2016-2020

ASSESSMENT AND STRATEGIES FY 2016 – FY 2020

Prepared in accordance with:

COASTAL ZONE MANAGEMENT ACT SECTION 309

PUERTO RICO COASTAL ZONE MANAGEMENT PROGRAM
DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES

VERSION 31 AUG 2015

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1 introduction

The following Assessment and Strategy was developed pursuant to Section 309 of the Coastal Zone Management Act (CZMA)[1]. The document is structured to conform to CZMA Section 309 Program Enhancement Guidance[2] issued by NOAA Office of Ocean and Coastal Resources Management (OCRM) covering the period FY2016-2020.

The Puerto Rico Coastal Zone Management Program (PRCZMP) 309 Assessment is based on information generated at the Puerto Rico Department of Natural and Environmental Resource's (DNER) Coastal Management Office or provided by Federal and Commonwealth agencies, municipalities, as well as information provided by the public. The assessment summarizes trends and current status of resources pertaining to the priority enhancement areas identified for Puerto Rico.

The PRCZMP 309 Strategies were developed for the selected priority areas in coordination with PRCZMP partners. The strategies integrate initiatives to promote increased cooperation among Federal and Commonwealth agencies in order to maximize the value of the investment of 309 funds. This introduction summarizes how the assessment and program enhancement strategies were developed and reviewed. A summary of the stakeholder perspectives survey and public comments, including how they were addressed, is provided under Appendix A.

This version is the final as of August 31, 2015 and incorporates revisions based on NOAA OCRM comments from the March 31, 2015 draft PRCZMP 309 Assessment and Strategy. The Coastal Management Office (CMO) will publish the final NOAA-approved document.

Conformance to OCRM Guidance

In June 2014, NOAA/OCRM issued the final draft guidance for the Section 309 Program which considerably streamlines the Assessment and Strategy. This document has adhered as closely as possible to those guidelines.

The Strategy covers the five year period FY 2016– FY 2020. It is understood that OCRM's acceptance of the Assessment and Strategy is an eligibility requirement for receiving new Section 309 funding beginning in FY 2016.

[1] http://coast.noaa.gov/czm/act/
[2] http://coast.noaa.gov/czm/guidance/

The main body of the report is organized by program enhancement area. For the two priority program areas ---Wetlands and Coastal Hazards – the strategy sections follows the assessment. No strategies were developed for enhancement areas with a medium or low priority ranking.

Prior Cycle of Sec.309 Assessment and Strategy

In June 2011, DNER submitted an updated and revised Section 309 Assessment and Strategies to OCRM. In the intervening period between the 2011 submission and the present, coastal development trends have remained largely unchanged due to slow economic activity and a major contraction in the construction sector.

The economic downturn beginning in 2008 and continuing to the present has brought a halt to most new building development in both the private and public sectors. Puerto Rico's macroeconomic indicators reflect that the Commonwealth's economy is centered on high value-added services and manufacturing. During 2013, the gross domestic product was nearly $67 billion, with a GDP per capita of over $24,000. The Gross National Product was 62.8 billion. As of February 2010, the labor force was around 1.3 million strong, of which 1.1 million were employed. Mean household income was over $28,000 (Source: Government Development Bank).

According to the Government Development Bank, the Puerto Rico GDP composition by sector (2013) is distributed as follows: Manufacturing, 45.5%; finance, insurance and real estate, 19%; services, 12.8%; government, 9.7%; trade, 7.8%; transportation and other public utilities, 3.2%; construction and mining, 1.9%; and agriculture, 0.7%.

As in 2009, statistics in 2015 reflect a major contraction in the construction and transportation sectors. While planning, project design and permitting processes for future coastal development are continuing, only a few construction projects are actively underway. Budgetary constraints and employment reductions have likewise moderated governmental activities with respect to public works and new program initiatives.

Proposed Section 309 program activities are consistent with inputs received from key Commonwealth and federal agencies. These include the Puerto Rico Planning Board, Department of Recreation and Sports, National Parks Company, Environmental Quality Board, U.S. Fish and Wildlife Service, U.S. Forest Service, International Institute of Tropical Forestry, National Marine Fisheries Service, the Natural Resources Conservation Service, the Caribbean Landscape Conservation Cooperative, and the Caribbean Regional Ocean Partnership. Results from a PRCZMP survey designed to obtain public and stakeholder comment on 309 program priorities were integrated into a March 2015 draft Assessment and Strategy document in order to develop this final document (Appendix A). The three highest priority areas as identified through consultations with key Commonwealth and federal agencies and survey results were Coastal Hazards and Coastal

Habitats, Wetlands, and Public Access followed by Marine Debris, Ocean Resources, Aquaculture, Energy Facility Siting, Special Planning Areas and Cumulative Impact Analysis.

2 summary of recent section 209 achievements

A number of **ACCOMPLISHMENTS** were achieved by the PRCZMP since 2011. This section highlights some of the accomplishments under the PRCZMP public access, wetlands and coastal hazards strategies.

Public Access

PRCZMP completed the Puerto Rico Coastal Areas Public Access Master Plan. This document, published in 2013, updates and reviews the previous Master Plan for Beach Access developed during the 1980s. It is not currently available online, only in print format distributed by PRDNER. Segments of the plan were distributed to the 44 coastal municipalities. The PRCZMP provided technical support to improve access to various coastal municipalities that signed cooperation agreements with the PRDNER (Six have currently been signed). However, all of the municipalities received their segments of the public access guides. During 2015, the PRCZMP convened the first encounter of coastal municipalities where coastal access was identified as one of the key priorities.

Public Access Accomplishments since 2011

- PRCZMP completed the Puerto Rico Coastal Areas Public Access Master Plan
- The PRCZMP was designated as the Executive Secretariat of the Interagency Beach Management Board
- PRCZMP completed the Puerto Rico Beach Conservation and Maintenance Plan

PRCZMP completed the Puerto Rico Beach Conservation and Maintenance Plan. This comprehensive document was developed and completed in 2014 and presented to the Puerto Rico *Interagency Beach Management Board*, of which the PRCZMP is the executive secretariat and the Secretary of PRDNER the Chair as of 2013. The document is only available in printed format. Marine debris and solid waste management at beaches has been identified as a priority concern for coastal municipalities at the first encounter of coastal municipalities. PRDNER has established a "Green Stations" project to promote recycling and zero waste beaches by installing green stations at select beaches. There are currently ten of such projects island-wide. The PRCZMP, based on the recommendations listed in the Beach Conservation and Maintenance Plan, is moving to support outreach and education campaigns to shift away from providing support to maintenance brigades and invest more in extension services to the municipal governments, outreach and education, to reduce solid waste generation at Puerto Rico's beaches.

Wetlands

The PRCZMP, using the draft national wetlands inventory for PR, *completed the Puerto Rico Coastal Wetlands Atlas* using the cadastral information from PR Municipal Revenue Commission that identified wetlands in public or private tenure. Publicly owned wetlands were either designated as natural reserves by PRDNER or were administered by the PR Land Authority. PRDNER subsequently identified those wetlands owned by the PR Land Authority that were not actively farmed and initiated a process to formally request transfer of the lands and to designate as natural reserves. This has been a highly contentious process that is still on-going.

PRCZMP completed the draft guidelines for submerged lands zoning. During the 2011-2015 cycle, PRCZMP developed draft submerged lands zoning maps. Using the NOAA Benthic Maps and expert knowledge, draft priority conservation polygons and zoning recommendations were made. Recent initiatives conducted through the Caribbean Regional Ocean Partnership, the Caribbean Fisheries Management Council, Caribbean Integrated Coastal and Ocean Observing Systems, NOAA NCOS-Biogeography Program, as well human uses participatory mapping (Cabo Rojo, Luquillo, Fajardo, Culebra, Vieques) provide new inputs to improve coastal and marine spatial planning in Puerto Rico. New decision support tools such as MARXAN are being used to improve marine planning and management in Puerto Rico. Some of this information is already available at www.caribbean-mp.org and will continue to be updated in the near future.

Other accomplishments since 2011 include:

- PRCZMP prepared the draft zoning for submerged lands of the Southeast of Puerto Rico. This document was submitted to PRPB for evaluation and adoption as part of the Island-wide Land Use Pan.
- Governor of Puerto Rico issued Executive Order 2008-53 creating the Interagency Wetlands Committee.
- PRCZMP completed the inventory of coastal geomorphic features, coastal habitats and wetlands.
- DNER and the USACE signed a Memorandum of Understanding to develop a method to assess the condition of the Antilles Wetlands. PRCZMP leads the development of the method to assess wetlands condition in Puerto Rico as part of a project funded by the USEPA. The project identified 8 wetland classes and will establish 24 permanent wetlands reference sites which PRCZMP-CMD is recommending as potential sentinel sites to assess climate change vulnerability using the first assessments as baseline conditions to support long-term studies. PRCZMP also recommended to the USEPA and EQB the use of the 24 reference sites as permanent monitoring stations for water quality

Wetlands Accomplishments since 2011

- PRCZMP completed the atlas of coastal wetlands and wetlands land tenure.
- PRCZMP completed the draft guidelines for submerged lands zoning.
- PRCZMP prepared the draft zoning for submerged lands of the Southeast of Puerto Rico. This document was submitted to PRPB for evaluation and adoption as part of the Island-wide Land Use Pan.

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Coastal Hazards

Coastal Hazard accomplishments since 2011 are:

- PRCZMP completed the evaluation of coastal features functions as non-structural forms of coastal hazards mitigation.
- PRCZMP supported the collection of aerial photography that were used to model a 1 meter sea level rise scenario.
- PRCZMP identified critical infrastructure of the metropolitan area vulnerable to a 1 meter sea level rise.
- PRCZMP evaluated coastal areas that would be potentially affected by sea level rise.
- PRCZMP and the UPR-CariCOOS modelers identified a problem of accuracy associated to the lack of enhanced elevation data for Puerto Rico. NOAA National Geodetic Survey addressed this issue and completed the development of the new Puerto Rico Vertical Datum 2002. http://www.ngs.noaa.gov/datums/vertical/
- Based on the corrected LiDAR PRCZMP, CariCOOS, and the UPR- Marine Sciences Department commissioned and completed the higher accuracy inundation projections are completed, PRCZMP can use Maximum of Maximums (MOM) inundation lines and reassess vulnerable areas . These products are available at: pr-ccc.org
- Governor of Puerto Rico created the Puerto Rico Advisory Committee via Executive Order.2008-09.
- PRCZMP Director and NOAA Coastal fellow led the development of the first "State of the Puerto Rico Climate Report (2010-2013)". This reports assesses Puerto Rico's socio-ecological vulnerabilities, as well as potential effects and impacts of climate change on coastal communities, critical infrastructure, and biodiversity.
- Governor of Puerto Rico established the mandate that all infrastructure agencies develop vulnerability assessments and adaptation plans based on the PRCCC "State of the Puerto Rico Climate 2010-2013" report via Executive Order 2013-016

Coastal Hazards Accomplishments since 2011

- PRCZMP completed the evaluation of coastal features functions as non-structural forms of coastal hazards mitigation.
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- PRCZMP and the UPR-CariCOOS modelers identified a problem of accuracy associated to the lack of enhanced elevation data for Puerto Rico. NOAA National Geodetic Survey addressed this issue and completed the development of the new Puerto Rico Vertical Datum 2002.
- PRCZMP, CariCOOS, and the UPR-Marine Sciences Department commissioned and completed the higher accuracy inundation projections
- PRCZMP Director and NOAA Coastal Management Fellow led the development of the Puerto Rico Climate Change Council and the completion of the first island-wide vulnerability assessment to climate change, "State of the Climate 2010-2013: Assessing Puerto Rico's Social-Ecological Vulnerabilities in a Changing Climate"
- Governor of Puerto Rico established the mandate that all infrastructure agencies develop vulnerability assessments and adaptation plans based on the PRCCC "State of the Climate 2010-2013" report via Executive Order 2013-016

3 program enhancement assessments

1.1 Wetlands Assessment

S309 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. 17 of the CZMA Performance Measurement Guidance for a more in-depth discussion of what should be considered a wetland.*

Resource Characterization

1. Using provided reports from NOAA's Land Cover Atlas or high-resolution C-CAP data (Pacific and Caribbean Islands only), please indicate the extent, status, and trends of wetlands in the state's coastal counties. You can provide additional or alternative information or use graphs or other visuals to help illustrate or replace the table entirely if better data are available. Note that the data available for the islands may be for a different time frame than the time periods reflected below. In that case, please specify the time period the data represents. Also note that Puerto Rico and the Commonwealth of the Northern Mariana Islands (CNMI) currently only have data for one time point so will not be able to report trend data. Instead, Puerto Rico and CNMI should just report current land use cover for all wetlands and each wetlands type.

Coastal Wetlands Status and Trends		
Current state of wetlands in 2011 (acres)	**244,293,624.84538 m² /60,366.28 acres ** (Freshwater: 48,677,303.35 m²; Saltwater: 195,446,941.598712 m²)**	
Percent net change in total wetlands (% gained or lost)*	from 1996-2011	from 2006-2011
	N/A for PR	N/A for PR
	from 1996-2011	from 2006-2011

Percent net change in freshwater (palustrine wetlands) (% gained or lost)*	N/A for PR	N/A for PR
Percent net change in saltwater (estuarine) wetlands (% gained or lost)*	from 1996-2011	from 2006-2011
	N/A for PR	N/A for PR

**CZMP/Dragoni (2013) Datos de esto 2007-2010

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 coastal wetlands since the last assessment to augment the national data sets.

Total wetlands acreage from the inventory maps is 217,118.00 acres. Relevant information on the extent of protected wetlands in Puerto Rico before 2006 is included in the table. Actually, a total of 61,233.98 acres (29036.18 acres, 48.1%)** of wetlands are protected by federal and local government designations. The remaining 152,933.96 wetlands acreage is distributed along private properties, altered wetlands, or wetlands remaining in their natural condition. In order to make informed policy recommendations for other coastal regions, comprehensive data for specific coastal sub regions is needed.

Table 2: Coastal habitats protected by federal and local government designations

Designation	Estuarine (acres)	Lacustrine (acres)	Marine (acres)	Palustrine (acres)	Riverine (acres)	
State Forest	7474.57	0	413.67	447.86		0
State Forest- Buffer zone	15.60	0	.33	0		0
Marine Reserve	49.01	0	96.16	447.83		0
National Estuarine Research Reserve	1244.29	0	9.26	161.59		0
Natural Reserve	769.09	0	26.19	1169.61	7.22	
Natural Reserve- Buffer zone	0	0	0	0		0
Natural Reserve- Marine Extension	2437.50	0	1718.67	0		0
Wild Life Refuge	578.59	31	0	1.11		0
Conservation Trust of Puerto Rico	3363.25	0	17215.31	862.95	11.65	
US Fish and Wildlife Service	2545,56	0	317.51	.03		0
*DNER acquired properties (2)	2138.50	0	40.83	291.10		0
TOTAL	**25,496.01**	**31**	**35,306.03**	**3,382.13**	**18.87**	

* To be designated

Management Characterization

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

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

Enhancement Area Prioritization

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

High X

Medium __

Low __

2. Justification for priority ranking

Wetlands provide coastal protection:

Wetlands as well as reef systems represent an essential, low cost means of providing natural, low- impact infrastructure to minimize loss of life and property damage from climate change and sea level rise. Coastal and intertidal wetlands together with reef systems and other marine ecosystems offer the first line of defense against inland flooding from storm surge and hurricane driven waves from severe weather events.

Need to counter continuing threats to marine ecosystems:

Maintenance dredging of ports and marina facilities, ship groundings, laying of submarine cables, bad anchoring practices and commercial and recreational fisheries

activities continue to pose significant threats to marine ecosystems along the coastal perimeter and in submerged lands within PR territorial waters.

Wetlands protect coastal water quality:

Wetlands and marine vegetation filter sediments and other pollutants originating in upland areas and draining to the sea through nonpoint source runoff and through river and stream flow. The destruction of these critical ecosystems represents an increased threat to coastal water quality.

Stakeholder and Public Input

Results of the stakeholder perceptions study (Appendix A) and input from numerous public meetings (Appendix A) demonstrate that stakeholders greatly prioritize wetlands management when compared to the other enhancement areas (coastal hazards was prioritized first though comments from respondents show that they see clear connections between healthy wetlands and safe communities).

In-Depth Resource Characterization: WETLANDS

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

1. What are the three most significant existing or emerging physical stressors or threats to wetlands within the coastal zone? Indicate the geographic scope of the stressor, i.e., is it prevalent throughout the coastal zone or specific areas that are most threatened? Stressors can be development/fill; hydrological alteration/channelization; erosion; pollution; invasive species; freshwater input; sea level rise/Great Lake level change; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.

	Stressor/Threat	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Stressor 1	Development/Fill	Extensive
Stressor 2	Alteration of hydrology	No systematic locational data available but known to occur in some agricultural areas adjacent to wetlands
Stressor 3	Erosion	Limited
Stressor 4	Pollution	Extensive
Stressor 5	Channelization	Extensive in riverine areas
Stressor 6	Nuisance or exotic species	No systematic data
Stressor 7	Freshwater input	No systematic location data but occurring in some agricultural areas adjacent to wetlands
Stressor 8	Sea level rise	Extensive along the entire coastal perimeter
Stressor 9	Other (see notes below)	Extensive damage to submerged lands from multiple sources

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

Sea level rise

Projected mean sea level rise for the north coast of PR has been calculated to average 2.8mm/yr, and 3.1 mm/yr for the south coast. The sea level trends are based on records from 1993 to 2015 from La Puntilla (San Juan) and Magueyes Island (Lajas) tide gauges. Using these projections, salinity impacts on selected estuaries and coastal freshwater habitats were forecast. A verified

increase in salinity of a coastal lagoon was recorded in the Humacao Natural Reserve[3]. DNER, in coordination with the USGS, Environmental Quality Board, San Juan Bay National Estuary Program, and university researchers, are continuing to monitor sea level rise in coastal waters.

While the threats resulting from sea level rise are not readily apparent, the long term implications of climate change and global warming are predicted to significantly raise sea level elevations in the coming decades. This is a recognized threat to ocean islands worldwide. Given the concentration of Puerto Rico's population, infrastructure, and economic activity in the coastal zone, the submerged lands, intertidal wetlands, and reef systems, in addition to their ecological value, play a vital function in providing the "soft infrastructure" that protects life and property by buffering inland areas from the impacts of storm surge and other coastal hazards.

Other

Port and marina maintenance, dredging, ship groundings, laying of submarine fiber optic cables, increased demand of boating activities, poor anchoring practices and commercial and recreational fisheries activities, pose growing threats to marine ecosystems. Today they represent only a few of existing multiple ocean uses

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
Stressor 8: sea level rise	Sea level rise is an emerging issue as previously stated and while the program has contributed to knowledge about potential effects and impacts on wetlands, more information is needed for management, such as wetland accretion and advancement potentials.

[3] Colón-Rivera et al. 2014. Hydrological modification, saltwater intrusion, and tree water use of a *Pterocarpus officinalis* swamp in Puerto Rico. Journal of Estuarine, Coastal and Shelf Science 147: 156-167. http://www.academia.edu/7819185/Hydrological_modification_saltwater_intrusion_and_tree_water_use_of_a_Pterocarpus_officinalis_swamp_in_Puerto_Rico.

In-Depth Management Characterization: WETLANDS

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

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

Management Category	**Employed By State or Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Wetland assessment methodologies	Y (In-progress: Antilles Wetland Condition Rapid Assessment)	Y	Y (Antilles Wetland Condition Rapid Assessment; long-term monitoring program development)
Wetland mapping and GIS	Y	Y	Y (2013 Updated inventory of coastal habitats and geomorphic features)
Watershed or special area management plans addressing wetlands	Y	Y	N
Wetland technical assistance, education, and outreach	Y	Y	N
Other (please specify)			

2. For management categories with significant changes since the last assessment, 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 significant changes since the last assessment;

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

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

Antilles Wetland Condition Rapid Assessment: The PRCZMP has initiated the development of a rapid assessment framework to evaluate the ecological condition of wetlands and their associated riparian areas throughout Puerto Rico. The Antilles Wetland Condition Rapid Assessment Method is currently being developed through an agreement with the U.S. Army Corps of Engineers and funding from the U.S. Environmental Protection Agency to support on-going efforts to promote effective management and protection of the state's wetland resources. The overarching goal is to provide the necessary information to help prevent the continued loss and decline of Puerto Rico's scarce and important wetland resources and support regulatory agencies' decision making processes.

2013 Updated Inventory of Coastal Habitats and Geomorphic Features: PRDNER through the PRCZMP financed the delineation of the ecosystems, habitats and geomorphic features of Puerto Rico in support of the process to delineate the Maritime Terrestrial Zone, the coastal public trust lands. Among other intertidal wetlands, marshes, estuaries, salt flats, identified consistent with Regulation 4860, Artícule 3.3.A.

3. Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's or territory's management efforts in protecting, restoring, and enhancing coastal wetlands since the last assessment. **If none, is there any information that you are lacking to assess the effectiveness of the state's or territory's management efforts?**

The Commonwealth is currently lacking baseline characterizations of wetlands that could be used to compare the before and after conditions once restoration or enhancement projects are implemented. Additionally, Puerto Rico also lacks island-wide wetland migration studies to determine potential effects from sea level rise, such as wetland type conversion due to increases in salinity. Site-specific studies have been conducted by the U.S. Fish and Wildlife Service using SLAMM (Sea Level Marsh Migration Modeling) in two refuges on the South Coast but other studies are not known at this time.

Identification of Priorities:

1. Considering changes in wetlands and wetland management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively respond to significant wetlands stressors. *(Approximately 1-3 sentences per management priority.)*

Management Priority 1: *Promote the conservation of wetlands through sustainable development activities.*

Description: Land use planning at both the island-wide and municipal levels coupled with effective implementation of existing regulations should greatly contribute to wetlands protection in the short-term. Ecosystem-based adaptation (EbA), or other nature-based methods, and a better understanding of potential effects and impacts of sea level rise and climate change on wetlands in the long-term should also be integrated into zoning regulations as the best available scientific information becomes available.

Management Priority 2: *Improve interagency and multi-partner coordination including the coordination of the implementation of erosion and sediment control requirements by the Puerto Rico Planning Board and Environmental Quality Board.*

Description: Through improved interagency and multi-partner coordination Puerto Rico could fill the knowledge gaps and conduct baseline characterizations of wetlands that could be used to compare the before and after conditions once restoration or enhancement projects are implemented. This coordination could also address the lack of island-wide wetland migration studies by financing appropriate studies to determine potential effects from sea level rise, such as wetland type conversion due to increases in salinity.

Management Priority 3: *Development of wetland restoration strategies and monitoring plans*

Description: Based on the updated Coastal Habitats and Geomorphic Features Inventory (2013), the PRCZMP could recommend target areas and priorities for wetland restoration and enhancement (i.e., Guanica Lagoon Restoration Project supported by the US Coral Reef Task Force as part of their Watershed Stewardship Initiative).

2. Identify and briefly explain priority needs and information gaps the CMP has to help it address the management priorities identified above. The needs and gaps identified here do not need to 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	Cost benefit assessment of restoration methods and options for wetlands and related ecosystems. Better understanding of ecosystem services provided by wetlands as part of social-ecological systems.
Mapping/GIS	Y	Wetland habitat characteristics and conditions. In order to make informed policy recommendations and develop multilayered strategic zoning districts for other coastal regions, comprehensive data for specific coastal sub regions is needed. Identification of vulnerable wetlands and coastal communities.
Data and information management	Y	Baseline characterizations of wetlands that could be used to compare the before and after conditions once restoration or enhancement projects are implemented. Island-wide wetland migration studies to determine potential effects from sea level rise, such as wetland type conversion due to increases in salinity.
Training/capacity building	Y	Training for rangers to identify and report violations.
Decision-support tools	Y	Comprehensive plan for the management and restoration of coastal wetlands (validation in-progress). Identify potential, feasible mechanisms. Develop guidelines considering institutional issues with respect to agency roles and responsibilities for wetland protection, restoration and mitigation. Outputs from the plan will provide: an updated inventory of coastal wetlands (more complete than 1978 federal inventory (still currently under review), current and potential sustainable uses of coastal wetland resources, identification of conflicts or incompatible uses of wetland

		resources, and identification of those wetlands that are providing ecosystem services such as protecting coastal communities and critical infrastructure from inundation. These outputs could be integrated into the Puerto Rico/Caribbean MSP Region Plan Draft and the Coastal Hazard Management Program.
Communication and outreach	N	In previous assessment is was mentioned how DNER consolidated its public education and community outreach resources under an Assistant Secretariat for Information and Education. While some outreach activities will be undertaken, similar to those performed in the 2006-2010 and 2011-2015 program cycles, the preponderance of this work will be conducted and/or coordinated through the 306 program.
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.

Yes, a strategy will be developed as a response to short and long-term needs and acute and chronic stressors affecting Puerto Rico's wetlands. There is an increasing recognition of the importance of wetland assets to increase coastal communities' resilience, this is consistent with survey results (Appendix A), therefore the PRCZMP is using an integrated approach of ecosystem services, protection of natural infrastructure, and the promotion of nature-based infrastructure methods.

1.2 Coastal Hazards Assessment

S309 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.*

Resource Characterization

1. **Flooding:** Using data from *NOAA's State of the Coast* "Population in the Floodplain" viewer[4] and summarized by coastal county through NOAA's Coastal County Snapshots for Flood Exposure,[5] indicate how many people were located within the state's coastal floodplain as of 2010 and how that has changed since 2000. You may to use other information or graphs or other visuals to help illustrate.

Population in the Coastal Floodplain			
	2000	**2010**	**Percent Change from 2000-2010**
No. of people in coastal floodplain[6]	1, 460, 240[5]	1, 435, 865[5]	-1.7%
No. of people in coastal counties[7]	2,412,486	2,317,189	-3.95%
Percentage of people in coastal counties in coastal floodplain	60.5%	62.0%	----------

Other relevant information: 297,098 families live below the poverty level and live in the floodplain with a $18,342-household mean income living in floodplain.

Populations living in floodplains: 15% 65 years or older 26% under 18 years. 6,053 people living in storm surge risk areas.

[4] http://stateofthecoast.noaa.gov/pop100yr/welcome.html. Note FEMA is in the process of updating the floodplain data. This viewer reflects floodplains as of 2010. If you know the floodplain for your state has been revised since 2010, you can either use data for your new boundary, if available, or include a short narrative acknowledging the floodplain has changed and generally characterizing how it has changed.

[5] www.csc.noaa.gov/digitalcoast/tools/snapshots

[6] To obtain exact population numbers for the coastal floodplain, download the Excel data file on the State of the Coast "Population in the Floodplain" viewer: http://stateofthecoast.noaa.gov/pop100yr/welcome.html. Summary population data for each coastal state is available on the ftp site.

[7] To obtain population numbers for coastal counties, see spreadsheet of coastal population and critical facilities data provided or download directly from http://www.csc.noaa.gov/digitalcoast/data/stics. Summary population data for each coastal state is available on the ftp site.

2. **Shoreline Erosion** (for all states other than Great Lakes and islands; for Great Lakes and islands, see Question 5): Using data from *NOAA's State of the Coast* "Coastal Vulnerability Index,"[8] indicate the vulnerability of the state's shoreline to erosion. You may use other information or graphs or other visuals to help illustrate or replace the table entirely if better data is available. *Note: For New York and Pennsylvania that have both Atlantic and Great Lakes shorelines, fill out the table below for the Atlantic shoreline only.*

Vulnerability to Shoreline Erosion		
Vulnerability Ranking	**Miles of Shoreline Vulnerable**[11]	**Percent of Coastline**[9]
Very low (>2.0m/yr) accretion	N/A**	N/A**
Low (1.0-2.0 m/yr) accretion)	N/A**	N/A**
Moderate (-1.0 to 1.0 m/yr) stable	N/A**	N/A**
High (-1.1 to -2.0 m/yr) erosion	N/A**	N/A**
Very high (<-2.0 m/yr) erosion	N/A**	N/A**

**This information is currently unavailable for Puerto Rico and is one of the needs we are continuously working to fill. Currently the program has more information than ever before to calculate these numbers but has yet to develop a Puerto Rico Coastal Vulnerability Index to combine all the new available data. This need will be addressed in the 2016-2020 Coastal Hazards Strategy. The newly available information from last cycle where this quantitative vulnerability assessment will be based off is the Puerto Rico Sea Level and Storm Surge Atlas (2014), the updated Coastal Habitats and Geomorphic Features Inventory (2013) as well as the recently updated Puerto Rico Beach Inventory (2015).[10]

[8] http://stateofthecoast.noaa.gov/vulnerability/welcome.html (see specifically "Erosion Rate" drop-down on map). The State of the Coast visually displays the data from USGS's Coastal Vulnerability Index.

[9] To obtain exact shoreline miles and percent of coastline, mouse over the colored bar for each level of risk or download the Excel data file.

[10] Study by Dr. Maritza Barreto, UPR Rio Piedras

3. **Sea Level Rise** (for all states other than Great Lakes and islands; for Great Lakes and islands, see Question 5): Using data from *NOAA's State of the Coast* "Coastal Vulnerability Index",[11] indicate the vulnerability of the state's shoreline to sea level rise. You may provide other information or use graphs or other visuals to help illustrate or replace table entirely if better data is available. *Note: For New York and Pennsylvania that have both Atlantic and Great Lakes shorelines, fill out the table below for your Atlantic shoreline only.*

Coastal Vulnerability to Historic Sea Level Rise		
Vulnerability Ranking	**Miles of Shoreline Vulnerable**[11]	**Percent of Coastline**
Very low	N/A**	N/A**
Low	N/A**	N/A**
Moderate	N/A**	N/A**
High	N/A**	N/A**
Very high	N/A**	N/A**

**This information is currently unavailable for Puerto Rico and is one of the needs we are continuously working to fill. Currently the program has more information than ever before to calculate these numbers but has yet to develop a Puerto Rico Coastal Vulnerability Index to combine all the new available data. This need will be addressed in the 2016-2020 Coastal Hazards Strategy. The newly available information from last cycle where this quantitative vulnerability assessment will be based off is the Puerto Rico Sea Level and Storm Surge Atlas (2014), the updated Coastal Habitats and Geomorphic Features Inventory (2013) as well as the recently updated Puerto Rico Beach Inventory (2015).[12]

[11] http://stateofthecoast.noaa.gov/vulnerability/welcome.html (see "Vulnerability Index Rating" drop-down on map). The State of the Coast visually displays the data from USGS's Coastal Vulnerability Index.

[12] Study by Dr. Maritza Barreto, UPR Rio Piedras

4. **Other Coastal Hazards:** In the table below, indicate the general level of risk in the coastal zone for each of the coastal hazards. The state's multi-hazard mitigation plan is a good additional resource to support these responses.

Type of Hazard	General Level of Risk[13] (H, M, L)
Flooding (riverine, stormwater)	N/A**
Coastal storms (including storm surge)[14]	N/A**
Geological hazards (e.g., tsunamis, earthquakes)	N/A**
Shoreline erosion[15]	N/A**
Sea level rise[13,14,15]	N/A**
Great Lake level change[14]	N/A**
Land subsidence	N/A**
Saltwater intrusion	N/A**
Other (please specify)	N/A**

**This information is currently unavailable for Puerto Rico and is one of the needs we are continuously working to fill. Currently the program has more information than ever before to calculate these numbers but has yet to develop a Puerto Rico Coastal Vulnerability Index to combine all the new available data. This need will be addressed in the 2016-2020 Coastal Hazards Strategy. The newly available information from last cycle where this quantitative vulnerability assessment will be based off is the Puerto Rico Sea Level and Storm Surge Atlas (2014), the updated Coastal Habitats and Geomorphic Features Inventory (2013) as well as the recently updated Puerto Rico Beach Inventory (2015).[16]

[13] 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*

[14] In addition to any state- or territory-specific information that may help respond to this question, the U.S. Global Change Research Program has an interactive website that provides key findings from the 2014 National Climate Assessment for each region of the country, including regions for the coasts and oceans, and various sectors. The report includes findings related to coastal storms and sea level rise that may be helpful in determining the general level of risk. See http://nca2014.globalchange.gov/.

[15] See NOAA State of the Coastal Vulnerability to Sea Level Rise Tool (select "Erosion Rate" from drop-down box) http://stateofthecoast.noaa.gov/vulnerability/welcome.html. The State of the Coast visually displays the data from USGS's Coastal Vulnerability Index.

[16] Study by Dr. Maritza Barreto, UPR Rio Piedras

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-hazard mitigation plan or climate change risk assessment or plan may be a good resource to help respond to this question.

In the last cycle we completely Puerto Rico's first island-wide vulnerability assessment to climate change, State of the Puerto Rico Climate 2010-2013 (available at pr-ccc.org). The report concluded:

> *Temperatures are increasing, precipitation patterns are changing, extreme events are occurring more frequently, oceans are more acidic, and sea level is rising. These climatic changes are projected to occur at much faster than natural rates. Some types of extreme weather and climate events have already increased in frequency and intensity and these changes are projected to continue. Climate changes are already affecting some aspects of society, the economy and natural ecosystems of Puerto Rico and these effects are expected to increase. Not all of these changes will be gradual. When certain tipping points are crossed, impacts can increase dramatically. Past climate is no longer a reliable guide to the future. This affects planning for public and private infrastructure, tourism and industry, water resources, energy and all other social and economic systems. In response to these changes, the Puerto Rico Climate Change Council (PRCCC) was convened in November 2010 to assess Puerto Rico's vulnerabilities and recommend strategies to respond to changes. The PRCCC is comprised of four working groups: (WG1) Geophysical and Chemical Scientific Knowledge; (WG2) Ecology and Biodiversity; (WG3) Society and Economy; and (WG4) Communicating Climate Change and Coastal Hazards.* ***Based on the results of PRCCC's WG1, WG2 and WG3 as well as the results of coastal hazards risk assessment workshops conducted with thirty of the forty-four coastal municipalities, the PRCCC concludes that Puerto Rico's climate is changing and coastal communities of Puerto Rico, critical infrastructure, wildlife and ecosystems are all vulnerable to various impacts associated with changes in global, regional, and island weather and oceanographic conditions*** *(PRCCC 2013: 307[17]).*

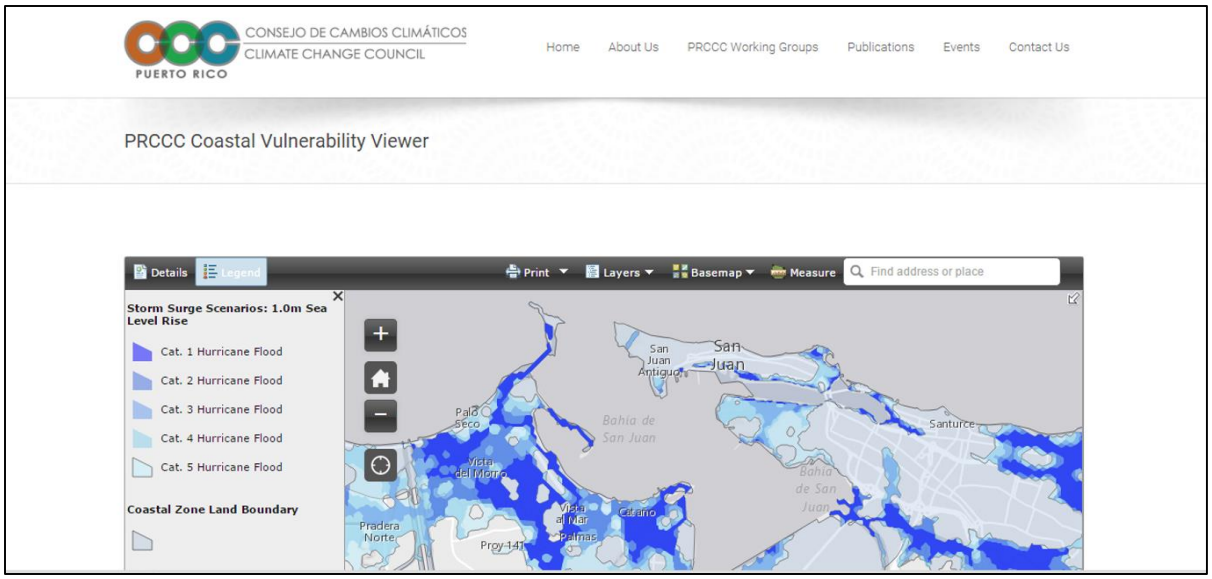
Specific to sea level rise, the State of the Climate report found that tide gauge records from Isla Magueyes (south coast of PR) and from San Juan (north coast of PR) contain the longest sea level time series in the U.S. Caribbean. 56.7 years of monthly mean sea level for Isla Magueyes and 49.4 years for San Juan were analyzed. Three analysis were conducted for the PRCCC: (1) Dr. Jorge Capella with UP-R's CariCOOS; (2) UPR Professor Aurelio Mercado; (3) UPR's Dr. Mark Jury. All three studies show sea level rise trends for Puerto Rico. Analyses of Puerto Rico's tide gauges show a rise of at least 1.4 mm/year, which is expected to continue and possibly will accelerate. These accelerations are in accord with satellite data (since 1993) though not to the same magnitude of up to 6mm/year sea level rise as seen from 1970-2009 in the northeast hotspot for sea level rise in the Northeast of the continental United States. As a result of the

[17] Puerto Rico Climate Change Council (PRCCC). 2013. Puerto Rico's State of the Climate 2010-2013: Assessing Puerto Rico's Social-Ecological Vulnerabilities in a Changing Climate. Puerto Rico Coastal Zone Management Program, Department of Natural and Environmental Resources, NOAA Office of Ocean and Coastal Resource Management. San Juan, PR. http://pr-ccc.org/download/PR%20State%20of%20the%20Climate-FINAL_ENE2015.pdf

already observed sea level rise as well as weak shoreline management practices, coastal erosion is causing a retreat of the coastline of up to one meter per year (1.0 m/yr) in some sectors of Puerto Rico, such as Rincón, according to a USGS report that considered sequences of past aerial photos.

As mentioned all new data sources since the last assessment will be analyzed more quantitatively and spatially in this next cycle (2016-2020), however, resources are already available to visualize projected sea level rise in Puerto Rico through the PRCCC Data Portal "The Puerto Rico Coastal Vulnerability Viewer" at www.pr-ccc.org. Here is an example of how a user would view the city of San Juan's inundation areas from storm surge by hurricane categories 1-5 with a 1 meter sea level rise.

Figure 1 PRCCC Coastal Vulnerability Viewer (Data Source: Puerto Rico Sea Level and Storm Surge Atlas (2014))



Management Characterization

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

Management Category	**Employed by State or Territory** (Y or N)	**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 that address:			
elimination of development/redevelopment in high-hazard areas[18]	Y	Y	N
management of development/redevelopment in other hazard areas	Y	Y	N
climate change impacts, including sea level rise or Great Lake level change	Y	Y	Y (Executive Orders)
Hazards planning programs or initiatives that address:			
hazard mitigation	Y	Y	Y (Building Codes)
climate change impacts, including sea level rise or Great Lake level change	Y	Y	Y (Executive Orders)
Hazards mapping or modeling programs or initiatives for:			
sea level rise or Great Lake level change	Y	Y	Y
Storm surge	Y	Y	Y

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

High-hazard areas are defined in Puerto Rico's coastal zone by floodable areas, both by rivers and storms (coastal and riverine inundations), areas subject to coastal erosion and/or to geologic hazards (landslides).

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:

[18] Use 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.

There have been significant changes since the last assessment.

The Caribbean Regional Association (CaRA) and the University of Puerto Rico – Mayaguez had jointly established the Alliance for Numerical Modeling and Coastal Forecast before the last assessment. The PRCZMP contracted the Alliance to perform Coastal Zone inundation modeling using ADCIRC, SWAN and COULWAVE for all storm categories (1-5) and since the last assessment contracted them to conduct sea level rise and storm surge modeling studies. This was partially funded through Section 309 funds. Additionally, the Alliance has improved their modeling of coastal winds, coastal waves, coastal currents, and offshore currents. These efforts are partially funded by non-309 funds of the CZMP. Collectively these studies developed the Puerto Rico Sea Level Rise and Storm Surge Atlas as a result of S309 strategy implementation in the last cycle.

As a result of S309 strategy implementation in the last cycle, the Governor of Puerto Rico issued two climate change-related executive orders that explicitly recognized the Puerto Rico State of the Climate 2010-2013 report. Executive Order 2013-016 establishes the mandate for infrastructure agencies to conduct climate change vulnerability assessments and develop adaptation plans. Executive Order 2013-015 mandates the completion of the island-wide land use plan and the integration of climate change adaptation.

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.

During recent decades there has been an increase in the demand for space in coastal lands to construct second homes and tourism related facilities. Many shoreline hardening structures, groins, and breakwaters affect littoral processes increasing vulnerability and coastal community's exposure to coastal hazards. Activities in the upper reaches of river basins also have an impact on erosion changing the sedimentation patterns in the coast by reducing sediment inputs into the system.

In Puerto Rico there are 8,431 hectares classified as coastal barriers, located principally in the southwest and northeast. These are fragile coastal areas and natural systems vulnerable to increasing sea level rise and exposure to storms, floods, and other natural hazards. Coastal hazard policies are an integral part of the PRCZMP. However, there is a need to further define specific policies and management strategies to address current and potential impacts associated with climate change, sea level rise, and associated coastal hazards in light of new knowledge and model projections.

Given the significant threat posed by coastal hazards and climate change and the resulting need for promoting community resiliency, as well as results from the Stakeholder Perceptions Survey (Appendix A) showing that coastal hazards ranked highest priority than any other topic, this enhancement area is considered a high priority.

In-Depth Resource Characterization: COASTAL HAZARDS

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

1a. **Flooding In-depth** (for all states besides territories): Using data from *NOAA's State of the Coast* "Population in the Floodplain" viewer[19] and summarized by coastal county through NOAA's Coastal County Snapshots for Flood Exposure,[20] indicate how many people at potentially elevated risk were located within the state's coastal floodplain as of 2010. These data only reflect two types of vulnerable populations. You can provide additional or alternative information or use graphs or other visuals to help illustrate or replace the table entirely if better data are available. *Note: National data are not available for territories. Territories can omit this question unless they have similar alternative data or include a brief qualitative narrative description as a substitute.*

2010 Populations in Coastal Counties at Potentially Elevated Risk to Coastal Flooding[21]				
	Under 5 and Over 65 years old		**In Poverty**	
	# of people	**% Under 5/Over 65**	**# of people**	**% in Poverty**
Inside Floodplain	*N/A***	*N/A***	*N/A**	*N/A**
Outside Floodplain	*N/A***	*N/A***	*N/A**	*N/A**

**This information is currently unavailable for Puerto Rico and is one of the needs we are continuously working to fill. Currently the program has more information than ever before to calculate these numbers but has yet to develop a Puerto Rico Coastal Vulnerability Index to combine all the new available data. This need will be addressed in the 2016-2020 Coastal Hazards Strategy. The newly available information from last cycle where this quantitative vulnerability assessment will be based off is the Puerto Rico Sea Level and Storm Surge Atlas (2014), the updated Coastal Habitats and Geomorphic Features Inventory (2013) as well as the recently updated Puerto Rico Beach Inventory (2015).[22]

1b. **Flooding In-depth** (for all states besides territories): Using summary data provided for critical facilities, derived from FEMA's HAZUS[23] and displayed by coastal county through

[19] http://stateofthecoast.noaa.gov/pop100yr/welcome.html

[20] http://www.csc.noaa.gov/digitalcoast/tools/snapshots

[21] To obtain exact population numbers for the coastal floodplain, download the excel data file from the State of the Coast's "Population in Floodplain" viewer.

[22] Study by Dr. Maritza Barreto, UPR Rio Piedras

[23] http://www.fema.gov/hazus; can also download data from NOAA STICS http://www.csc.noaa.gov/digitalcoast/data/stics. Summary data on critical facilities for each coastal state is available on the ftp site.

NOAA's Coastal County Snapshots for Flood Exposure,[24] indicate how many different establishments (businesses or employers) and critical facilities are located in the FEMA floodplain. You can provide more information or use graphs or other visuals to help illustrate or replace the table entirely if better information is available.

Critical Facilities in the FEMA Floodplain[44]						
	Schools	**Police Stations**	**Fire Stations**	**Emergency Centers***	**Medical Facilities**	**Communication Towers**
Inside Floodplain	370	30	2	33	60	16
Coastal Counties	1,327	67	6	240	185	110

*OGP 2009

2. Based on the characterization of coastal hazard risk, what are the three most significant coastal hazards[25] within the coastal zone? Also indicate the geographic scope of the hazard, i.e., is it prevalent throughout the coastal zone or are specific areas most at risk?

	Type of Hazard	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Hazard 1	Sea level rise	Coasts-wide
Hazard 2	Storm surge	Coasts-wide
Hazard 3	Erosion	Sub-regions
Hazard 4	Geological hazards (e.g., tsunamis and earthquakes)	Coasts-wide

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**
Sea Level Rise	Accurate NOAA-validated sea level rise projections; Accurate LiDAR bathytopo grid to model sea level rise projections and potential effects and impacts on coastal communities' assets, biodiversity and habitats.

In-Depth Management Characterization: COASTAL HAZARDS

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

[24] http://www.csc.noaa.gov/digitalcoast/tools/snapshots

[25] See list of coastal hazards at the beginning 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.

Management Category	**Employed by State/Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Change Since the Last Assessment** (Y or N)
Statutes, Regulations, and Policies:			
Shorefront setbacks/no build areas	Y	Y	N
Rolling easements	N	N	N
Repair/rebuilding restrictions	Y (<50% damages)	Y	N
Hard shoreline protection structure restrictions	N	N	N
Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)	Y	Y	Y (Dune stabilization/Dune Restoration projects)
Repair/replacement of shore protection structure restrictions	Y	Y	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	Y	N
Repetitive flood loss policies (e.g., relocation, buyouts)	Y	Y	Y (Insurance/Reinsurance Study, developed through S309 implementation)
Freeboard requirements	Y (FEMA-based)	N (PRPB yes)	N
Real estate sales disclosure requirements	N	N	N
Restrictions on publicly funded infrastructure	Y (Hud and other federal programs)	N	N
Infrastructure protection (e.g., considering hazards in siting and design)	N	N	N
Other (please specify)			
Management Planning Programs or Initiatives:			
Hazard mitigation plans	Y	Y	N

Sea level rise/Great Lake level change or climate change adaptation plans	Y	Y	Y (Executive Orders)
Statewide requirement for local post-disaster recovery planning	N	N	N
Sediment management plans	Y (Ongoing)	Y (Ongoing)	N
Beach nourishment plans	N	N	N
Special Area Management Plans (that address hazards issues)	Y	Y	N
Managed retreat plans	Y	Y	N
Other (Community-based Climate Adaptation Pilot Projects)	Y	Y	Y (On-going)
Research, Mapping, and Education Programs or Initiatives:			
General hazards mapping or modeling	Y	Y	Y
Sea level rise mapping or modeling	Y	Y	Y
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?

No specific studies have been conducted to assess the effectiveness of the state's management efforts regarding coastal hazards. However, the 2016-2020 S309 strategy proposes to assess the community-based climate adaptation planning processes conducted for five coastal municipalities during the previous S309 cycle (2011-2015).

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: Mapping and research efforts to fill critical knowledge gaps needed for risk and vulnerability reduction, planning, and implementation.

Description: Gaps to-be-filled include accurate NOAA-validated sea level rise projections; Accurate LiDAR bathytopo grid to model sea level rise projections and potential effects and impacts on coastal communities' assets, biodiversity and habitats. Additionally, updates are needed to the Puerto Rico State of the Climate report in order to have the quantitative and spatially explicit coastal vulnerability indices conducted and included and other relevant socio-economic information now that new information is available due to the work conducted in the last cycle. The results from these mapping and research efforts as well as the synthesis into the updated State of the Climate (and associated data portal) will be used by future community-based climate adaptation planning teams, by partners of the Puerto Rico Climate Change Council in their individual efforts in coastal management, as well as by the Puerto Rico Planning Board, the PRDNER Water Plan, the DNER Fish and Wildlife Division, the Puerto Rico Emergency Management Agency, the DNER Forest Division, and others who have to conduct climate assessments that include coastal resources. Additionally, the new information will be used to work towards the adoption of new or amended island-wide policies or municipal territorial ordainment plans (see the program changes described in Coastal Hazards Strategy).

Management Priority 2: Assessment of the effectiveness of the state's management efforts regarding coastal hazards.

Description: This strategy will propose to assess the community-based climate adaptation planning processes conducted for five coastal municipalities during the previous S309 cycle (2011-2015).

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	Accurate NOAA-validated sea level rise projections; Accurate LiDAR bathytopo grid to model sea level rise projections and potential effects and impacts on coastal communities' assets, biodiversity and habitats; social-ecological vulnerability studies; economic analyses; legal and institutional policy analysis; innovative nature-based strategies for adaptation
Mapping/GIS/modeling	Y	Critical facilities and other assets; vulnerable communities; vulnerable wetlands and other habitats
Data and information management	Y	Enhancement of data portals and visualization/analytical tools tailored to decision makers and other coastal manager needs (management priority 1, above)
Training/Capacity building	Y	To be developed in coordination with the Jobos Bay NERR Coastal Training Program
Decision-support tools	Y	Enhancement of data portals and visualization/analytical tools tailored to decision makers and other coastal manager needs (management priority 1, above)
Communication and outreach	Y	Specific needs are for municipalities and elected officials as well as the general public
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.

Yes, a strategy will be developed in order to increase Puerto Rico's capability to cope with current and future hazards in line with the findings with previously mentioned studies, principally the Puerto Rico State of the Climate Report 2010-2013 (www.pr-ccc.org) developed with the voluntary support of over 150 scientists, planners, architects, engineers, social scientists, and communicators. The top ranking coastal hazards received in the survey (Appendix A) and concerns by stakeholders and the public also elevate this strategy for the 2016-2020 period. Furthermore, the large lack of quantitative and spatially-explicit data available, particularly as related to coastal ecosystems like wetlands and socio-economic vulnerabilities as well as effectiveness of coastal hazard mitigation efforts by the PRCZMP to-date, as evidenced by the above assessment, make this strategy particularly important. As a result, the Coastal Hazards Strategy for 2016-2020 will consist of the development of an updated State of the Climate Report and associated PRCCC data portal with quantitative and spatially-explicit analyses to fill the information gaps listed above, an evaluation of the three community-based climate adaptation pilot projects from last cycle and identification of barriers to adaptation so as to draft and submit legislation to overcome those barriers for consideration by the Commonwealth of Puerto Rico.

1.3 Public Access Assessment

S309 Enhancement Objective

Attain increased opportunities for public access, taking into account current and future public access needs, to coastal areas of recreational, historical, aesthetic, ecological, or cultural value. §309(a)(3)

Resource Characterization

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

Public Access Status and Trends			
Type of Access	**Current number[26]**	**Changes or Trends Since Last Assessment[27]** (↑, ↓, –, unknown)	**Cite data source**
Beach access sites	>300 at 44 coastal municipalities	–	PRCZMP Public Access Master Plan 2014
Shoreline (other than beach) access sites	Not available	Not available	Not available
Recreational boat (power or nonmotorized) access sites	Not available	Not available	Not available
Number of designated scenic vistas or overlook points	Not available	Not available	Not available
Number of fishing access points (i.e. piers, jetties)	Not available	Not available	Not available
Coastal trails/ boardwalks	Not available Miles of Trails/boardwalks	Not available	Not available
Number of acres parkland/open space	Total sites Sites per miles of shoreline	Not available	Not available

[26] 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.

[27] 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 "unkwn."

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.[28] There are several additional sources of statewide information that may help inform this response, such as the Statewide Comprehensive Outdoor Recreation Plan,[29] the National Survey on Fishing, Hunting, and Wildlife Associated Recreation,[30] and your state's tourism office.

Much of this information is not known at the time of this draft but the assessment will be enhanced with the results of the public survey and partner input.

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.

Management Characterization

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

Management Category	**Employed by State or Territory** (Y or N)	**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	Y (PRCZMP serves as Executive Secretariat of the Interagency Beach Management Board)
Operation/maintenance of existing facilities	Y	Y	N
Acquisition/enhancement programs	Y	Y	Y (new coastal lands acquired by the state but PRCZMP doesn't fund the acquisition)

[28] See NOAA's Coastal Population Report: 1970-2020 (Table 5, pg. 9): http://stateofthecoast.noaa.gov/coastal-population-report.pdf

[29] 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 www.recpro.org/scorps.

[30] 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 2011 data to 2006 and 2001 information to understand how usage has changed. See www.census.gov/prod/www/fishing.html.

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:

PRCZMP now serves as Executive Secretariat of the Interagency Beach Management Board. New coastal lands have been acquired by the state but the PRCZMP does not fund those acquisitions.

3. Indicate if your state or territory has a publically available public access guide. How current is the publication and how frequently it is updated?[31]

Public Access Guide	Printed	Online	Mobile App
State or territory has? (Y or N)	Y	Y	N
Web address (if applicable)	http://www.drna.gobierno.pr/oficinas/arn/recursosvivientes/costasreservasrefugios/pmzc/acceso-publico-a-la-costa	http://www.drna.gobierno.pr/oficinas/arn/recursosvivientes/costasreservasrefugios/pmzc/acceso-publico-a-la-costa	N
Date of last update	2014	2014	N
Frequency of update	10 years	--	N

Enhancement Area Prioritization

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

High _____
Medium __X__
Low _____

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

Justification for assigning a medium priority to public access is due to the most recent SCORP, the results of CMO staff findings, and by the anticipated public response to the survey conducted by DNER in formulating the 2016-2020 Sec. 309 program. The past work done under the public access component of the Sec. 309 program has laid the basis for a more integrated island-wide public access program to be conducted under the regular Sec. 306 program.

[31] 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. However, you may choose to note that the local guides do exist and may provide additional information that expands upon the state guides.

1.4 Marine Debris Assessment

Section 309 Enhancement Objective

Reducing marine debris entering the nation's coastal and ocean environment by managing uses and activities that contribute to the entry of such debris. §309(a)(4)

Resource Characterization

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

Source of Marine Debris	**Existing Status and Trends of Marine Debris in Coastal Zone**		
	Significance of Source (H, M, L, unknwn)	**Type of Impact**[32] (aesthetic, resource damage, user conflicts, other)	**Change Since Last Assessment** (↑, ↓, –, unkwn)
Land-based			
Beach/shore litter	H	Aesthetic, resource damage, user conflicts	–
Dumping	H	Aesthetic, resource damage, user conflicts	–
Storm drains and runoff	H	Resource damage, non-point contamination	–
Fishing (e.g., fishing line, gear)	L	Aesthetic, resource	–
Other (please specify)			
Ocean-based			
Fishing (e.g., derelict fishing gear)	L	Resource damage, user conflict	–
Derelict vessels	M	Resource damage	–
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	H	Aesthetic, resource damage, non-point contamination	↑
Hurricane/Storm	H	Resource damage	–
Tsunami	L	Resource damage	–
Other (please specify)			

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

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.

Eighty percent of marine debris is land-based generated. The management and disposal of solid waste in Puerto Rico is intensified by the limited disposal area available on an island community with a delicately balanced ecosystem. Puerto Rico's per capita volume of solid waste generation is higher than on the mainland, while recycling rates are lower. Much of Puerto Rico's solid waste ends up in one of island's 32 landfills, most of which do not comply with Commonwealth and federal landfill requirements. The solution calls for a comprehensive and integrated solid waste management plan to reduce solid waste generation, increase recycling, use waste to produce energy, and efficiently manage all landfills.

Key Commonwealth agencies with responsibilities in this area are the Solid Waste Authority, the Environmental Quality Board, and DNER's Regional Offices which, through their Beach Maintenance Brigades, conduct weekly beach cleanups. Voluntary organizations are also active.

Voluntary groups in Puerto Rico annually record marine debris data as part of international coastal cleanup activities. During the 2010 Beach Cleanup Day, 12,659 volunteers worked together to collect more than 198,858 pounds of solid waste from our beaches, lakes, and waterways. **Vida Marina, Caribbean Center for the Reduction of Aquatic Debris, University of Puerto Rico**. Collection of microscopic particles of anthropogenic origin (fragments of plastic, paint, rustships, pieces of synthetic thread, etc.). Currently working on the analysis of a series of samples that were taken on the Puerto Rico Coast on February 2009 from the OSV/Bold.

Monofilament Recovery and Recycling Program of Puerto Rico, University of Puerto Rico. Implementation of the first monofilament recovery and recycling program in Puerto Rico. The Agricultural extension program will construct and install 45 monofilament recovery stations throughout Puerto Rico at various high volume fishing locations with the help of volunteers. All the lines collected will be shipped to a monofilament recycling compound.

ACC's Plastic Division (formerly APC), in conjunction with the **Center for Marine Conservation,** is researching ways to identify effective methods to reduce litter through reduction and improved waste handling. With support from the plastic industries, the National Model Communities Program launched a marine debris remediation program targeting six communities, one of which is Pinones. Visitors frequent small roadside stands and open air

restaurants in the Pinones area leaving large amounts of trash that is a threat to endangered species and to the largest mangrove forest remaining in Puerto Rico.

Marine Reserve Tres Palmas has established a marine waste handling disposal project. The objective aims to restore existing coral reefs habitats by eliminating waste through an educational awareness program for schools and voluntary work.

Amigos de Amoná, Inc., a non-profit based organization, **i**mplemented the Mona Channel Marine Debris Removal (2004). One of their goals was to remove the marine debris that affected marine life and coastal habitats. Thirty volunteers donated 1,363 hours of labor to survey 26.5 Km of coastline. They removed 3,235 Kg.(7117.0 lbs) of marine debris classified as fishing gear (48%), plastics (13%), glass(14%), metal (8%), and others (17%) . Additionally a conservation guide was developed for visitor and boaters.

Scuba Dogs, Inc. This is a non-profit organization that coordinates the International Coastal Cleanup Days in Puerto Rico.

Management Characterization

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

Management Category	**Employed by State/Territory** (Y or N)	**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	Y	N
Marine debris removal programs	Y	Y	Y (EPA; PR Recycling Partnership; DNER partnerships; City and Municipal efforts; NGO efforts)

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.

Governmental role

Two Commonwealth agencies: Solid Waste Authority and the Environmental Quality Board have the local responsibility for managing the Island's solid waste.

Marine debris management activities:

- Derelict vessel removal and cleanup is coordinated by NOAA, USACE and DNER.
- PRCZMP supports DNER Regional Offices and Beach Maintenance Brigades that conduct weekly cleanups at 434 miles of coastline in Puerto Rico.
- National Parks Company maintains and conducts routine cleanups of 12 public beaches under their administration.
- Municipalities such as Carolina conduct routine maintenance of public beaches under their administration.

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.

In previous surveys agency partners and stakeholders have placed a medium priority for the marine debris enhancement category for the island. Solid waste management is an important and very complex issue for the Commonwealth of Puerto Rico. Marine debris must be integrated in the Comprehensive Solid Waste Management Plan developed by the Solid Waste Authority. PRCZMP will continue supporting ongoing efforts and will coordinate with the Solid Waste Authority in addressing the marine debris problem as part of the comprehensive plan. However, at this point PRCZMP will not develop an enhancement area strategy for marine debris.

To effectively reduce the volume of marine debris active participation is needed from the Puerto Rico Solid Waste Authority, Puerto Rico Environmental Quality Board, Puerto Rico Tourism Company, Puerto Rico Ports Authority, PRCZMP, SeaGrant, NGOs, coastal municipalities and multiple stakeholders.

1.5 Cumulative and Secondary Impacts Assessment

Section 309 Enhancement Objective

Development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources. §309(a)(5)

Resource Characterization

1. Using National Ocean Economics Program Data on population and housing,[33] please indicate the change in population and housing units in the state's coastal counties between 2012 and 2007. 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 (2012-2007) to approximate current assessment period.

Trends in Coastal Population and Housing Units				
Year	**Population**		**Housing**	
	Total (# of people)	% Change (compared to 2000)	Total (# of housing units)	% Change (compared to 2002)
2010	2,317,189*	-3.95%*	Data not available for Puerto Rico at the website provided	
2000	2,412,486*		Data not available for Puerto Rico at the website provided 2000: 814, 780 hogares	

* Puerto Rico Coastal Zone Management Program calculation based on census data for coastal municipalities in 2000 and 2010. Puerto Rico is not included in either of the NOAA products listed in this assessment section, contrary to what is listed in guidance text.

[33] www.oceaneconomics.org/. Enter "Population and Housing" section. From drop-down boxes, select your state, and "all counties." Select the year (2012) and the year to compare it to (2007). Then select "coastal zone counties." Finally, be sure to check the "include density" box under the "Other Options" section.

2. Using provided reports from NOAA's Land Cover Atlas[34] or high-resolution C-CAP data[35] (Pacific and Caribbean Islands only), please indicate the status and trends for various land uses in the state's coastal counties between 2006 and 2011. You may use other information and include graphs and figures, as appropriate, to help illustrate the information. Note that the data available for the islands may be for a different time frame than the time periods reflected below. In that case, please specify the time period the data represents. Also note that Puerto Rico and the Commonwealth of the Northern Mariana Islands (CNMI) currently only have data for one time point so will not be able to report trend data. Instead, Puerto Rico and CNMI should just report current land use cover for developed areas and impervious surfaces.

Distribution of Land Cover Types in Puerto Rico*		
1Land Cover Type	**Land Area Coverage in 2000 (Acres)***	**Gain/Loss Since 2006 (Acres)**
Developed, High Intensity (Urban*)	853,560.75	N/A
Grassland	709,434.55	N/A
Woodland and Scrub/Shrubland	291,521.61	N/A
Barren Land (Natural)	4,089.79	N/A
Water (Freshwater & Saline)	21,099.93	N/A
Agriculture	64.25	N/A
Forested	853,560.75	N/A
Forested Wetland	22,140.74	N/A
Herbaceous Wetland	66,756.48	N/A

** Note: Despite the guidance mentioning high-resolution C-CAP data available for Puerto Rico, no such data by NOAA could be found. As such island-wide data, not specifically for coastal counties, locally from the USDA Forest Service International Institute of Tropical Forestry.*

3. Using provided reports from NOAA's Land Cover Atlas[36] or high-resolution C-CAP data[37] (Pacific and Caribbean Islands only), please indicate the status and trends for developed areas in the state's coastal counties between 2006 and 2011 in the two tables below. You may use other information and include graphs and figures, as appropriate, to help illustrate the information. Note that the data available for the islands may be for a different time frame than the time periods reflected below. In that case, please specify the time period the data represents. Also note that Puerto Rico and CNMI currently only

[34] www.csc.noaa.gov/ccapatlas/. Summary data on land use trends for each coastal state is available on the ftp site.

[35] www.csc.noaa.gov/digitalcoast/data/ccaphighres. Summary data on land use trends for each coastal state is available on the ftp site.

[36] www.csc.noaa.gov/ccapatlas/. Summary data on land use trends for each coastal state is available on the ftp site.

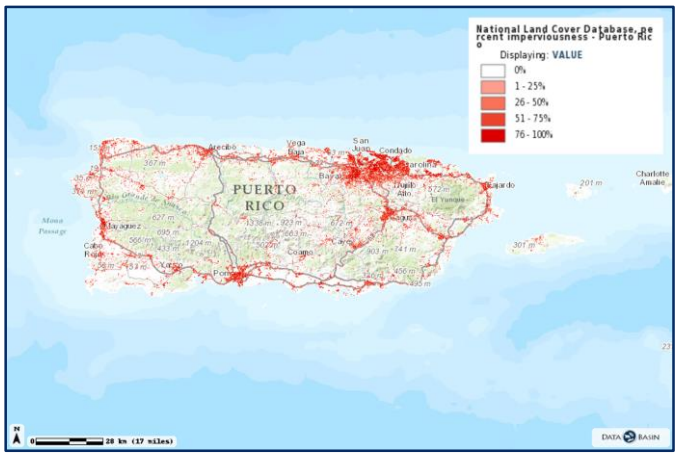
[37] www.csc.noaa.gov/digitalcoast/data/ccaphighres. Summary data on land use trends for each coastal state is available on the ftp site.

have data for one time point so will not be able to report trend data. Unless Puerto Rico and CNMI have similar trend data to report on changes in land use type, they should just report current land use cover for developed areas and impervious surfaces.

Development Status and Trends for Coastal Counties			
	2000*	**2011**	**Percent Net Change**
Percent land area developed	11%*	N/A	N/A
Percent impervious surface area	N/A	N/A	N/A

** Note: Despite the guidance mentioning high-resolution C-CAP data available for Puerto Rico, no such data by NOAA could be found. As such island-wide data, not specifically for coastal counties, locally from the USDA Forest Service International Institute of Tropical Forestry.*

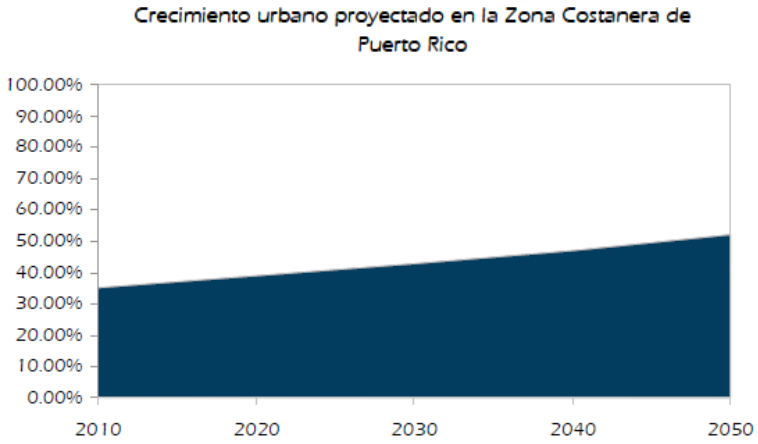
Despite no data being available on the C-CAP data portal for Puerto Rico at the time of publication, Data Basin map was generated for impervious surfaces in Puerto Rico:



How Land Use Is Changing in Coastal Counties	
Land Cover Type	**Areas Lost to Development Between 2006-2011** (Acres)
Barren Land	N/A
Emergent Wetland	N/A
Woody Wetland	N/A
Open Water	N/A
Agriculture	N/A
Scrub/Shrub	N/A
Grassland	N/A
Forested	N/A

** Note: Despite the guidance mentioning high-resolution C-CAP data available for Puerto Rico, no such data by NOAA could be found.*

Though changes in the coastal zone have not been quantified from land use maps in Puerto Rico, we do know that during recent decades (1977-1999) coastal development sectors have been experiencing substantial increases in urbanization. One analysis from the University of Puerto Rico, the Planning Board and Estudios Técnicos, Inc. demonstrated that this trend will continue and for the year 2050 the urban land use will have doubled in the coastal zone to be 44% of the territory's total[38]. The regions that will experience the greatest stress from increased coastal urban land use are the Northeast, South and North.



4. Using data from NOAA's State of the Coast "Shoreline Type" viewer,[39] indicate the percent of shoreline that falls into each shoreline type.[40] You may provide other information or use graphs or other visuals to help illustrate.

Shoreline Types*	
Surveyed Shoreline Type	**Percent of Shoreline**
Armored	10%
Beaches	27%
Flats	1%
Rocky	18%
Vegetated	43%

5. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the cumulative and secondary impacts of coastal

[38] PRCZMP 2009: http://www.drna.gobierno.pr/oficinas/arn/recursosvivientes/costasreservasrefugios/pmzc/pmzc/pmzc2009/PMZCPR%20espanol%202009-final.pdf

[39] http://stateofthecoast.noaa.gov/shoreline/welcome.html

[40] Note: Data are from NOAA's Environmental Sensitivity Index (ESI) Maps. Data from each state was collected in different years and some data may be over ten years old now. However, it can still provide a useful reference point absent more recent statewide data. Feel free to use more recent state data, if available, in place of ESI map data. Use a footnote to convey data's age and source (if other than ESI maps).

growth and development, such as water quality and habitat fragmentation, since the last assessment to augment the national data sets.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any significant state-level changes (positive or negative) in the development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources, since the last assessment.

Management Category	**Employed by State or Territory** (Y or N)	**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	N	N
Guidance documents	Y	Y	N
Management plans (including SAMPs)	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	_____

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

This is acknowledged to be an important subject area, but one in which CMO lacks the resources to play a leading role.

1.6 Special Planning Area Management Assessment

Section 309 Enhancement Objective

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

Note: 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."

Resource Characterization

The Puerto Rico Coastal Zone Management Program defines Special Planning Areas as "important coastal resource areas subject to serious present or potential use conflicts, and, therefore, requiring detailed planning." Eight Special Planning areas were adopted as part of the PRCZMP in 1978.

SAMPs provide public and private development guidance. PRCZMP currently funds the development of SPA management plans under Section 306 as an active program task. SPA management plans usually identify best management practices for each land use category and may include recommendations for new natural reserve designations or boundary changes of existing SPAs. Once adopted by the PRPB and approved by the Governor, SPA management plans are adopted as part of the Island-wide Land Use Plan. Policies established through SPA management plans are integrated as a part of Municipal Land Use Plans that also require PRPB approval.

In 1978 PRCZMP identified 26 candidate areas for designation as natural reserves. As of 2010, DNER had submitted 35 recommendations for natural reserve designation of which 34 have been approved by the Puerto Rico Planning Board (PRPB). The Puerto Rico Legislature has also adopted, via special statutes, seven natural reserves< although not all are coastal or marine reserves.

1. In the table below, identify geographic areas in the coastal zone subject to use conflicts that may be able to be addressed through a special area management plan (SAMP). 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
Northeast	Boundaries definition of proposed designation of NE natural reserve Intensive use of coastal waters for recreational navigation. This region hosts 75% of the marinas and 45,000 registered boats in Puerto Rico. Coastal waters sedimentation
Southeast region	Coastal and shoreline erosion and sedimentation
Southwest region	Boating access constraints Coastal waters sedimentation Shoreline erosion
Northwest region	Increase in urban development at the Isabela, Aguadilla Special Planning Area Shoreline erosion in Rincon Sedimentation of the marina at Rincon

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.

Management Characterization

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

Management Category	**Employed by State or Territory** (Y or N)	**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	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 _____

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

Special Planning Area activities are covered under the 306 program. PRCZMP will continue supporting planning and active management efforts for the eight designated areas and the new Northeast Corridor SPA. Although Federal and Commonwealth agencies' partners and stakeholders recognize the importance of sound sub-regional and watershed planning there were other enhancement areas identified as higher priorities for Sec. 309 program funding.

1.7 Ocean Resources Assessment

Section 309 Enhancement Objective

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

Resource Characterization

1. Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW),[41] indicate the status of the ocean and Great Lakes economy as of 2010, as well as the change since 2005, 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 (2010)				
	Establishments (# of Establishments)	**Employment** (# of Jobs)	**Wages** (Millions of Dollars)	**GDP** (Millions of Dollars)
Living Resources	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Marine Construction	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Marine Transportation	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Offshore Mineral Extraction	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Tourism & Recreation	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
All Ocean Sectors	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided

[41] http://www.coast.noaa.gov/enowexplorer/ . If you select any coastal county for your state, you receive a table comparing county data to state coastal county, regional, and national information. Use the state column for your responses.

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2010)				
	Establishments (% change)	**Employment** (% change)	**Wages** (% change)	**GDP** (% change)
Living Resources	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Marine Construction	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Marine Transportation	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Offshore Mineral Extraction	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
Tourism & Recreation	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided
All Ocean Sectors	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided	Data not available for Puerto Rico at the website provided

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

Significant Changes to Ocean and Great Lakes Resources and Uses	
Resource/Use	**Change in the Threat to the Resource or Use Conflict Since Last Assessment** (↑, ↓, −, unkwn)
Resource	

Benthic habitat (including coral reefs)	Data not available for Puerto Rico at the website provided
Living marine resources (fish, shellfish, marine mammals, birds, etc.)	Data not available for Puerto Rico at the website provided
Sand/gravel	Data not available for Puerto Rico at the website provided
Cultural/historic	Data not available for Puerto Rico at the website provided
Other (please specify)	Data not available for Puerto Rico at the website provided
Use	
Transportation/navigation	Data not available for Puerto Rico at the website provided
Offshore development[42]	Data not available for Puerto Rico at the website provided
Energy production	Data not available for Puerto Rico at the website provided
Fishing (commercial and recreational)	Data not available for Puerto Rico at the website provided
Recreation/tourism	Data not available for Puerto Rico at the website provided
Sand/gravel extraction	Data not available for Puerto Rico at the website provided
Dredge disposal	Data not available for Puerto Rico at the website provided
Aquaculture	Data not available for Puerto Rico at the website provided
Other (please specify)	Data not available for Puerto Rico at the website provided

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

Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources												
Resource	**Major Reasons Contributing to Increased Resource Threat or Use Conflict** (Note All that Apply with "X")											
	Land-based development	Offshore development	Polluted runoff	Invasive species	Fishing (Comm & Rec)	Aquaculture	Recreation	Marine Transportation	Dredging	Sand/Mineral Extraction	Ocean Acidification	Other (Specify)
Example: Living marine resources		*X*	*X*	*X*	*X*	*X*		*X*	*X*			
[Resource or Use from Table 2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
[Resource or Use from Table 2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[42] 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. 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.

Coral Reefs and associated benthic communities

Threats to coral reef ecosystems have increased due to land based sources of pollution, bleaching and mortality from diseases. During 2005, live coral cover was severely impacted by increased sea surface temperatures and disease. Coral reefs have been declining over past decades. NOAA's Coral Reef Conservation Program has been instrumental in providing greater understanding of the threats to coral reefs.

Seagrass resources

Puerto Rico has abundant seagrass resources. There has been an increase in seagrass coverage between Vieques and the main island of Puerto Rico. Past dredging at the Port of Las Americas (Ponce) and the navigation channel for EcoElectica power plant facilities has impacted benthic habitats -- seagrass beds and hard bottom habitats[43] (though recent studies in Guayanilla Bay show that recent years the effects of the power plants operations have not been detectable[44]). Seagrass habitats are directly impacted by dredging activities and boat propeller scaring and indirectly by reduced light penetration caused by increased sedimentation or burial from dredging activities.

General

The U.S. Army Corps of Engineers, Fish and Wildlife Service, National Marine Fisheries Service and DNER are the key decision-making agencies affecting marine resources use and protection. Although existing policies and regulations provide protection to ocean resources[45], permitting

[43] Vicente, V. P., and J. A. Rivera. 1982. Depth limits of the seagrasses Thalassia testudinum (Konig) in Jobos and Guayanilla bays, Puerto Rico. Caribbean Journal of Science 17:73-79.
[44] Otero, Ernesto. 2013. 2011 Biological Monitoring Project Plan: Examination of Seagrasses Adjacent to EcoEletrica's Pier, Penuelas, PR: [Access Date 30 Aug 2015] http://www.ecoelectrica.com/images/Documents_pdf/2011_Seagrass_Report.pdf
[45] NOAA National Marine Fisheries Service and U.S. Fish and Wildlife Service: Endangered Species Act and the Marine Mammal Protection Action; US Army Corps of Engineers: Section 404 of the Federal Water Pollution Control Act (better known as the Clean Water Act) and Section 103 of the Ocean Dumping Act.

actions have resulted in development-related impacts to coastal and marine resources. Going forward, climate variability and change may pose a growing threat to these resources.

Management Characterization

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

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 (fisheries and submerged lands)	Y	N
Regional comprehensive ocean management plans	N (on-going)	Y	Y (Caribbean Regional Ocean Partnership (CROP)/Regional Planning Body (RPB): developing plans)
State comprehensive ocean management plans	N	Y	Y (CROP/RPB: developing plans)
Single-sector management plans	Y (fisheries)	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.

In 2010 PRCZMP-CMO in coordination with the Office of the Governor of the USVI and TNC developed the proposal for the establishment of the U.S. Regional Ocean Partnership. In the same year a Memorandum of Understanding was signed between the Governor of Puerto Rico and the Governor of the USVI. The Governors of Puerto Rico and the U.S. Virgin Islands have indicated, by way of written intent, their commitment to advancing coastal and marine spatial planning (CMSP) in alignment with the National Ocean Commission. Regional organizations such as the Caribbean Fisheries Management Council, Sea Grant, CaRA-CARICOOS, and the Caribbean Coral Reef Institute support this PRCZMP initiative. PRCZMP has funded marine spatial planning efforts through Sec. 309 coastal habitat and wetlands task activities addressing characterization and zoning needs for marine wetlands, territorial waters and submerged lands. As a result of these efforts a data portal was created at www.caribbean-mp.org and the Caribbean Regional Plan continues to be developed.

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

Comprehensive Ocean Management Plan	**State Plan**	**Regional Plan**
Completed plan (Y/N) (If yes, specify year completed)	No	No
Under development (Y/N)	Yes	Yes
Web address (if available)	www.caribbean-mp.org	www.caribbean-mp.org
Area covered by plan	US Caribbean EEZ	Caribbean 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.

Coastal managers and stakeholders that were consulted at meetings and through the survey (Appendix A) ranked ocean resources as a low-medium priority. Their comments indicate that most agree there are higher priority needs in Puerto Rico. Nevertheless, the PRCZMP recognizes the importance of addressing Ocean Resources. Accordingly, separate funding has been requested to develop the Caribbean Regional Ocean Partnership. This effort will enable Puerto Rico to comprehensively address issues such as energy facility siting, aquaculture, marine debris, and certain aspects of climate change. This work is proposed to be developed following the guidelines issued by the White House through the Executive Order of President Obama (July 2010).

1.7 Energy & Government Facility Siting Assessment

Section 309 Enhancement Objectives

Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance. §309(a)(8)[46]

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. The MarineCadastre.gov may be helpful in locating many types of energy facilities in the coastal zone.

Types of energy facilities in the Puerto Rico coastal zone (e.g., oil and gas, Liquefied Natural Gas, wind, wave, Ocean Thermal Energy Conversion, etc.) based on best available data.

Status and Trends in Energy Facilities and Activities in the Coastal Zone				
Type of Energy Facility/Activity	**Exists in CZ**		**Proposed in CZ**	
	(# or Y/N)	Change Since Last Assessment (↑, ↓, –, unkwn)	(# or Y/N)	Change Since Last Assessment (↑, ↓, –, unkwn)
Energy Transport				
Pipelines[47]	Y	↑	Y	↑
Electrical grid (transmission cables)	Y	↑	Y	↑
Ports	Y	↑	Y	–
Liquid natural gas (LNG)[48]	Y	–	Y	↑
Other (please specify)				

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

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

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

[47] For approved pipelines (1997-present): www.ferc.gov/industries/gas/indus-act/pipelines/approved-projects.asp

[48] For approved FERC jurisdictional LNG import/export terminals: www.ferc.gov/industries/gas/indus-act/lng/exist-term.asp

Energy Facilities				
Oil and gas	Y	–	Y	–
Coal	Y	–	N	–
Nuclear[49]	Y (Not active)	–	N	–
Wind	Y	↑	Y	↑
Wave[50]	N	–	N	–
Tidal[36]	N	–	N	–
Current (ocean, lake, river) [36]	N	–	N	–
Hydropower	Y	–	N	–
Ocean thermal energy conversion	N	–	Y (research)	–
Solar	Y	↑	Y	–
Biomass	N	–	N	–
Other (please specify)				

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

3. Briefly characterize the existing status and trends for federal government facilities and activities of greater than local significance[51] in the state's coastal zone since the last assessment.

No significant changes have occurred in the type or number of oil and gas facilities. During the past five years the San Juan power plant has been reactivated and an explosion occurred at the Caribbean Petroleum (CAPECO) storage facility at Cataño. There are six major power plants located in Puerto Rico's coastal zone. Three of the power plants are located on the north coast: San Juan, Palo Seco, Cambalache and three on the south coast: Ecoelectrica and Costa Sur (Guayanilla), AES (Guayama) and Aguirre (Salinas).

[49] The Nuclear Regulatory Commission provides a coarse national map of where nuclear power reactors are located as well as a list that reflects there general locations: www.nrc.gov/reactors/operating/map-power-reactors.html

[50] For FERC hydrokinetic projects: www.ferc.gov/industries/hydropower/gen-info/licensing/hydrokinetics.asp

[51] 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).

The explosion, fire, and subsequent oil spill at CAPECO's petroleum tank farm created a dangerous situation that impacted the adjacent wetlands and water bodies. This facility is in the middle of a densely populated community. The environmental impacts continue to pose a threat to human health and the environment. cleanup activities are ongoing.

PREPA has proposed to build a LNG pipeline from EcoElectrica's terminal and storage facilities at Guayanilla (south coast of Puerto Rico) to Palo Seco and San Juan power plants on the north coast. Environmental assessments and permitting activities are underway, with completion date indeterminate given project complexities and the number of affected stakeholders.

Four major wind power facilities had been proposed during the last assessment and two were built at Santa Isabel and Naguabo. Government is also considering the construction of a waste-to-energy facility to be built on the north coast of Puerto Rico as a means to address the solid waste issue and to generate electric power.

Management Characterization

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

Management Category	**Employed by State or Territory** (Y or N)	**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
State comprehensive siting plans or procedures	N	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 _____

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

In the stakeholder engagement survey (Appendix A) the majority of the respondents (86.9%) ranked this priority as medium-low, indicating that most agreed that there were higher priority needs in Puerto Rico. The PRCZMP has identified that energy facility siting and ocean resources can be addressed through the proposed Puerto Rico component of the Caribbean Regional Ocean Partnership between Puerto Rico and the U.S. Virgin Islands.

1.8 Aquaculture Assessment

Section 309 Enhancement Objective

Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone, which will enable states to formulate, administer, and implement strategic plans for marine aquaculture. §309(a)(9)

Resource Characterization

1. 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.[52]

Type of Facility/Activity	**Status and Trends of Aquaculture Facilities and Activities**		
	# of Facilities[53]	Approximate Economic Value	Change Since Last Assessment (↑, ↓, −, unkwn)
Companies with permit to culture fish in Puerto Rico territorial waters (1)	0	0	−
Marine fish culture (2)	0	0	−
Freshwater fish on land (3)	41 (Tilapia and Shrimp)	unknown	−
Freshwater fish hatcheries (4)	0	0	−
Small-scale coastal aquaculture operations	0	0	−

[52] While focused on statewide aquaculture data rather than just within the coastal zone, the *Census of Aquaculture* (www.agcensus.usda.gov/Publications/2002/Aquaculture/) may help in developing your aquaculture assessment. The 2002 report, updated in 2005, provides a variety of state-specific aquaculture data for 2005 and 1998 to understand current status and recent trends. The next census is scheduled to come out late 2014 and will provide 2013 data.

[53] 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.

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.

According to 2012 Agriculture Census by the US Department of Agriculture[54]:

Item	2012	2007
Total aquaculture sales by farm	51	40
Total aquaculture sales by dollars	$687,976	$832,725

Management Characterization

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

Management Category	**Employed by State or Territory** (Y or N)	**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	N

[54] USDA Ag Census 2012: http://www.agcensus.usda.gov/Publications/2012/Full_Report/Puerto_Rico/st72_1_016_017.pdf

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 _____

Low _X_

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

At the global scale small-scale coastal aquaculture may pose a significant environmental risk from the discharge of low quality effluent and runoff, and the introduction of exotic organisms and pathogens to fresh and marine waters. There is no sizable aquaculture industry currently in existence in Puerto Rico, therefore this enhancement area is given a low priority.

4 program enhancement strategies

2.1 Wetlands Strategy

I. *Issue Area(s)*

The proposed strategy or implementation activities will support the following high-priority enhancement areas (check all that apply):

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

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:** Restoration and enhancement of wetlands protection to increase coastal communities' resilience through ecosystem-based adaptation (EbA) and other nature-based policies and approaches.

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

The approach in this strategy and associated program changes will shift the PRCZMP's coastal wetlands protection approach from purely ecological to an ecosystem services focus using social-ecological and nature-based, green infrastructure-use approaches. Puerto Rico's Law 314 (1998), Public Policy for Wetlands in Puerto Rico, Land Law lays out the principal policy motive to be the following (emphasis added):

> *Wetlands represent an essential part of the coastal ecosystems and their acceptance as a natural resource of* ***high ecological value*** *is relatively recent. Wetlands are highly productive systems for the organisms that inhabit them. They are lands adapted to conditions of saturation, flooding or flood water. The most important feature in the wetlands is the volume of water in them. They are transitional areas between aquatic and terrestrial systems frequently inundated or saturated by surface and groundwater during a period of time sufficient to begin to have some changes in the soil that enables them to create a type of vegetation specifically adapted to live in those conditions.*

Secondary benefits of wetlands are later listed in the law and include "serving to control flooding" and "helping to mitigate floods". This prioritization of ecological value over the services they provide was an important step at the time considering wetlands were previously regarded as nuisance lands. Through many efforts over the years the Commonwealth of Puerto Rico has institutionally and legally recognized the importance and value of wetlands. The historically observed and projected trends of further development of Puerto Rico's coastal wetlands highlight the great importance of considering wetland ecosystem services at the site level and island level as agency decisions are made by the Department of Natural and Environmental Resources, the Puerto Rico Planning Board, the Environmental Quality Board and the Land Authority. This is particularly imperative when weighing approval of hard/structural engineering projects for coastal developments or coastal protection measures. Currently the Commonwealth existing laws lack the direction to prioritize soft or nonstructural engineering, also known as nature-based or green infrastructure. This necessary shift in approach is consistent with the U.S. Army Corps of Engineers (USACE) new *integrated* planning approach for reducing coastal risks and increasing human and ecosystem community resilience through a combination of natural, nature-based, non-structural and structural measures. For decades the

USACE, at the urging of congressional representatives and other constituencies, designed costly structural engineering solutions for environmental problems that in many cases resulted in long-term coastal damages. "During this time, the prevailing idea was to build a way out of the problem" (Priscoli and Stakhiv 2015[55]). The 2013 USACE report *Coastal Risk Reduction and Resilience: Using the Full Array of Measures*[56] describes the new approach of the US Federal Government and states they use "the terms natural, nature-based, nonstructural, and structural to describe the full array of coastal risk reduction measures employed by the USACE. Some agencies and organizations have used the term *green infrastructure* to refer to the integration of natural systems and processes, or engineered systems that mimic natural systems and processes (e.g., USEPA[57], White House Conference on Green Infrastructure[58], Kousky et al. 2013[59], McDonald et al. 2005[60], McMahon and Benedict 2000[61])". This integrated approach not only recognizes the intrinsic ecological value of natural resource systems like dunes, wetlands, coral reefs and seagrasses, but recognizes and prioritizes their benefits to human populations (ecosystem services) that are typically not acknowledged (fig. 1).

[55] Jerome Delli Priscoli and Eugene Stakhiv. 2015. Water-related disaster risk reduction (DRR) management in the United States: floods and storm surges. Water Policy 17: 58-88 http://www.iwaponline.com/wp/017S1/0058/017S10058.pdf

[56] US Army Corps of Engineers (2013) Coastal Risk Reduction and Resilience. CWTS 2013-3. Washington, DC: Directorate of Civil Works, US Army Corps of Engineers: http://www.corpsclimate.us/ccacrrr.cfm

[57] http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-1

[58] http://water.epa.gov/infrastructure/greeninfrastructure/whconference.cfm

[59] Kousky, C., S.M. Olmstead, M.A. Walls, and M. Macauley (2013) Strategically placing green infrastructure: Cost-effective land conservation in the floodplain. Environmental Science and Technology 47 (8): 3563–3570.

[60] McDonald, L., W. Allen, M. Benedict, and K. O'Connor (2005) Green infrastructure plan evaluation frameworks. Journal of Conservation Planning 1 (1): 12–43.

[61] McMahon, E.T., and M.A. Benedict (2000) Green infrastructure. Planning Commissioners Journal 37 (4)

Figure 2 Nature and Nature-based Features At a Glance (Source: US Army Corps of Engineers (2013) Coastal Risk Reduction and Resilience. CWTS 2013-3. Washington, DC: Directorate of Civil Works, US Army Corps of Engineers.)

A similar method to green or natural infrastructure is *ecosystem-based adaptation (EbA)*. Preserving, enhancing and restoring natural systems, like wetlands, that provide critical protection from the elements, or that provide food, water or work opportunities, can be the most successful and cost-effective actions to protect life and property from coastal hazards, specifically climate change[62]. Climate change stressors to coastal ecosystems, like sea level rise, are particularly threatening to wetland systems as in many cases the ecosystems cannot keep pace with the rates of sea level rise and their slow accretion leads them to eventually be submerged, or in other cases they are *squeezed*[63] between coastal development and rising seas resulting in intertidal habitat loss. This methodology prioritizes nature-based planning in places where vulnerable human populations are located using multi-criteria analyses. For the Commonwealth of Puerto Rico this approach is particularly useful as limited capacity prevents protection and restoration of all wetland systems. By using EbA the PRCZMP can help direct wetland enhancement efforts to areas in Puerto Rico that have the highest social-ecological vulnerabilities. In this way, our Wetlands Strategy is linked to our Coastal Hazards Strategy.

[62] Schill, S., J. Brown, A. Justiniano. A. Hoffman. 2014. US Virgin Islands Climate Change Ecosystem-based Adaptation: Promoting Resilient Coastal and Marine Communities. The Nature Conservancy, developed with support from the NOAA Coral Reef Conservation Program cooperative agreement #NA09NoS4190173.

[63] Coastal squeeze is defined as intertidal habitat loss which arises due to the high water mark being fixed by a defense and the low water mark migrating landwards in response to sea level rise (Nigel Pontee. 2013. Defining coastal squeeze: A discussion. Ocean & Coastal Management)

The fundamental question for coastal management in Puerto Rico comes down to where is our limited capital spent – in developing levees, dikes, and gates to reduce Puerto Rico's flood and erosion issues – or do we invest in protecting existing resources like wetlands and coral reefs that offer the same if not more benefits[64]?

For permit and planning decisions made by the Commonwealth of Puerto Rico to prioritize these ecosystem services approaches Puerto Rico specific research and guidance are necessary to achieve policy amendments or new laws. Fortunately, a number of efforts are underway or are being completed that will feed into the first step of our five-year strategy: **Step One – Validate with Partners and Submit the Puerto Rico Wetlands Conservation and Management Plan** that was developed during the 2011-2015 program period. During this program period the PRCZMP completed the atlas of coastal wetlands and wetlands land tenure as well as the inventory of coastal geomorphic features, coastal habitats and wetlands. Within the first year of this five-year cycle the PRCZMP will submit the Puerto Rico Wetlands Management and Conservation Plan to the Puerto Rico Planning Board and Environmental Quality Board for conservation and would then be signed by the governor. If adopted this plan would provide the most updated inventory of coastal wetlands in Puerto Rico since the 1978 Federal Inventory (USFWS, which continues to be under review). The plan also provides current and potential sustainable uses of coastal wetland resources and the identification of conflicts or incompatible uses of wetland resources.

In 2013, a Memorandum of Understanding between the USACE and PRDNER was signed (Oct 2013) that built on a 2008 Executive Order (OE-2008-53) creating a permanent working committee composed of the Executive Director of the Land Authority of Puerto Rico, the Secretary of the Department of Natural and Environmental Resources, the Administrator of the Administration of Natural Resources, the Secretary of Agriculture, Secretary of Department of Housing, the Executive Director of the Land Administration, the President of the Planning Board, the Executive Director of the Office of Special Communities, the Executive Director of the National Parks and the Superintendent of Police to ensure more effective protection of agricultural land and wetlands of the Land Authority of Puerto Rico and other agencies and instrumentalities of the Commonwealth of Puerto Rico. Because of an identified need by the working committee for a wetland condition assessment methodology (Antilles Rapid Assessment Method or A-RAM) specific for Puerto Rico, the Corps and PRDNER committed to engage in collaborative efforts to develop such methodology. For this purpose, an Interagency Team was convened, co-led by the PRDNER and the USACE with funding by the

[64] See US Army Corps of Engineers (2013) Summary Table of the Benefits of Natural, Nature-Based, Nonstructural, and Structural Coastal Risk Reduction Measures

USEPA, and constituted by representatives from DNER and the USACE as co-leads and relevant federal agencies USEPA, NOAA, NMFS, USFWS, USDA, NRCS and USFS. This work not only provides new useable science but also opens the lines of communications with other agencies and moreover with NGOs, communities and landowners managing wetlands. Related to this, the PRCZMP works to support the Environmental Quality Board's Water Quality Monitoring work under the Federal Water Pollution Control Act (Nov 2002)[65]. Twenty-seven of EQB's water quality monitoring sites were selected as reference sites by the Interagency Wetlands Team for the development of the A-RAM. These efforts will help us to develop tools, synthesize data and information to be used in the second step of our five-year strategy: **Step Two - Conduct ecosystem-based adaptation (EbA) analyses to support the development of public policy(s)** that prioritize nature-based solutions for assisting coastal communities increase their resilience to sea level rise and storm surges. The PRCZMP will review potential EbA and other nature-based methods (fig. 2) and conduct a multi-criteria analysis using the previously described information and partnerships to identify both communities at-risk as well as wetlands at-risk and an evaluation of the ecosystem services those wetlands provide. In partnership with agencies from the interagency work team, the Puerto Rico Climate Change Council (described in Coastal Hazards Strategy) and other wetland partnerships currently in-development, such as a new Puerto Rico Wetlands Network, the PRCZMP will solicit other necessary data as well as review of the analysis.

Institution/Methodology	Web Resources
United Nations Framework Convention on Climate Change	http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/6227.php and http://unfccc.int/resource/docs/2013/sbsta/eng/02.pdf
Ecosystem Based Management Tools Network and NatureServe	https://connect.natureserve.org/sites/default/files/documents/EBM-ClimateToolsGuide-FINAL.pdf
United Nations Development Program	http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/ecosystems_and_biodiversity/ecosystem-based_climatechangemitigationandadaptation.html
International Union for the Conservation of Nature	https://cmsdata.iucn.org/downloads/iucn_eba_brochure.pdf
The World Bank/World Wildlife Fund	http://awsassets.panda.org/downloads/wwf_wb_eba_project_2014_gms_ecosystem_based_adaptation_general_framework.pdf
Conservation International	http://unfccc.int/files/adaptation/application/pdf/eba_marine_terrestrial_coastal.pdf

Figure 3 Examples of EbA and nature-based methodologies or approaches by Institution

[65] Federal Water Pollution Control Act (Nov. 27, 2002): Sec. 106 For the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, and to compile and analyze data on (including classification according to eutrophic conditions), the quality of navigable waters and to the extent practicable, ground waters including biological monitoring; and provision for annually updating such data and including it in the report required under section 305 of this Act.

The results of this analysis will be critical for **Step 3 – Identification of policies and guidelines to support local governments with integration of EbA strategies**. The PRCZMP will complete a legal and institutional framework of existing laws and regulations that could potentially support EbA in Puerto Rico, with a specific focus on policies and regulations that empower the Puerto Rico Planning Board, the Permits Management Office, and Municipalities (particularly autonomous municipalities). In partnership, the PRCZMP will identify prospective opportunities for enhancement of existing laws and regulations or new mechanisms that will support EbA and shift the Commonwealth of Puerto Rico to prioritizing natural infrastructure over structural engineering solutions. The program changes that are anticipated are EbA integration into territorial ordainment plans or land use plans or amendments to the 1998 Puerto Rico Wetlands Law (Ley 314, previously described). It is important to point out that we cannot predict the results of either the multi-criteria analysis or the legal and institutional framework and so it is possible other program changes will result from this five-year strategy. Additionally, wetland conservation and EbA mechanisms could be identified that do not result in program changes, such as tax and other incentives. Such programs already exist by NRCS, FWS, and USFS for private landowners. These results would not be excluded from the next and final step of our five-year strategy. Once the suitable program changes are identified the PRCZMP will move on to **Step 4 - Adopt EbA policies and enhance the adoption of legislation to provide tax and other incentives to conserve and restore wetland acreage and functions.** Communications materials like technical briefs will be developed to communicate the results of the multi-criteria analysis and legal and institutional framework with the priority objective of successfully educating policy makers and stakeholders about this shift to an ecosystem services approach to wetlands management. This communications task under the fourth step in the five year strategy will also include a rigorous schedule of meetings and workshops. First to discuss with select elected officials the feasibility of EbA measures being adopted and then to educate the wider set of elected officials and policy makers the reasons for the shift in management and the results of our analyses. It is through this communications process that the PRCZMP program changes would occur.

A number of significant program changes in wetlands management are projected for the next cycle of Sec. 309 program activities that will build off the Puerto Rico Plan for Coastal Wetlands Management and Conservation.

(1) Adopt ecosystem-based adaptation (EbA) strategies to build public policy(s) related to assisting coastal communities and associated wetland systems in increasing their resilience to sea level rise and storm surges, based on the guidelines developed in previous S309 strategy implementation for protection, conservation and restoration of wetlands and further analyses.

The EbA strategies would most likely be adopted by the Puerto Rico Planning Board, the Environmental Quality Board, the Land Authority, and the Department of Natural and Environmental Resources as they are the current authorities under Puerto Rico's Wetlands Law.

(2) Support local governments with integration of EbA strategies into their territorial ordainment or land use plans, in partnership with the PRPB (PRCZMP Federal Consistency review lead). The mechanisms to do so will be determined through the legal and institutional framework analysis.

Through this work additional benefits and potential program changes will be supported because of the new information being generated and the reinforcement of our wetland partnerships. Principally the development of draft legislation to be presented to the Puerto Rico Legislature that would provide tax and other incentives to conserve and restore wetland acreage and function. Other potential benefits to the work in this five-year strategy include the adoption of changes to water quality standards to conserve wetlands acreage and functions, in partnership with EQB. EQB would lead the development of permanent water quality monitoring stations and baselines are in the process of being established at selected wetland classes sites (8 – 24 sites). Wetlands water quality monitoring would be implemented by EQB and funded through Clean Water Act funds administered by USEPA. Results from data collection will support EQB's annual report on the state of water resources in Puerto Rico and also the Puerto Rico State of the Climate 2014-2016 (see coastal hazards strategy).

In summary, these program changes will shift the PRCZMP's wetlands protection approach from purely ecological to an ecosystem services focus using social-ecological and nature-based, infrastructure-use approaches. The associated new wetlands protection or sustainable use policies, to be determined, will enable the PRDNER and collaborating agencies, such as NRCS, to fund and/or provide incentives for restoration and enhancement of wetlands to increase coastal communities' resilience. The steps to achieve the strategic goal of *restoration and enhancement of wetlands protection to increase coastal communities' resilience through ecosystem-based adaptation* are laid out in fig. 2.

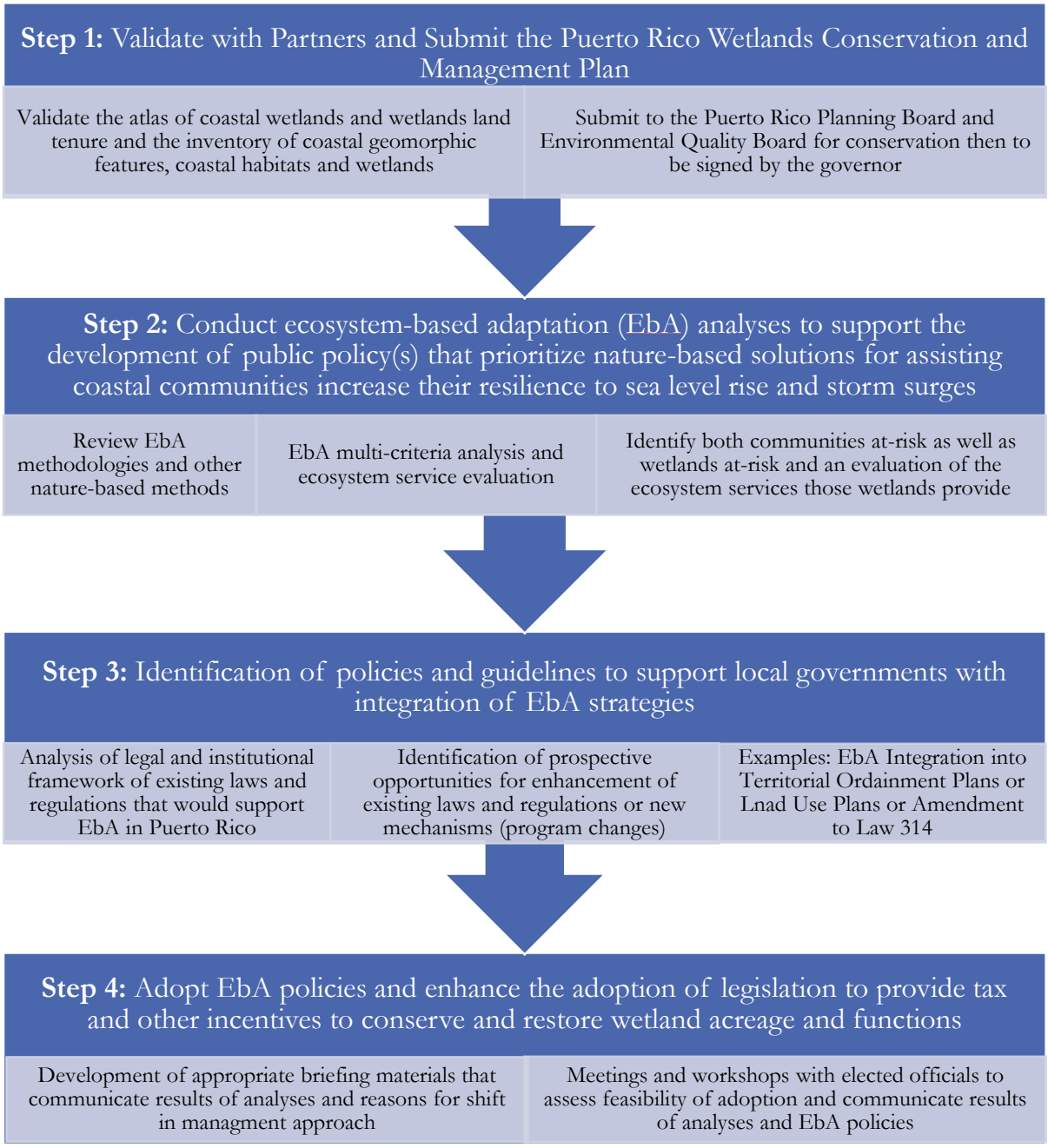


Figure 4 The steps to achieve the strategic goal of restoration and enhancement of wetlands protection to increase coastal communities' resilience through ecosystem-based adaptation and other nature-based approaches

III. Needs and Gaps Addressed

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

In the Assessment the following needs were identified that this strategy specifically seeks to fulfill:

- ***Research and GIS/Mapping.*** The Commonwealth is currently lacking baseline characterizations of wetlands that could be used to compare the before and after conditions once restoration or enhancement projects are implemented. Additionally, Puerto Rico also lacks island-wide wetland migration studies to determine potential effects from sea level rise, such as wetland type conversion due to increases in salinity. Site-specific studies have been conducted by the USFWS using SLAMM (Sea Level Marsh Migration Modeling) in two refuges on the South Coast but other studies are not known at this time. Lastly, the Commonwealth needs to identify vulnerable wetlands and coastal communities. PRCZMP will also benefit from the ongoing communication and exchange of data and information with NOAA-Office for Coastal Management partners in Charleston, SC. Products developed for Puerto Rico by NOAA-OCM have been integrated into the PRCZMP GIS while products developed by PRCZMP have been presented for potential integration as part of NOAA's Digital Coast platform.
  These needs will be addressed in this five-year strategy, though not in its totality, by validating the Puerto Rico Wetlands Conservation and Management Plan with partners and submitting for adoption, the Commonwealth will have more access to baseline characterizations of wetlands. Additionally, the EbA and ecosystem service methodologies identified and conducted will provide necessary information for future wetland migration studies and the identification of vulnerable wetlands and coastal communities.
- ***Research:*** The Commonwealth currently lacks a cost benefit assessment of restoration methods and options for wetlands and related ecosystems as well as a better understanding of ecosystem services provided by wetlands as part of social-ecological systems. Both analyses being conducted under this 5-year strategy will address the costs and benefits of EbA and other nature-based restoration methods and options as well as provide the Commonwealth with enhanced information on the ecosystem services

provided by wetlands. The PRCZMP, as co-chair of the Caribbean Landscape Conservation Cooperative[66], was a leader in a September 2012 workshop on Ecosystem-based Adaptation in Puerto Rico *Allowing for Resilient Ecosystems*. This two-day workshop in Guaníca provided participants background to EbA concepts and one methodology championed by The Nature Conservancy Caribbean Program. The workshop discussions and outputs were a strong indicator that more research is needed in Puerto Rico for understanding all possible EbA and nature-based methods and policy opportunities.

- ***Decision Support Tools.*** The Puerto Rico Wetlands Conservation and Management Plan, currently in final stages of development, identifies potential, feasible mechanisms and develops guidelines considering institutional issues with respect to agency roles and responsibilities for wetland protection, restoration and mitigation. Having this plan validated by wetland stakeholders and partners and adopted by the Puerto Rico Planning Board and Environmental Quality Board will provide the necessary foundation for the EbA analyses.
- ***Decision Support Tools.*** Fostering a shift from a purely ecological approach to an ecosystem services approach will require a heavy investment of funds, talent and partner contributions, as evidenced by the substantial communications efforts that were required in the 1990's to move decision makers from a "wetlands are nuisances" mindset to "wetlands are ecologically valuable". This PRCZMP is not be the sole effort to move the Commonwealth of Puerto Rico to an ecosystem services approach. Other efforts by PRCZMP and partners are underway (listed below) and will continue to be supported by the PRCZMP throughout the next five years, both in terms of sharing analyses results but also including these partner efforts in our communications materials and dissemination strategies:
    - PRCCC State of the Climate 2010-2013 report and data portal.
    - Caribbean Landscape Conservation Cooperative Interactive Map and Conservation Action Team outputs.
    - Conferences and Workshops: Antilles Interagency Wetlands Committee, Puerto Rico Climate Change Council, Puerto Rico Wetlands Network, NOAA Green Infrastructure Trainings[67], Climate Change in the Caribbean 2015: Puerto Rico and US Virgin Islands, USDA Caribbean Climate Sub Hub Carbon Sequestration Workshop, San Juan ULTRA Green Infrastructure symposiums[68], Caribbean

[66] www.caribbeanlcc.org
[67] http://coast.noaa.gov/digitalcoast/training/green
[68] http://sanjuanultra.org/

Landscape Conservation Cooperative Ecosystem-based Adaptation and Landscape Conservation Design meetings and workshops.

The strategy for the wetlands component also addresses the following additional needs:

- Promote the conservation of wetlands through sustainable development activities.
- Improve interagency coordination including the coordination of the implementation of erosion and sediment control requirements on agricultural lands by the PRPB and EQB.
- Development of coastal habitat restoration strategies and monitoring plans.
- Support of review of permit applications by regulatory agencies (USACE, USEPA, PRDNER)

IV. Benefits to Coastal Management

Discuss the anticipated effect of the strategy, including the scope and value of the strategy, in advancing improvements in the CMP and coastal management, in general.

- Wetlands and wetland functions are inextricably linked to their surroundings, particularly human systems and, therefore, wetland conservation must be pursued in the context of sustainable development and climate adaptation. This strategy will contribute to reduce risks to coastal community infrastructure and habitats by supporting efforts by municipalities and PRCZMP partner initiatives (previously described) that build resilience of these social-ecological systems.
- There is a great need in Puerto Rico for enhanced recognition of the benefits of services that coastal natural infrastructure (i.e., healthy ecosystems), especially wetlands, provide to coastal communities (fig. 1). This strategy and the program changes elevates awareness and attention to these services.

V. Likelihood of Success

Discuss the likelihood of attaining the strategy goal and program change (if not part of the strategy goal) during the five-year assessment cycle or at a later date. Address the nature and degree of support for pursuing the strategy and the proposed program change and the specific actions the state or territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities.

Support for this strategy exists at the Commonwealth and Federal levels and PRCZMP will seek increased support from the Puerto Rico Planning Board, the Environmental Quality Board, the Land Authority, and municipal governments. Based on past wetlands work (see

accomplishments and strategy description) the PRCZMP is confident that though building relationships, improving access to critical information (i.e., PRCCC and CROP portals), and generating much-needed new information during the implementation of the five-year work plan the Program can achieve the goals of this strategy.

A five–year period is a reasonable time frame for the implementation of a strategy of this nature because it requires rigorous analyses, intergovernmental coordination through PRCZMP working relationships throughout multiple levels of government, as well as innovative outreach and education to the public.

VI. Strategy Work Plan

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

Strategy Goal: (Step One) Validate with Partners and Submit the Puerto Rico Wetlands Management and Conservation Plan to the Puerto Rico Planning Board, the Puerto Rico Environmental Quality Board and the Governor of Puerto Rico for adoption

Total Years: 1

Year(s): 2016-2017

Description of activities:

Validate the Puerto Rico Wetlands Management and Conservation Plan developed during the last Section 309 funding cycle with partners. Once reviewed and validated by partners Plan will be submitted to the Puerto Rico Planning Board, Environmental Quality Board and the Governor for adoption.

Major Milestone(s):

Puerto Rico Wetlands Conservation and Management Plan validated by partners (*no cost as covered through relevant partnership contributions (A-RAM, PR Wetlands Network, CLCC)*)

Publication of validated Puerto Rico Wetlands Conservation and Management Plan

Submission of the plan to Planning Board, Environmental Quality Board, and the Governor of Puerto Rico for adoption and signature

Budget: $50,000

Strategy Goal: (Step Two) Conduct ecosystem-based adaptation (EbA) analyses to support the development of public policy(s) that prioritize nature-based solutions for assisting coastal communities increase their resilience to sea level rise and storm surges, based on the guidelines developed in previous S309 strategy implementation for protection, conservation and restoration of wetlands.

Total Years: 2

Year(s): 2017 - 2018

Description of activities:

Conduct an analysis of EbA and other nature-based methodologies and select the most appropriate methodology for Puerto Rico. Using the chosen multi-criteria methodology, identify wetlands adjacent to coastal communities using the PRCZMP GIS-Remote Sensing capabilities and assess vulnerabilities of the coastal communities as well as the potential services those wetlands could provide.

Major Milestone(s):

Technical brief of tools and methods available for nature-based and EbA methodologies and methods available for assessing ecosystem services of wetlands.

Using selected multi-criteria analysis methodology and FEMA flood maps, NOAA Office for Coastal Management Sea Level Rise Viewer, PRCCC Storm Surge Atlas and Sea Level Rise projections (developed through last S309 Strategy Implementation), and other data sources for socio-economic information identify communities potentially vulnerable to flooding.

Using selected multi-criteria analysis methodology and the FWS National Wetlands Inventory (1978 draft) and the updated Coastal Habitats and Geomorphic Features Inventory (2013; developed through the last S309 Strategy Implementation) identify vulnerable wetlands.

Use the new layers of vulnerable communities and vulnerable wetlands to identify vulnerable communities that are adjacent to vulnerable wetlands in order to create an information layer (shapefiles with corresponding metadata) that could be used for EbA efforts.

Using selected evaluation methodologies (above technical brief) and focusing on the communities previously identified, analyze Puerto Rico-specific ecosystem services of wetlands.

Budget: $175,000

Strategy Goal: (Step 3) Identification of policies and guidelines to support local governments with integration of EbA strategies, such as modification of territorial ordainment or land use plans, in partnership with the PRPB (PRCZMP Federal Consistency review lead) or amendments to Puerto Rico Wetlands Law (Ley 314)

Total Years: 1

Year(s): 2018-2019

Description of activities:

Conduct an analysis of the legal and institutional framework of existing laws and regulations that would support EbA in Puerto Rico as well as identification of

prospective opportunities for enhancement of existing laws and regulations or development of new mechanisms. Examples: EbA Integration into Territorial Ordainment Plans or Land Use Plans or Amendment to Law 314

Major Milestone(s):

Legal and institutional framework analysis and recommendations

Budget: $45,000

Strategy Goal: (Step 4) Adopt EbA policies and enhance the adoption of legislation to provide tax and other incentives to conserve and restore wetland acreage and functions

Total Years: 1

Year(s): 2019-2010

Description of activities:

Development of appropriate briefing materials that communicate results of analyses and reasons for shift in management approach. Conduct meetings and workshops with elected officials to provide education and information as well as to assess the feasibility of adopting new legislation or amending/enhancing existing legislation based on the results of the legal and institutional framework analysis.

Major Milestone(s):

4 regional meetings/workshops conducted by PRCZMP

1 Commonwealth-wide meeting/workshop conducted by PRCZMP

Participation in partner meetings and events to present on shift in approach and preliminary and final results of analyses (*no cost as covered by partners*)

Educational materials that communicate the need for shift in approach and results of strategy products

Draft laws or regulations resulting from the legal and institutional framework analysis, the regional and Commonwealth-wide meetings/workshops.

Budget: $60,000

VII. Fiscal and Technical Needs

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

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

5-Year Budget Summary by Strategy

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

WETLANDS						
Strategy Title	**Year 1 Funding**	**Year 2 Funding**	**Year 3 Funding**	**Year 4 Funding**	**Year 5 Funding**	**Total Funding**
Validate and submit Puerto Rico Wetlands Conservation and Management Plan	$50,000					$50,000
Conduct ecosystem-based adaptation (EbA) analyses to support the development of public policy(s) that prioritize nature-based solutions for assisting coastal communities increase their resilience to sea		$87,500	$87,500			$175,000

level rise and storm surges						
Identification of policies and guidelines to support local governments with integration of EbA strategies				$45,000		$45,000
Adopt EbA policies and enhance the adoption of legislation to provide tax and other incentives to conserve and restore wetland acreage and functions				$30,000	$30,000	$60,000
Total Funding						

2.2 Coastal Hazards Strategy

I. *Issue Area(s)*

The proposed strategy or implementation activities will support the following high-priority enhancement areas (check all that apply):

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

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:** To move the Program's work up the "adaptation ladder[69] " and to larger-scale impact through an evidence-based process for identification and adoption of new island-wide policies. EcoAdapt's Adaptation Ladder of Engagement (fig. 4) is a good mental model of the levels of adaptation work. In the 2010-2015 cycle we focused on awareness raising, scientific assessment, and pilot project planning and implementation. Many accomplishments were achieved, including successful assistance to Commonwealth efforts for launching executive orders (see accomplishments section). This cycle the program will focus on moving up the ladder to larger-scale planning and implementation efforts. "Larger-scale" meaning island-wide or long-term policy to build and strengthen the previous resilience building efforts of existing executive orders and pilot projects in the Commonwealth. As has been mentioned repeatedly by the members of the Puerto Rico Climate Change Council (PRCCC) at our annual summits and working group meetings, it is not enough to have a plan, nor a scientific assessment. The next rung is to put our plans into action. For the PRCZMP this means proposing and moving the Commonwealth forward in implementing new laws, regulations, or processes, and/or adjusting existing activities by changing what we do, how, or when you do it at the PRDNER agency level as well as through other permit management agencies. This five-year strategy will achieve this in a variety of ways (see next section).

Figure 5 EcoAdapt's Adaptation Ladder of Engagement.

C. **Describe the proposed strategy and how the strategy will lead to and/or implement the program changes selected above.** If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)

PRCZMP will develop a number of program changes related to coastal hazards vulnerability and climate change adaptation policies over the next 5 years. Program changes will result from work being conducted by the PRCZMP-CMO through the Puerto Rico Climate Change Council (PRCCC) and by integration of coastal hazards and future climate conditions into new adaptation guidance for communities and new or enhanced coastal legislation. The purpose of

[69] EcoAdapt's Adaptation Ladder of Engagement: http://ecoadapt.org/programs/awareness-to-action/climate-savvy-quick-course/ladder-of-engagement

this strategy is to advance the management of Puerto Rico's coasts in consideration of coastal hazards and potential future climate conditions. This strategy is necessary because of the coast's economic, environmental and cultural significance to the State and the finding from the last five year cycle that:

> *Temperatures are increasing, precipitation patterns are changing, extreme events are occurring more frequently, oceans are more acidic, and sea level is rising. These climatic changes are projected to occur at much faster than natural rates. Some types of extreme weather and climate events have already increased in frequency and intensity and these changes are projected to continue. Climate changes are already affecting some aspects of society, the economy and natural ecosystems of Puerto Rico and these effects are expected to increase. Not all of these changes will be gradual. When certain tipping points are crossed, impacts can increase dramatically. Past climate is no longer a reliable guide to the future. This affects planning for public and private infrastructure, tourism and industry, water resources, energy and all other social and economic systems. In response to these changes, the Puerto Rico Climate Change Council (PRCCC) was convened in November 2010 to assess Puerto Rico's vulnerabilities and recommend strategies to respond to changes. The PRCCC is comprised of four working groups: (WG1) Geophysical and Chemical Scientific Knowledge; (WG2) Ecology and Biodiversity; (WG3) Society and Economy; and (WG4) Communicating Climate Change and Coastal Hazards.* ***Based on the results of PRCCC's WG1, WG2 and WG3 as well as the results of coastal hazards risk assessment workshops conducted with thirty of the forty-four coastal municipalities, the PRCCC concludes that Puerto Rico's climate is changing and coastal communities of Puerto Rico, critical infrastructure, wildlife and ecosystems are all vulnerable to various impacts associated with changes in global, regional, and island weather and oceanographic conditions*** *(PRCCC 2013: 307[70]).*

In the last five year cycle, the PRCZMP successfully completed the State of the Climate 2010-2013 report that was the first island-wide vulnerability assessment to climate change. There were many positive outcomes associated with the work of the PRCCC and the report including identifying and convening Puerto Rico's top 150 experts on topics related to climate change and coastal hazards, synthesizing all current and available knowledge on climate science and climate change effects on the ecology and biodiversity and society and economy of the Commonwealth, identifying research needs that are now being filled by the PRCZMP and a wide variety of partner institutions from academia, NGOs, and federal programs, new collaborations and connections outside the PRCZMP that were made as a result of the frequent meetings of PRCCC members, enhanced knowledge sharing of the global community of practice as members of the PRCCC Executive Secretariat have been invited to speak at a variety of local, stateside and international forums including our closest neighbors the U.S. Virgin Islands and the Dominican Republic. Arguably the greatest achievement of the State of the Climate 2010-2013 report was the call to action to the governments of the Commonwealth of Puerto Rico.

[70] Puerto Rico Climate Change Council (PRCCC). 2013. Puerto Rico's State of the Climate 2010-2013: Assessing Puerto Rico's Social-Ecological Vulnerabilities in a Changing Climate. Puerto Rico Coastal Zone Management Program, Department of Natural and Environmental Resources, NOAA Office of Ocean and Coastal Resource Management. San Juan, PR. http://pr-ccc.org/download/PR%20State%20of%20the%20Climate-FINAL_ENE2015.pdf

The five executive orders issued by Governor Alejandro García-Padilla (February 28, 2013), draft climate legislation introduced in 2015, and the selection of the City of San Juan to be one of the world's 100+ Resilient Cities are all connected to the work of the PRCCC. However, the first State of the Climate also exposed a number of proficiencies that the PRCCC currently lacks but are necessary for identifying and educating on policy changes beyond just mandating planning efforts. These deficiencies are principally quantitative socio-economic and spatially-explicit vulnerability analyses (i.e., social vulnerability index, climate and health interfaces, and food security vulnerabilities), economic and financial assessments, and legal analyses. Thus, the Coastal Hazards Strategy begins with **Step 1A – Facilitate the development of the next State of the Puerto Rico Climate 2014-2017**, an island-wide, multi-sector vulnerability assessment. In this second State of the Climate integrate advancements made over the last five years and specifically provide a more quantitative and spatially-explicit report that bolsters the social and economic components that are currently highly qualitative and based on regional rather than local studies. To achieve this goal the PRCCC Executive Secretariat comprised of members of the PRCZMP, Puerto Rico Sea Grant College Program, Caribbean Integrated Coastal and Ocean Observing System (CariCOOS), University of Puerto Rico's Marine Sciences Department, Mayaguez campus and Medical Sciences campus, National Oceanic and Atmospheric Administration, U.S. Forest Service, Caribbean Landscape Conservation Cooperative, and Puerto Rico Seismic Network, will first convene to review the procedural lessons learned from the last state of the climate (i.e., structure of working groups, approaches to collaborative writing, processes used in working meetings and summits, etc) and make any necessary governance changes to strengthen this next round of work. With the help of the 2015-2017 NOAA Coastal Management Fellow the PRCCC will be reconvened and the next round's processes presented, discussed and revised. Additionally, the Puerto Rico Climate Research Library will be reactivated either through Dropbox or the PRCCC's new website (www.pr-ccc.org) so that new publications and information can be shared with each of the relevant working groups. Each of the working groups will update the present day and possible future scenarios for Puerto Rico's coasts and the most vulnerable regions through quantitative and qualitative methods, specifically utilizing new Puerto Rico-specific climate data from the Caribbean Landscape Conservation Cooperative (CLCC) and USGS Southeast and Caribbean Climate Science Center and from the Puerto Rico Storm Surge and Sea Level Rise Atlas (developed in last S309 Strategy Implementation). The PRCCC with the GIS support from the PRCZMP will use U.S. Census data and information (Census tracks-Tiger files) in addition to other geophysical, social, and ecological indicators to identify coastal communities currently or potentially vulnerable to coastal hazards and climate change. To do this, the new coastal ecosystem and geomorphic features database developed in the last cycle will be integrated as well as new storm surge and sea level rise models developed by the CMO GIS facility through UPR-

CariCOOS to provide new spatially explicit vulnerability graphics in the State of the Climate, that the last State of the Climate 2010-2013 did not. Working Group 4 of the PRCCC will publish policy briefs with the gathered information throughout the process as well as other outreach/education materials (print and online through PRDNER and PRCCC websites as well as social media). The PRCCC Executive Secretariat with Working Group lead authors will edit, finalize, and publish full report of updated vulnerability assessment in Year 3 with a user-friendly executive summary in both Spanish and English. Step one will finish with the PRCZMP working with PRCCC partners to disseminate the report widely. It is important to note that Sec. 309 funds could in no way cover all the work and associated expenses of the PRCCC in the development of the State of the Climate. It is not possible to calculate the monetary value of the in-kind contributions of all 150 members for the last State of the Climate but fig. 5 provides an at-a-glance look at in-kind contributions of just the lead authors and executive secretariat members from 2010-2013. In general, PRCCC members provided in-kind contributions in the form of their specialized knowledge, time in gathering information, synthesizing, writing, reviewing, preparing for meetings, conducting conference calls, and presenting to the group, provision of meeting rooms and hosting working groups, co-facilitation at meetings and risk assessment workshops, modeling capabilities of UPR Marine Sciences Department, Physics and Engineering Departments, CariCOOS, US Army Corps of Engineers, US Forest Service International Institute of Tropical Forestry, and many others. Additionally, non-PRCCC members contributed such as the Caribbean Community Climate Change Centre providing access to their unpublished fisheries projections for the Caribbean and published downscaled climate projections, Dr. Joanie Kleypas and Dr. Johann Bell granting permissions for use of their world-class ocean acidification and coral reef/fisheries/pelagic graphics, respectively. As fig. 5 demonstrates the cumulative contributions of PRCCC members clearly exceeds the amount to be used through Sec. 309 funds and we have commitments from the PRCCC members to provide these services once again for the 2016-2020 program cycle.

PRCCC Member	In-Kind Contributions for State of the Climate 2010-2013
Puerto Rico Sea Grant College Program	Gathering information, reviewing sections, hosting meetings, presentations, outreach guidance, co-facilitating meetings and risk assessment workshops, event planning, recruiting PRCCC members
Caribbean Integrated Ocean and Coastal Observing System	Modeling historic and future sea level rise trends, analyzing ocean acidification and sea surface temperature data, advising on uncertainties, gathering information, writing

	and reviewing sections, hosting meetings, presentations, co-facilitating meetings, event planning, synthesizing meeting notes, recruiting PRCCC members
University of Puerto Rico	Analyzing historic temperature and precipitation trends, modeling climate projections using high resolution grid-interpolated station data, reanalysis products and low resolution general circulation models, providing information hurricane tracks and intensities, interpreting paleoclimatic data, advising on uncertainties, gathering information, writing and reviewing sections, hosting meetings, presentations, recruiting PRCCC members
USGS Climate Science Center at North Carolina State University	Funding downscaled climate projections and making connections to world renowned specialist, advising on uncertainties, gathering and synthesizing publications and information, writing, reviewing, and editing sections, hosting conference calls, presentations, event planning, synthesizing meeting notes, recruiting PRCCC members
National Oceanic and Atmospheric Administration (NMFS, CFMC and NWS)	Gathering and synthesizing publications and information, writing, reviewing, and editing sections, hosting meetings, presentations, event planning, synthesizing meeting notes, recruiting PRCCC members
U.S. Forest Service International Institute of Tropical Forestry	Gathering and synthesizing publications and information, providing land cover and species data, writing and reviewing sections, cartography, hosting meetings, presentations, event planning, recruiting PRCCC members

Figure 6 In-kind contributions of PRCCC Lead Authors and Executive Secretariat only

At the same time the PRCCC works to develop the next State of the Climate report with the assistance of the NOAA Coastal Management Fellow 2015-2017, the PRCZMP will work through **Step 1B - Continue the development and refinement of the open-access hazards data portal that has the best available coastal hazards and climate change information for the Commonwealth.** Just as the new State of the Climate will be a tool for integrating advancements made over the last five years and specifically providing a more quantitative and spatially-explicit knowledge base, the PRCCC Data Portal (www.pr-ccc.org) serves the same function but in an interactive way that tailors the user's experience in how they interact with the

PRCCC results. These types of climate or hazard decision support tools ("interactive forms of learning") are frequently cited as needs for providing easy access to information and communicating climate science and vulnerabilities to a diverse array of coastal resource managers[71]. To be effective though, these online platforms need to be maintained, user friendly, monitored, evolving with the users experience, kept up-to-date with the best available science and knowledge, and integrated into a larger communications strategy. Currently the PRCCC data portal does not have metrics identified for monitoring and evaluation of user need and experiences. One of the major milestones of Step 1B will be the development of those metrics. Additionally, user experience focus group workshops will be conducted with current and potential users to improve the tool usability and features. The invitees of these workshops will be a mix of PRCCC members, municipal officials, community organizations, businesses, academic institutions, and partner data managers from CariCOOS, the Caribbean Landscape Conservation Cooperative, the USDA Climate Sub Hub for Agriculture and Tropical Forestry, and the Caribbean Marine Alliance. This online platform also serves as a tool for the individual PRCCC members to quickly have access to the partnership's publications and data, to guide them in their work. Another key part of the strategy that will occur in parallel to the PRCCC State of the Climate and Data Portal work will be **Step 3A - Assess the successes of the community-based adaptation pilot programs conducted in the last cycle and develop guidance based on the lessons learned for future community-based climate adaptation plans.** This step is critical for achieving the desired program changes. Each of the community-based climate adaptation planning teams in Culebra, Dorado and Rincon are confronting data and policy limitations for the implementation of adaptation actions. Step 3A brings together these teams in working meetings to summarize the challenges they encountered with a specific focus on policy and institutional restrictions at the Federal, Commonwealth and Municipal levels, as well as data and communications limitations. This guidance will be useful for others interested in developing future community-based climate adaptation projects in Puerto Rico. Furthermore, by bringing together the municipal adaptation teams the wide suite of possible adaptation policy needs can be narrowed together. For instance, one of the greatest challenges the municipalities are facing is that many of the coastal homes and businesses are located in high risk areas. Those who purchased their homes decades ago or even recently are not made aware of the hazards they are exposed to until a hazard event, like winter swells or inland inundations, occur. One reason they learn of their exposure and sensitivities after a hazard event has caused damages or loss of property, suffered injuries or, in the least, experienced inconveniences, is that despite the fact that FEMA flood maps and municipal hazard mitigation plans are publicly

[71] Tribbia, J. and S. Moser. 2008. More than information: what coastal managers need to plan for climate change. Environmental Science & Policy 11: 315-328 http://www.susannemoser.com/documents/Tribbia-Moser_2008_ESP.pdf

available they are frequently not easily accessible in Puerto Rico. A policy that the PRCZMP has envisioned for Puerto Rico is a "right-to-know" or coastal hazards disclosure law ("Full disclosure law"). As the Hawai'i guidance *Natural Hazard Considerations for Purchasing Coastal Real Estate in Hawai'i* states "Whether you are looking to buy a developed or an undeveloped lot, there are critical issues that should be examined and assessed before committing to a purchase[72]." Coastal Hazards Disclosure Law has been evidenced in the State of Florida to protect life and property. Following two dramatic years of landfall hurricanes, the 2006 Florida Legislature amended Section 161.57, Florida Statutes to require that sellers of certain coastal property notify purchasers that the property being purchased was subject to natural hazards, special regulations, and the possible presence of nesting marine turtles. Florida's coastal hazards disclosure law applies only to property that it totally or partially seaward of the Coastal Construction Control Line, a line of jurisdiction similar to Puerto Rico's Maritime-Terrestrial Zone. The law lays out the exact language that must be used, what supporting documentation, and within a certain timeline. The language of the law and the implementation, or lack thereof in some cases, for the state of Florida has been deemed to be "not accomplishing its statutory purpose" and efforts were made to research what went wrong. The results of one study "suggest that the manner in which the disclosure is presented, during the transaction process, is inadequate to meet the stated objectives of Florida Statute 161.57(1). Furthermore, factors that mail survey respondents stated that they did not initially consider important (sea turtle nesting restrictions, erosion, winter storms, and beach renourishment) resulted in being factors that they ultimately encountered after they purchased their property. This suggests that prospective purchasers need to have more and better information available related to coastal hazards and restrictions than is currently provided pursuant to the disclosure statute"[73]. The PRCZMP has been in communications with researchers and coastal management lawyers throughout the last program cycle to learn about potential options for Puerto Rico, but the necessary information and perspectives from communities and municipalities was not available. The lessons learned from the three community-based climate adaptation projects as well as the Wetlands Strategy and PRCCC deliberations will provide the necessary information to draft legislation and coastal hazard briefing materials that is comprehensive and avoids the deficiencies other jurisdictions, like the State of Florida, have experienced with their climate disclosure laws. It is important to

[72] Eversole, D. and Z. Norcross-Nu'u. 2006. Natural Hazard Considerations for Purchasing Coastal Real Estate in Hawai'i: A Practical Guide for Common Questions and Answers. Hawaii Coastal Zone Management Program, Department of Land and Natural Resources, Hawai'i Sea Grant College Program, National Oceanic and Atmospheric Administration:
http://seagrant.soest.hawaii.edu/sites/default/files/publications/Purchasing_Coastal_Real_Estate.pdf

[73] Wozniak, K., G. Davidson and T. Ankerson. 2012. Florida's Coastal Hazard Disclosure Law: Property Owner Perceptions of the Physical and Regulatory Environment. Levin College of Law at University of Florida, Sea Grant Florida, Southeast Climate Consortium, and Florida Climate Institute:
http://www.law.ufl.edu/_pdf/academics/centers-clinics/clinics/conservation/tp194_coastal_hazards_disclosure_law.pdf

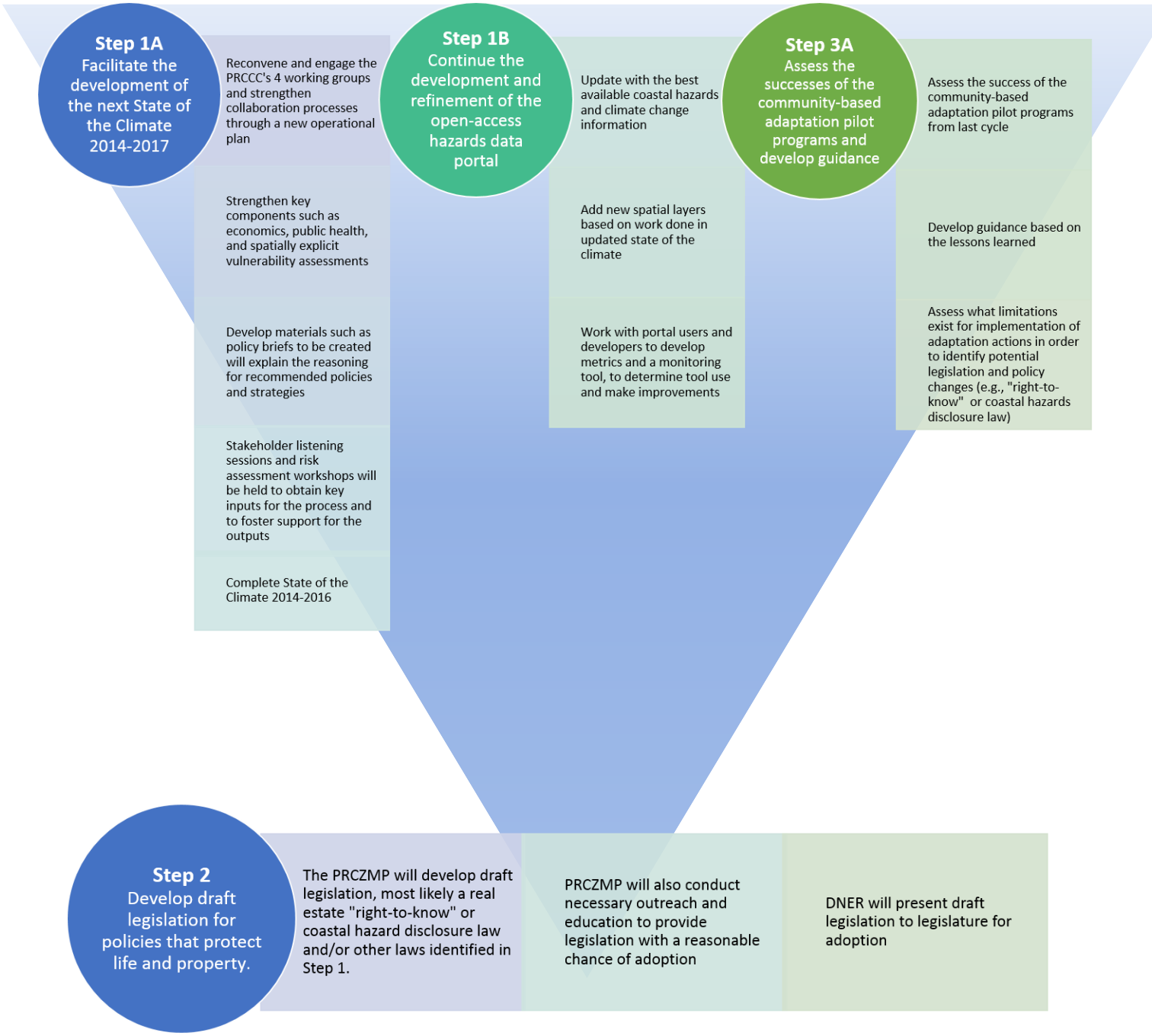
note that the "Right-to-Know"/"Full disclosure" law is just one possible program change that will result from this work of identifying policy barriers to adaptation at the local level.

Another possible policy that could be identified through this process is based on the results of risk assessment workshops conducted in the last cycle with thirty-three of the forty-four coastal municipalities' public works, planning, and emergency management officers. There's a great need for "erosion control from landslides and floods through the use of vegetation (natural options).[74]" As explained in detail this cycle's five-year Wetlands Strategy is focused on achieving program changes that shift the Commonwealth from a purely ecological approach for wetlands management to an ecosystem services approach. If ecosystem-based adaptation or other nature-based policies are adopted by the Commonwealth the ability of municipalities to prioritize natural infrastructure over hard structural engineering to control inundations would be enhanced.

The results of Steps 1A, 1B, and 1C and their associated policy recommendations will guide the PRCZMP's work in **Step 2 - Develop draft legislation with legal consultation for policies and recommendations for creation of adaptation mechanisms that protect life and property.** To do so the PRCZMP with coastal management law specialists will identify policy opportunities and draft legislation to submit to the appropriate elected officials and government bodies. Communication materials in the form of technical briefs and other outreach materials will be created and used during meetings and workshops in order to assess the feasibility of their adoption and to educate on the need and key elements of each. If in fact, the right-to-know law is selected the PRCZMP will inform the legal consultants on the past research conducted by the program on disclosure laws around the world. And if the natural infrastructure/EbA policies are selected the Wetlands Strategy research will inform the work of the legal consultants as well. As a result of this strategy work plan at least one new piece of draft legislation will be submitted for consideration, thus one potential program change. The outreach and education plan for the draft legislation will also include PRCCC and community-based adaptation pilot project partners as their stories and expertise will prove to be instrumental in clearly explaining the benefits of such legislation.

[74] Results of 2013 risk assessment workshops with municipalities (unpublished spreadsheet of vulnerabilities and adaptation options for coastal municipalities in Puerto Rico, used by the PRCCC)

Figure 7 provides a summary of the Coastal Hazards Strategy for 2016-2020: To move the Program's work up the "adaptation ladder" and to larger-scale impact through an evidence-based process for identification and adoption of new island-wide policies.



III. Needs and Gaps Addressed

Coastal hazards need to be elevated as a priority in the Commonwealth of Puerto Rico in order to obtain the policy, management, financial and institutional support that it needs to address these critical issues. This sentiment has been clearly articulated by participants at numerous PRCZMP meetings and dialogues since the last CZMA section 309 assessment and strategy. This Coastal Hazards Strategy reflects the important gaps that have been identified through numerous discussions and collaborations over the years.

Specifically, ***sound public policies and regulations*** should be codified in Puerto Rico and certain hazard mitigation approaches should be undertaken by the Commonwealth, such as the Puerto Rico Planning Board and coastal municipalities integrating climate change into territorial ordainment plans or the Puerto Rico Wetlands Law being amended to prioritize nature-based or non-structural mitigation options. This strategy has been developed with a focus on creating a robust foundation of critical data with the means for a variety of decision makers and coastal managers to have access and usability to that data and information, collaboratively developed and advocated mitigation approaches for a variety of stakeholders (including policies and regulations for Commonwealth and municipal governments) for adoption and implementation, and education-outreach efforts to reduce risks to life and property and to foster the needed push for policy and regulation actions related to these issues.

The Coastal Hazards Enhancement Area Assessment identified the following needs that are being addressed by this strategy:

1. ***Research.*** *Social-ecological vulnerability studies; economic analyses; legal and institutional policy analysis; innovative nature-based strategies for adaptation.* The first three needs are explicitly addressed in Steps 1A, 1C and 2 in the Coastal Hazards Strategy and the nature-based strategies will be addressed in Steps 1C of the Coastal Hazards Strategy as well as by the Wetlands Strategy.
2. ***Mapping/GIS/Modeling.*** *Critical facilities and other assets; vulnerable communities; vulnerable wetlands and other habitats.* These needs are explicitly addressed in Steps 1A, 1B of the Coastal Hazards Strategy and the vulnerable wetlands and vulnerable communities will also have spatial analysis and multi-criteria analysis conducted in the Wetlands Strategy.
3. ***Data and Information Management/Decision Support Tools.*** *Enhancement of data portals and visualization/analytical tools tailored to decision makers and other coastal manager needs.* Step 1B of the Coastal Hazards Strategy will develop metrics based on input from

developers, partners and users as well as based on the latest methods in user experience research. The PRCZMP has become very aware of the challenges of managing open-access data portals and decision support tools and the variety of available methods and talents for maximizing use and information delivery through numerous meetings, seminars and group discussions through the PRCCC Working Group 4 (Communicating Climate Change and Coastal Hazards), the Caribbean Regional Association/CariCOOS, the San Juan Bay Estuary Program Technical Advisory Committee, the Caribbean Regional Ocean Partnership Data Managers Meeting, the Caribbean Landscape Conservation Cooperative Data Managers Advisory Group, the Southeast and Caribbean Climate Community of Practice, the National Adaptation Forum, and the Global Earth Observing System of Systems workshops. The Coastal Hazard Strategy specifically focuses on this need identified in the Sec. 309 Enhancement Area Assessment to ensure that tools are not developed that go unused or don't actively contribute to the protection of life and property in the Commonwealth of Puerto Rico.

4. ***Communication and Outreach.*** *Specific needs are for municipalities and elected officials as well as the general public.* Step 2 of the Coastal Hazards Strategy will specifically focus on developing appropriate materials and executing a number of outreach activities with partners and elected officials in order to achieve the desired program changes. As previously mentioned, the PRCZMP recently shifted outreach efforts to Sec. 306, however, as related to communication and outreach for the adoption of new legislation or amendments to existing law Sec. 309 will provide the majority of the support for those activities.

IV. Benefits to Coastal Management

This strategy will have three principal effects. First, the project will continue to provide much needed data in a usable format, specifically the Puerto Rico Climate Change Council data portal and its vulnerability visualization tool, reports, adaptation guides and municipal adaptation plans to guide future planning and project development to a variety of stakeholders. Second, the strategy will continue to foster a more aware, more engaged, and eventually more "resilient" Puerto Rican public by learning from the five community-based climate adaptation pilot projects and developing guidance based on their experiences so other communities and municipalities in Puerto Rico are empowered with proven methods and tools to allow them to successfully conduct their own. And third, it will lay the groundwork for adoption of effective hazard mitigation policies and actions by the Commonwealth and relevant resource users. The goal is for the CMO through the updated coastal zone vulnerability assessment and recommended adaptation strategies to encourage and advocate for the designation of coastal hazards and climate change impacts as issues that must be considered when developing new legislation or to

refine existing legislation, Commonwealth plans and policies, hazard mitigation plans, development projects, local mitigation strategies, civil society activities, etc. Having the necessary assessments, recommendations, and backing of the Puerto Rican public will increase the political will to implement much-needed policies and regulations. Through partnership building and inter-agency collaboration this valuable information may be translated into adoption at different levels of society.

V. Likelihood of Success

Discuss the likelihood of attaining the strategy goal and program change (if not part of the strategy goal) during the five-year assessment cycle or at a later date. Address the nature and degree of support for pursuing the strategy and the proposed program change and the specific actions the state or territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities. The likelihood of success for this strategy is strong because the project will build upon existing work by both CZM-efforts and non-CZM efforts, as well as CMO's vast experience and partnerships. On the basis of repeated experience with coastal floods, hurricanes, and related events, the Commonwealth has a healthy respect for coastal hazards and their consequences, and, over time, has initiated significant mitigation measures including large-scale relocation. DNER's strength lies in its knowledge base of coastal conditions and its past work in mitigation planning. Additionally, this project is centered around multi-stakeholder collaboration and will have project partners with great technical resources, such as the Caribbean Coastal Ocean Observing System (CariCOOS), the Caribbean Tsunami Center, The Coastal Hazards Center of Puerto Rico, the Puerto Rico Seismic Network, Puerto Rico Sea Grant, the National Weather Service, the Puerto Rico Emergency Management Agency, the Caribbean Landscape Conservation Cooperative, the Caribbean Regional Ocean Partnership, and the University of Puerto Rico. Each of these organizations is committed to the development of the next State of the Climate, to the data portal (www.pr-ccc.org) and to advocating for the adoption of policies, regulations and incentives that are implemented and enforced in the Commonwealth of Puerto Rico.

CMO is cognizant of constraints to successful program outcomes which may be enumerated as follows:

a. Resource availability

Program resources, both personnel and budgetary, must be adequate to the task. Because the budget is limited and the tasks large, efforts must be continued to draw on in-kind resources

from other agencies (Commonwealth and Federal) and project partners. This will require both skill and experience on the part of the task leader and careful direction and support from CMO management. Fortunately, through the NOAA Coastal Management Fellowship Program we are guaranteed a graduate fellow for two years of the project to serve as a co-project manager with the CMO Director.

b. Diversity of stakeholder interests

Stakeholder opposition to new design standards on coastal setbacks, building elevations, designation of high vulnerability areas, building prohibitions, and other adaptation strategies are likely to create political impediments to the enactment of measures. Any opposition needs to be countered by effective outreach and public education. There needs to be maximum dialogue with stakeholders in the formative phase, from the beginning of the vulnerability assessment to the formulation of adaptation strategies. Without active stakeholder involvement, sound science, and advocacy by the CMO and partners political opposition could be formidable.

c. Access to senior level decision makers

At key points, the top levels of DNER, PRPB, and representatives of the Governor's office will need to be involved in the review of issues and policy directions since the resolution of coastal hazard vulnerability issues go well beyond technical considerations. Without senior level involvement and support, technical staff will find it difficult to move program recommendations to the implementation stage.

By collaborating with multiple partners the outcomes of the strategy will have a higher probability of widespread support due to enhanced scientific robustness and stakeholder-supported management recommendations. The realities of potential opposition force a large emphasis on collaboration. Multiple voices from a variety of sectors will assist with reaching out to key decision- makers, the public, and the private sector.

The above actions will maintain or build future support for achieving and implementing the Program change. More specific actions (that may or may not require Section 309 funds) include:

- Continue to convene and engage the Puerto Rico Climate Change Council (PRCCC), a task force of over 150 partners and expert advisors (currently 187) throughout the process. Support and encourage their active participation in CMO coastal hazard efforts.

- Incorporate a peer-review process into the State of the Climate 2014-2017 vulnerability assessment to ensure sound science is used to develop hazard mitigation and climate adaptation strategies.
- Develop outreach and communication materials to educate about coastal hazards, explain the reasoning for recommended policies and strategies, and garner support for such work.
- Stakeholder listening sessions and risk assessment workshops will be held to obtain key inputs for the process and to foster support for outputs.
- Take advantage of opportunities provided by conferences, meetings, workshops to present the work. When the strategy outputs are completed use these forums and others to widely disseminate and advocate.

VI. Strategy Work Plan

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

Strategy Goal: Facilitate the development of the next State of the Climate 2014-2017, an island-wide, multi-sector vulnerability assessment.

Total Years: 3

Year(s): 2016-2018

Description of activities:

Reconvene the four (4) working groups of the PRCCC through a series of meetings and conferences using modified collaborative processes and work together to update existing coastal hazard and climate variability/change information to assess Puerto Rico's vulnerability to multiple climate stressors, with emphasis on sea level rise and coastal inundation. An additional Working subgroup will be established under the leadership of the Professional Engineers Association Permanent Commission for Risks and Disaster Preparedness

Major Milestone(s):

Conduct at least four workshops and meetings per working group (totaling 16 by the PRCZMP and an unidentified amount by partners based on needs of working groups).

Determine with partners the lessons learned from the last State of the Climate report (2010-2013) and develop an operational plan that will improve the process and refine the final publication.

Reactivate and systematically collect with partner relevant climate information (new after July 2013) into the shared Puerto Rico Climate Research Library for use by the partners

Update the present day and possible future scenarios for Puerto Rico's coasts and the most vulnerable regions through quantitative and qualitative methods, specifically utilizing new Puerto Rico-specific climate data from the Caribbean Landscape Conservation Cooperative and USGS Southeast and Caribbean Climate Science Center and from the Puerto Rico Storm Surge and Sea Level Rise Atlas (developed in last CZMA Section 309 Strategy Implementation).

Using U.S. Census data and information (Census tracks-Tiger files) in addition to other geophysical, social, and ecological indicators identify coastal communities currently or potentially vulnerable to coastal hazards and climate change.

Incorporate the new coastal ecosystem and geomorphic features database developed in the last cycle as well as new storm surge and sea level rise models developed by the CMO GIS facility through UPR-CariCOOS to provide new

spatially explicit vulnerability graphics in the State of the Climate, that the last State of the Climate 2010-2013 did not.

Annual partnership meeting (PRCCC) (3 total/1 per year).

Stakeholder listening sessions and risk assessment workshops will be held to obtain key inputs for the process and to foster support for the outputs.

Publish policy briefs with the gathered information throughout the process as well as other outreach/education materials and activities (print and online through PRDNER and PRCCC websites as well as social media).

Finalize and publish full report of updated vulnerability assessment in Year 3 with a user-friendly executive summary in both Spanish and English. Work with partners to disseminate report effectively.

Budget: $205,000

Strategy Goal: Continue to develop and refine an open-access hazards data portal that has the best available coastal hazards and climate change information for the Commonwealth.

Year(s): 2016-2020

Description of activities:

Continue to develop and refine an open-access hazards data portal that has the best available coastal hazards and climate change information for the Commonwealth. [This section should be expanded to clarify what aspects of the portal will be updated or refined (e.g., what data layers or other information will be added to the portal, what tools will be added or modified, etc.).]

Major Milestone(s):

User-friendly tool updated with the best available coastal hazards and climate change information to access hazards related data and information in support of

coastal communities resilience planning and awareness (New spatial layers added based on work done in updated state of the climate).

Develop metrics and a user experience monitoring tool, such as Google analytics, to determine tool use and make improvements

Conduct focus group workshops with existing and potential users to improve the tools usability and features.

Budget: $115,000[75]

Strategy Goal: Assess the successes of the community-based adaptation pilot programs conducted in the last cycle and develop guidance based on the lessons learned for future community-based climate adaptation plans

Year(s): 2017

Description of activities:

Assess the successes of the community-based adaptation pilot programs conducted in the last five years and develop guidance based on the lessons learned for future community-based climate adaptation plans.

Major Milestone(s):

Meeting of the five pilot project teams with PRCZMP staff to determine lessons learned and recommend next steps and method modifications.

Assess what limitations exist for implementation of adaptation actions in order to identify potential legislation and policy changes (e.g., "right-to-know" or coastal hazards disclosure law)

Revised adaptation method and strategies based on the lessons learned from five community-based adaptation pilot planning projects (PRCZMP 312 metrics).

[75] CMO will use in-house resources, capabilities, and existing tools developed through previous work funded through the PRCZMP (i.e., PRCCC portal), as well as open source and free software and resources available online .

Budget: $35,000

Strategy Goal: Develop draft legislation with legal consultation for policies and recommendations for creation of adaptation mechanisms that protect life and property, specifically expected is a real estate "right-to-know" or hazard disclosure law.

Year(s): 2016-2018

Description of activities:

Using past research by PRCZMP on right-to-know laws around the world, draft legislation with legal consultation and conduct meetings and workshops with elected officials to provide education and information as well as to assess the feasibility of adopting such legislation.

Major Milestone(s):

Draft law resulting from the legal consultation, the regional and Commonwealth-wide meetings/workshops.

4 regional meetings/workshops

1 Commonwealth-wide meeting/workshop

Outreach and education materials that communicate the results of strategy products to provide legislation with a reasonable chance of adoption (to be developed with partners)

Draft legislation presented to legislature with partners for adoption

Budget: $65,000

VII. Fiscal and Technical Needs

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

Fiscal support through in-kind contributions (fig. 5) have been committed by the members of the Executive Secretariat of the PRCCC (PRCCC Executive Secretariat comprised of members of the PRCZMP, Puerto Rico Sea Grant College Program, Caribbean Integrated Coastal and Ocean Observing System (CariCOOS), University of Puerto Rico, National Oceanic and Atmospheric Administration and Puerto Rico Seismic Network, U.S. Forest Service) and it is anticipated many more members of the PRCCC will provide fiscal support. The action items and milestones described in this strategy will not be possible without those contributions. Fig. 5 provides examples of the types of expected support. Additionally, PR DNER and NOAA will support a new NOAA Coastal Management Fellow that will work with the Director of the PRCZMP to coordinate the next State of the Climate and to enhance the online decision support tools. For additional support the PRCZMP has submitted a proposal for the FY 2015 Regional Coastal Resilience Grants Program[76].

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

Technical support through in-kind contributions have been committed by the members of the Executive Secretariat of the PRCCC (PRCCC Executive Secretariat comprised of members of the PRCZMP, Puerto Rico Sea Grant College Program, Caribbean Integrated Coastal and Ocean Observing System (CariCOOS), University of Puerto Rico, National Oceanic and Atmospheric Administration and Puerto Rico Seismic Network, U.S. Forest Service) and it is anticipated many more members of the PRCCC will provide technical support. The action items and milestones described in this strategy will not be possible without those contributions. Fig. 5 provides examples of the types of expected support. Additionally, PR DNER and NOAA will support a new NOAA Coastal Management Fellow that will work with the Director of the PRCZMP to coordinate the next State of the Climate and to enhance the online decision support tools. For additional support the PRCZMP has submitted a proposal for the FY 2015 Regional Coastal Resilience Grants Program[77].

[76] http://coast.noaa.gov/data/docs/funding/ffo-resilience-2015.pdf
[77] http://coast.noaa.gov/data/docs/funding/ffo-resilience-2015.pdf

5-Year Budget Summary by Strategy

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

COASTAL HAZARDS						
Strategy Title	**Year 1 Funding**	**Year 2 Funding**	**Year 3 Funding**	**Year 4 Funding**	**Year 5 Funding**	**Total Funding**
Facilitate the development of the next State of the Climate 2014-2016, an island-wide, multi-sector vulnerability assessment	$85,000	$80,000	$40,000			$205,000
Continue to develop and refine an open-access hazards data portal	$20,000	$20,000	$25,000	$30,000	$20,000	$115,000
Assess the successes of the community-based adaptation pilot programs conducted in the last cycle and develop guidance		$35,000				$35,000
Develop draft legislation with legal consultation for policies and recommendations for creation of adaptation mechanisms that protect life and property			$25,000	$20,000	$20,000	$65,000
Total Funding						$420,000

Appendix A

5 stakeholder & public engagement

Stakeholder and Public Engagement Activities

Stakeholder and public engagement for the Sec. 309 Assessment and Strategies 2016-2020 included publishing the draft S&A online at the Puerto Rico Coastal Zone Management Program website[78], providing opportunities for public and stakeholder input and recording notes/outputs on variety of coastal management issues (see below section *meetings and facilitated workshops)*, and administering an online survey sent to 1, 244 people specific to the 2016-2020 Sec. 309 Assessment and Strategies.

I. *Meetings and Facilitated Workshops*

Numerous public meetings and workshops informed much of the assessment and strategy elements included in this document. Principally, the following meetings, discussions and facilitated workshop outputs were used:

- V and VI PRCCC Summits (5th Summit: March 28, 2014 and 6th Summit: October 3, 2014)
- Wetlands Workshop: Antilles Rapid Assessment Method (March 20, 2014)
- Meeting: Conservation and Management of Wetlands of Puerto Rico (Specific topic: Conservation, Restoration, Mitigation and Management of Wetland Ecosystems of High Ecological Value) (June 25 and 26, 2015)
- Encuentro – Coastal Municpalities (March 26, 2015)
- 1st Conference on Climate Change and Drought in Puerto Rico (April 23 and 24, 2015)
- Caribbean Landscape Conservation Cooperative Steering Committee Face to Face, Stakeholder Annual Meetings and Workshops (including Ecosystem-based Adaptation workshop with The Nature Conservancy)
- Annual symposia for the planning of marine spaces (5th Symposium: July 17, 2015)

II. Survey Methods

A. An online survey[79] was sent out to the PRCZMP Master list of 1,244 people as well as the PR-CC-Listserv. 38 responses were received for a 3% response. Majority of respondents were individual citizens (11 or 28.9%) with second highest respondents

[78] http://drna.gobierno.pr/oficinas/arn/recursosvivientes/costasreservasrefugios/pmzc/descripcion

[79] Form (via google docs) can be found for a limited time at: https://docs.google.com/forms/d/1mu_YEjdyJQl17w9Voq8fQrWaJgVAiqDOyeBSrTPa0aQ/viewform#start=invite

being state employees (8 or 21.1%), followed by federal employees (7 or 18.4%), academia (5 or 13.2%), non-governmental organizations (4 or 10.5%), and municipal (2 or 5.3%). 57% reported that they had also participated in PRCZMP consultations and/or meetings. The PRCZMP is pleased that such a high percentage (42.1%) were new voices.

B. Below is the opening paragraph for the Survey (in Spanish):

Encuesta de Percepción Sobre Prioridades Programáticas: 2016-2020

Departamento de Recursos Naturales y Ambientales de Puerto Rico
PROGRAMA DE MANEJO DE LA ZONA COSTANERA

La Sección 309 sobre Asignaciones para el Mejoramiento de la Zona Costanera (Coastal Zone Enhancement Grants) de la Ley Federal para el Manejo de Zonas Costeras (CZMA, por sus siglas en inglés) provee la oportunidad de solicitud de fondos para que las jurisdicciones con Programas de Manejo de la Zona Costanera desarrollen iniciativas que mejoren los programas en las siguientes áreas: Humedales, Riesgos Costeros, Acceso Público, Impactos Acumulativos, Desperdicios Marinos, Planificación de Áreas Especiales, Recursos Oceánicos y Grandes Lagos, Identificación de Áreas para el Desarrollo de Facilidades Energéticas y Acuacultura.

El Departamento de Recursos Naturales y Ambientales (DRNA), a través del Programa de Manejo de la Zona Costanera (PMZC) se encuentra en el proceso de preparación de la solicitud de fondos para atender las siguientes áreas: Humedales, Riesgos Costeros, Acceso Público, Desperdicios Marinos, Recursos Oceánicos y Grandes Lagos, Identificación de Áreas para el Desarrollo de Facilidades Energéticas y Acuacultura (vea las descripciones de cada categoría al fin de esta introducción).

La evaluación de Impactos Acumulativos no se considera para financiamiento durante este ciclo, debido a que en ciclos pasados el PMZC financió el desarrollo de la metodología para la evaluación de impactos acumulativos y se promovió la incorporación de este requisito en el marco de la nueva Ley de Política Pública Ambiental de Puerto Rico, lo cual se materializó en 2004.

Por otro parte, la Planificación de Áreas Especiales es financiada través de fondos asignados al PMZC en el marco de la Sección 306 de la Ley Federal, CZMA.

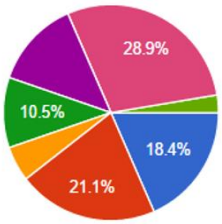
La siguiente encuesta tiene el propósito de reconocer la opinión de la ciudadanía para identificar las prioridades en las estrategias de conservación y manejo durante el período 2016-2020. Las respuestas serán aceptadas hasta el 17 de agosto 2015.

Si tiene alguna duda o pregunta sobre la encuesta, puede comunicar con nosotros al siguiente correo electrónico:
pmzc@drna.gobierno.pr

III. Survey Results

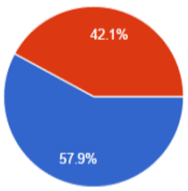
A summary of survey results (in Spanish) is below. For open ended questions the bolded responses (emphasis added) indicate responses consistent with the selection by the PRCZMP of focusing on a Wetlands Strategy and a Coastal Hazards Strategy.

¿Qué tipo de organización o agencia que representa?



Federal	**7**	18.4%
Estatal	**8**	21.1%
Municipal	**2**	5.3%
ONG	**4**	10.5%
Universidad	**5**	13.2%
Negocio	**0**	0%
Ciudadano/Individuo	**11**	28.9%
Other	**1**	2.6%

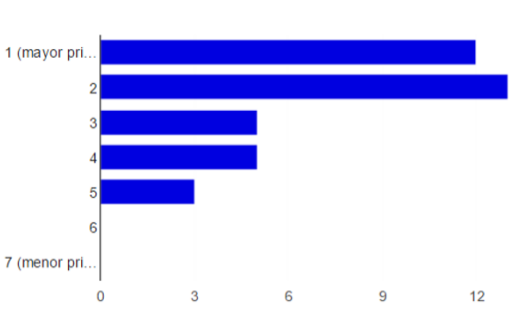
¿Ha participado en consultas o reuniones públicas realizadas por el Programa de Manejo de la Zona Costanera?



Sí	**22**	57.9%
No	**16**	42.1%

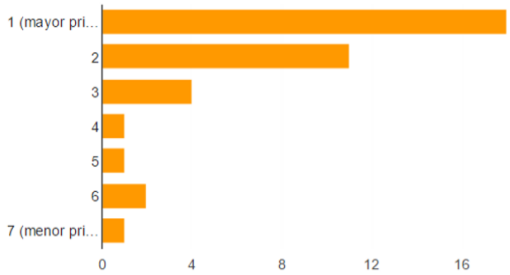
PERCEPCIÓN SOBRE PRIORIDADES POR CATEGORÍA

Humedales (hábitats costeros) [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



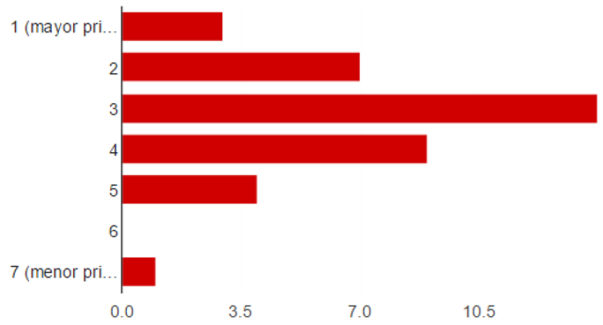
1 (mayor prioridad)	**12**	31.6%
2	**13**	34.2%
3	**5**	13.2%
4	**5**	13.2%
5	**3**	7.9%
6	**0**	0%
7 (menor prioridad)	**0**	0%

Riesgos Costeros (cambios climáticos, incremento del nivel del mar, inundaciones) [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



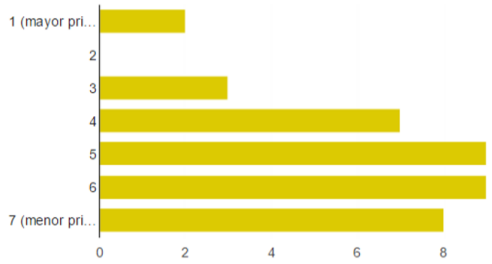
1 (mayor prioridad)	18	47.4%
2	11	28.9%
3	4	10.5%
4	1	2.6%
5	1	2.6%
6	2	5.3%
7 (menor prioridad)	1	2.6%

Desperdicios Marinos [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



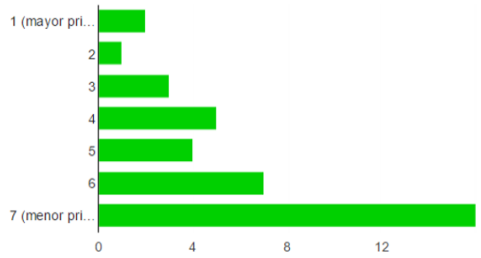
1 (mayor prioridad)	3	7.9%
2	7	18.4%
3	14	36.8%
4	9	23.7%
5	4	10.5%
6	0	0%
7 (menor prioridad)	1	2.6%

Identificación de sitios para el desarrollo de facilidades energéticas [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



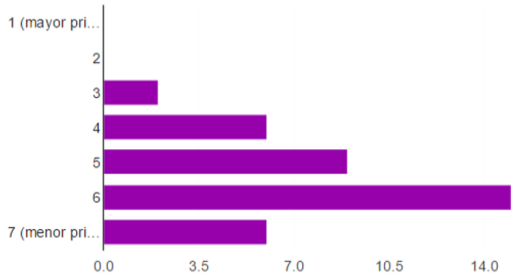
1 (mayor prioridad)	2	5.3%
2	0	0%
3	3	7.9%
4	7	18.4%
5	9	23.7%
6	9	23.7%
7 (menor prioridad)	8	21.1%

Recursos Oceánicos y de los Grandes Lagos de los Estados Unidos (Lake Huron, Lake Michigan, etc) [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



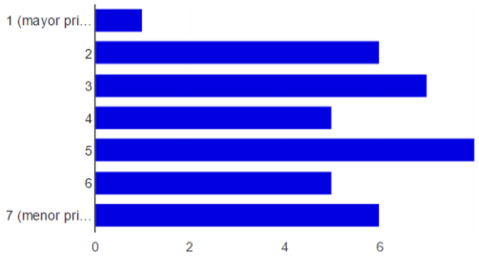
1 (mayor prioridad)	2	5.3%
2	1	2.6%
3	3	7.9%
4	5	13.2%
5	4	10.5%
6	7	18.4%
7 (menor prioridad)	16	42.1%

Acuacultura [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



1 (mayor prioridad)	0	0%
2	0	0%
3	2	5.3%
4	6	15.8%
5	9	23.7%
6	15	39.5%
7 (menor prioridad)	6	15.8%

Acceso Público a las costas y playas [De acuerdo a su opinión cuáles deben ser las áreas prioritarias de acción para el mejoramiento de la situación actual de los recursos costeros. Ordenar las categorías elegibles del 1 (mayor prioridad) al 7 (menor prioridad):]



1 (mayor prioridad)	1	2.6%
2	6	15.8%
3	7	18.4%
4	5	13.2%
5	8	21.1%
6	5	13.2%
7 (menor prioridad)	6	15.8%

Favor, explicar su selección en esta sección.

Humedales costeros, mayormente los palustrinos, se encuentran en un estado severo de degradacion. No existe practicamente ninguna informacion de caracter cuantitativo para saber donde, como y cuando intervenir para mejorar la calidad de habitat para la vida silvestre.

Entendemos que es de suma urgencia poder identificar aquellos lugares cercanos o en la zona costera que nos puedan ayudar a brindar oportunidades diversas de fuente de energia, como es utilizar el Impulso Marino, el viento y otros. Tambien para creas espacios para desalinizar el agua para crear nuevas Fuentes de Agua potable.

Nuestra situación de Isla y localización en El Caribe, nos hace atractivos para el desarrollo del turismo, particularmente el costero. No obstante, si dicho turismo no es realizado de forma sostenible y no se respetan los sistemas costeros, como los humedales, los riesgos y las consecuencias ante los cambios climáticos serán mayors. Las pérdidas de vida y propiedad, así como de sistemas serán mayors.

Entiendo que esas son las prioridades

Entiendo que ante la problematica actual, la principal prioridad debe ser el attender los riesgos costeros. Esta es una de las causas de muchos de los problemas que nos quehjan en la actualidad, como las areas residenciales inundadas, problemas por deslizamientos, las viviendas e infraestructura en areas cercanas a la costa, el aumento en el nivel del mar y sus implicaciones, las sequias, que seran mas recurrentes, el manejo adecuado de los recursos, etc. ahí cae el manejo de las áreas humdeales. teniendo todo lo anterior en cuenta, se dirime el acceso a las costas y se determina donde ubicar la infraestructura, teniendo en cuanta su vida util, El manejo de los desperdicios y la contaminacion en general y la acuacultura como una tecnica de manejar la crisis alimentaria y el control de las especies/

Porque apesar de que todas las areas son sumamente importantes en atender, la disposicion inadecuada de desperdicios sólidos no peligrosos es lo que está afectando enormemente las zonas costeras y la flora y fauna marina y nuestras costas son muy importantes para la economia del pais.

No se esta cumpliendo a cabalidad con la ley de acceso a las playas. El cambio climatico es evidente, y la erosion costera tambien, y es culpa de seguir usando combustibles fosiles para electricidad y transportacion. Hay que desarrollar la acuacultura para seguridad alimentaria. La basura (y el sedimento) en el mar impacta la base de nuestro sustento y las especies en peligro de extinction.

Los riesgos costeros, accesos publicos y humedales deben ser ;a prioridad ya que estan grandemente relacionados con el desarrollo economico del pais.

1. Riesgos costeros: relación del incremento del nivel del mar, la erosión costera y los impactos a la infraestructura crítica y residencial con cambio climático. 2. Los humedales y hábitats costeros como las dunas proveen servicios ecológicos que contribuyen al sostenimiento d ela biodiversidad , a la vez que reducen la vulnerabilidad de las comunidades costeras y la infraestructura. 3, El turismo y la recreación son sectores importantes de la sociedad y la economía. El libre acceso a las playas y a la costa es uno de los elementos fundamentales para potenciar el desarrollo de este sector.

Todas las áreas son prioritarias y de suma envergadura**. Sin embargo, ante la crisis ambiental se le debe de dar prioridad a los humedales, ya que son ecosistemas de extensión limitadas, pero de suma importancia para la sostenibilidad, mitigación de desastres y secuestro de carbono. En este sentido, el # 1 y el # 2 están atados.**

En Puerto Rico tenemos un serio problema de mala disposicion de desperdicios solidos lo cual no solo afecta elequilibrio ecologico de las costas, rios y bosques sino tambien afean los lugares tursiticos lo cual afecta nuestra economia que tanta atencion necesita. Los recursos oceanicos son muy importantes para nuestro bienestar por nuestra naturaleza de isla (como fuente de alimento, proteccion, salud publica, turismo) y por ese deben ser una prioridad. **Los riesgos costeros tambien deben ser una prioridad alta ya que en PR no estamos preparados para estos cambios que ya estan ocurriendo y es necesario darle prioridad a esta necesidad ya que es muy poco lo que se esta haciendo actualmente con este tema en la isla.** La identificacion de sitios para el desarrollo de facilidades energicas es importante pero es mas facil de hacerse si se integran esfuerzos de otros proyectos de conservacion actualmente llevandose a cabo Los humedales, la acuacultura y los accesos publicos creo que tienen importancia pero a menos escala. Trabajar con humedales es un poco dificil por la permisologia que requieren, la acuacultura puede tener serios impactos ecologicos a nuestras poblaciones locales y son costosas de llevarse a cabo y los accesos publicos siempre seran una necesidad continua que debe trabajarse, sin embargo si se educa bien a la ciudadania y estos cooperan no habria mucha necesidad de delimitar estas zonas para su proteccion y el disfrute del visitante.

Los humedales costeros son los criaderos de muchos peces de valor economico, sin ellos merma la pezca.

1. Humedales protegen costas (naturalmente) y apoya la prioridad #2 2. Proteccion de vida humana y propiedad (idenficar propiedades que Deben ser desalojadas) 3. Un problema continua, tenemos poco control, pero afecta directamente la vida marina, ecosistemas costeros y economia. 4. No veo relacion 5. Mantener PR y sus recursos en el campo de vision. 6. Promueve economia 7. Apoyo 100 % acceso a la costas y playas, pero apoyo mas la planificacion. **Todo infraestructura dirigida a crear acceso a zonas costera debe ser disenado y constsruido para promover la conservacion del recurso.**

Acciones en el reconocimiento fectos y planes de mitigación al cambio climático son una necesidad inmediata para Puerto Rico. sin esto loas otras acciones no pueden trabajarse adecuadamente a mediano y largo plazo.

Los habitats costeros deben primero que nada, ser protegidos, asegurar que están libre de actividades detrimentales incluyendo construcciones y/o actividades publicas que impactan su salud. Asegurar que el gobierno y sus agencias no violan sus leyes, incluyendo las federales. Los riesgos costeros por el cambio climático debe ser segunda prioridad especialmente por el impacto a las comunidades costeras y a la construcción costera que se esta aprobando recientemente. El manejo de desperdicios va a la par con la #1 pero es imprecindible que se desarrollen programas de integración comunitaria y educación para que los ciudadanos entiendan el impacto de la contaminación a la salud costera, de nuestras aguas y directamente a nuestra comunidad. El acceso publico a las costas y playas debe ser fomentado creando un balance de conservación como fundamento y limitando el nivel de construcción/destrucción de la ecología y nuestros paisajes.

La prioridad del programa debe estar en la conservación de los recursos para beneficio de todas las especies, no solo para la actividad humana. Hemos sobreexplotado tanto los recursos costeros que deberían enfatizar sus esfuerzos en la recuperación de estos recursos como los humedales, las costas erosionadas, reservas de agua potable, etc. No se pueden olvidar del aspecto educativo ya que de nada servirá todo lo que hagan, si no involucran a la ciudadanía, principalmente a los mas jóvenes.

Si atendemos los riesgos costeros como una prioridad, podría implicar que ya estaríamos identificando sitios con menos riesgos para el desarrollo de facilidades energéticas al igual que le otorgamos su espacio a la naturaleza y podríamos utilizar los humedales costeros como "buffer zones" y zonas de protección natural. Esto ayudaría a su vez a establecer los lugares de accesso a las costas.

Para que las personas puedan disfrutar de las costas se necesita conocer sus capacidades, comportamiento ante los cambios, etc. Una vez esta información se tiene disponible, es menester llevarla al público.

La prioridad deben ser humedales costeros, la restauracion de estos significa un aumento en el recurso pesquero, mejoramiento de habitat para especies en peligro de extinsion y proteccion del entorno costero para las inclemencias del tiempo. Los desperdicios marinos siguen en aumento y cada vez mas estamos viendo la vida marina afectandose; enredandose, ahogandose, y muriendo a causa de estos desperdicios. Por ultimo toda conservacion debe estar enlazada con el mejoarmiento de las plantas de tratamiento. La contaminacion que traen al ambiente costero es grande, los efectos acumulativos seran detrimentales para todo ecosistema en la Isla.

El cambio climático representa el mayor reto costero en el próximo siglo. Por lo tanto debemos desarrollar estrategias para la adaptación y resiliencia. Mi selección intenta seguir esa idea.

Las selecciones son basadas en la situacion socioeconomica actual de PR y de proteccion a habitat costeros para proteger ecosistemas que pudieran dar seguridad alimentaria

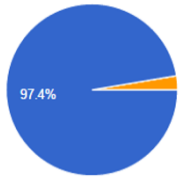
Estas respuestas están basadas en la protección a los residentes y conservación del recurso.

Protegiendo los habitats costeros y minimizando impactos antropológicos como la construcción en la costa disminuye grandemente los riesgos como pérdida de propiedad debido a la erosión e incrementos en el nivel del mar y otros relacionados con los tsunamis. Además garantiza el acceso público y el disfrute de este recurso a los ciudadanos.

Los hábitats costeros nos están protegiendo de los impactos de los CC, pero son vulnerables y sin ellos no nos podríamos adaptar a los CC. Los desperdicios marinos son una amenaza a los hábitats costeros.

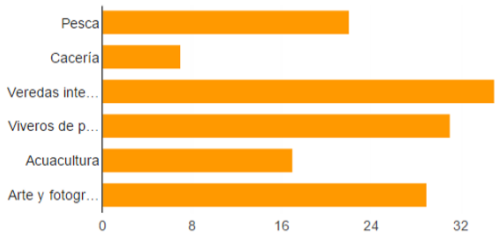
PREGUNTAS Y COMENTARIOS

¿Estaría interesado en obtener información sobre opciones de participación comunitaria y voluntariado en la protección de humedales y hábitat costeros de su comunidad?



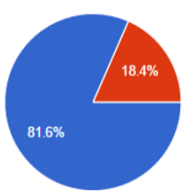
Sí	37	97.4%
No	0	0%
Other	1	2.6%

¿Cuáles de las siguientes alternativas considera compatible con el uso sustentable de los humedales?



Pesca	22	57.9%
Cacería	7	18.4%
Veredas interpretativas y kayaks	35	92.1%
Viveros de plantas humedales	31	81.6%
Acuacultura	17	44.7%
Arte y fotografía	29	76.3%

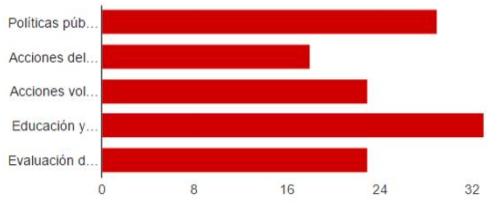
¿Cree usted que su residencia o la de alguien que usted conoce puede ser afectada por el aumento del nivel del mar o inundaciones costeras?



Sí	31	81.6%
No	7	18.4%

¿Qué estrategia(s) favorecería usted para promover la protección de vida y propiedad ante los riesgos costeros? Ordenar las categorías elegibles del 1 (mayor prioridad) al 5 (menor prioridad):

¿Qué estrategia(s) favorecería usted para promover la protección de vida y propiedad ante los riesgos costeros? Ordenar las categorías elegibles del 1 (mayor prioridad) al 5 (menor prioridad):



Políticas públicas y reglamentación	29	76.3%
Acciones del sector privado	18	47.4%
Acciones voluntarias	23	60.5%
Educación y concienciación ciudadana	33	86.8%
Evaluación de casos de estudio	23	60.5%

¿Otras? (Describir)

Evaluar y establecer areas para deposito de dolos con el doble proposito de crear arrecifes artificiales y reducir la energia costera, fomentando asi la formacion de dunas, que protegen la costa.

Dar poderes decisionales y de acción a las comunidades.

Acuerdos colaborativos entre el DRNA y el DE para que los jóvenes utilizen sus horas de servicio comunitario para participar en proyectos de impacto positivo ambiental. Creo que se está perdiendo esa oportunidad de involucrar a los jóvenes en proyectos verdaderos.

Educación -1 Acciones Voluntarias =2 Evaluación de casos-3 Acciones del Sector Privado-4 Políticas Públicas-5

RESPALDAR ONGs, fomentar participación ciudadana en todo proceso de proyectos de las agencias gubernamentales.

Enforcement que si una comunidad es desalojada por que sus viviendas en ese lugar en particular, representa un peligro a la vida y propiedad, no se permita que otras personas ocupen el area. Se mantienn un ciclo

1. Educación y concienciación ciudadana (más importante que la reglamentación, porque si no hay conciencia, no hay fiscalización de las leyes, y no hay acciones del sector privado) 2. Políticas públicas y reglamentación 3. Acciones del sector privado 4. Evaluación de casos de estudio (importante, pero ya hay suficiente data de casos de estudio)

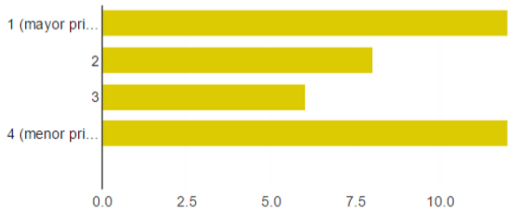
Reubicación a lugares seguros.

Delimitar bien la zona maritimo terrestre, dejar de dar permisos para construccion en la costa.

1- educación y cocienciación ciudana. 2- políticas públicas y reglamentación 3- acciones voluntarias 4- evaluación de casos de estudio 5- aciones de sector privado

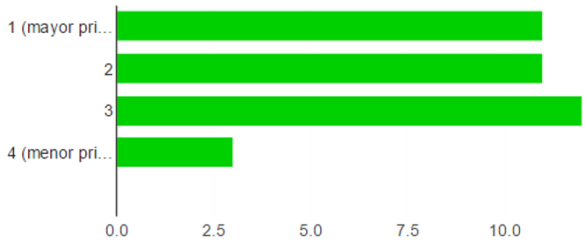
La pesca, la cacería y la acuicultura podrían ser usos sostenibles para los humedales pero considero que dependiendo de muchos factores. 1) No necesariamente es bueno para todos los lugares,. 2) Depende de las prácticas o tipo de pesca/acuicultura 3) Depende de si hay recursos para asegurar que los usos se estén llevando a cabo correctamente y siguiendo ciertas prácticas.

El derecho al acceso a la información ("Right-to-Know"/"Full Disclosure")(ejemplo de la Florida*) [De acuerdo a su opinión cuáles deben ser las prioridades de las políticas públicas que podrían desarrollarse para mejorar la gestión de los recursos costeros y marinos en Puerto Rico. Ordenar las categorías elegibles del 1 (mayor prioridad) al 4 (menor prioridad) o añadir otras sugerencias en el espacio provisto para ellos.]



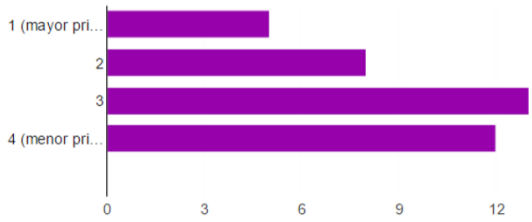
1 (mayor prioridad)	12	31.6%
2	8	21.1%
3	6	15.8%
4 (menor prioridad)	12	31.6%
	0	0%

retroceso estatuto: regla retroceso obligatoria (como la Zona Marítimo-Terrestre) [De acuerdo a su opinión cuáles deben ser las prioridades de las políticas públicas que podrían desarrollarse para mejorar la gestión de los recursos costeros y marinos en Puerto Rico. Ordenar las categorías elegibles del 1 (mayor prioridad) al 4 (menor prioridad) o añadir otras sugerencias en el espacio provisto para ellos.]



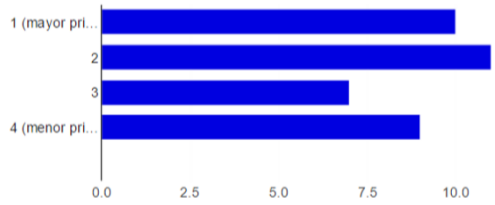
1 (mayor prioridad)	11	28.9%
2	11	28.9%
3	12	31.6%
4 (menor prioridad)	3	7.9%
	0	0%

retroceso estatuto: área de adaptación (ejemplo de la Florida**) [De acuerdo a su opinión cuáles deben ser las prioridades de las políticas públicas que podrían desarrollarse para mejorar la gestión de los recursos costeros y marinos en Puerto Rico. Ordenar las categorías elegibles del 1 (mayor prioridad) al 4 (menor prioridad) o añadir otras sugerencias en el espacio provisto para ellos.]



1 (mayor prioridad)	5	13.2%
2	8	21.1%
3	13	34.2%
4 (menor prioridad)	12	31.6%
	0	0%

implementación completa de la ley de humedales en Puerto Rico (ley 314) [De acuerdo a su opinión cuáles deben ser las prioridades de las políticas públicas que podrían desarrollarse para mejorar la gestión de los recursos costeros y marinos en Puerto Rico. Ordenar las categorías elegibles del 1 (mayor prioridad) al 4 (menor prioridad) o añadir otras sugerencias en el espacio provisto para ellos.]



1 (mayor prioridad)	10	26.3%
2	11	28.9%
3	7	18.4%
4 (menor prioridad)	9	23.7%
	0	0%

Si tiene usted otras sugerencias, favor explicar y ordenar por prioridad en esta sección.

N/A

Planificacion: La ordenacion territorial en PR, incluyendo el propuesto PUT, es un ejercicio de poesia. Menos verborreo y mas substancia, por ejemplo: Dado que el cambio climatico se debe a la quema de combustibles fosiles, definir claramente las areas que favorecemos para instalacion de proyectos de viento (predios agricolas, como se hace efectivamente en todo el mundo) y fotovoltaicos (en techos y estacionamientos).

Que el gobierno sea consistente con el manejo de su política pública

Imposición de ley que impida la entrada a la Isla de materiales (empaques, "foam"etc) que no tengamos la manera de disponer adecuadamente de ellos. Si no entra a la Isla, menos basura para nuestras playas y menos vertederos. Darle un verdadero seguimiento al problema de la basura (principalmente costera) y el reciclaje.

Revisar redacción de las opciones: En lugar de retroceso estatuto, usar: Retiros o zonas de separación obligatoria (como la Zona Marítimo Terrestre)

Favor, explicar su seleción en esta sección.

Una población educada puede tomar sabias decisiones. Eso es lo primero! Y luego debemos hacer cumplir las leyes y reglamentos que ya existen y que han tomado mucho esfuerzo y dinero.

La regla de retroseso y la de humedales tienen una funcion esencial, especificamente para eliminar proyectos ya hechos en la zona maritimo terrestre y para los proyectos de construccion futuros en la costa.

Segun mi entender asi es la mejor forma

Actualmente se debe trabajar la adaptación a los cambios que se ven poco a poco, sin dejar de prestar atención a la prevención de los problemas.

los humedales no se protegen como deberian y en muchas ocasiones se secan para construir casas y no se hace nada. se les debe dar mas proteccion y estar pendiente del recurso.

No permitir construcción futura en la zona maritima terrestre. Fijar un pago de fianza regresivo a las viviendas, negocios e industrias que actualmente ocupan la zona marítima terrestre.

Las prioridades. Un plan definido, elaborado y bien implementado, sobre el cuidado y mantenimiento de los recursos costeros.

El menosprecio por nuestros humedales aun está latente en nuestra sociedad y éstos deben ser la prioridad por los servicios expectaculares que brindan. Si debemos echarnos para atrás en las costas y permitir que se recupere el litoral; pero siempre manteniendo informada a la ciudadanía.

N/A

.

La accesibilidad a toda la información y datos sobre la implantación de políticas nos permite evaluar con conocimiento y sin engaños en bienestar de toda la comunidad (bien común).

Las humeldades deben ser protegidas bajo las reglamentaciones existentes y no se debe permitir que otras leyes creen "loopholes" para ignorar dichas leyes que, por ejemplo promueven participación comunitaria, vistas publicas, estudios de Declaración de Impacto Ambientales. El proceso "fast track" de permisos debe ser anulado.

NA

Acceso a la información es algo muy importante y lo han mencionado en las reuniones públicas del Programa- Evaluación 312- (2015)

Deben implementarse reglamentos que ya están establecidos, pero que no se cumplen.

antes de tomar una accion se deben de llevar a cabo correctamente las leyes existentes que tiene la isla.

El retroceso en la ZMT debe ser obligatorio.

Desconozco la ley completa de humedales y por eso la seleccioné al final, no, porque sea menos importante. Mas bien quisiera decir que no tengo criterios para ordenar esa alternativa. Me parece importantísimo evitar el desarrollo de infraestructura y relocalizar en la medida que sea posible el desarrollo de infraestructura en zonas costeras. Como desarrollo me refiero a infraestructura como vivienda. Puede haber desarrollo recreacional sustentable. Por otro lado, los propietarios existentes y futuros, de haber, deberían estar informados de los posibles riesgos y responsabilidades que adquieren con su propiedad.

La otorgación de permisos y planificación de proyectos debe ser información mas pública y transparente a la población. De esa manera se educa y se previenen proyectos que representen alto riesgo a la comunidad.

En lugar de retroceso estatuto, usar: Retiros o zonas de separación: Área de Adaptación (Ejemplo de Florida)

Access to information important decision making and policy development and implementation

Ser mas estrictos en la implementacion de las leyes y hacerlas cumplir.

Pocas opciones en esta seccion, dos de las cuales son del retroceso, lo cual no favorezco por lo limitadisimo de nuestra extension territorial. Planificar como proteger nuestra tierra de la erosion seria mas favorable para mi, y por planificar me refiero a lo siguiente: Hay que decidir qué hay que hacer en cada region o situacion (incluyendo retroceder) y ponerlo en orden de prioridades. El "right-to-know" es esencial para la libertad.

El retroceso estatuto establece las reglas de juego para todo desarollo.

Ser mas abierto a a los permisos y obras para construccion como en los EEUU que permiten obras en areas de mangles y otras con un plan de mitigacion.

Segun comente en la seccion anterior la prioridad deben ser los humedales por las razones expuestas.

Desarrollar un programa de educación /información al público- masivo TV, radio y escuelas. Esto promoverá acciones comunitarias.

La informacion debe estar disponible para que se tomen decisions basadas en ciencia

La implementación completa de la ley de humedales en Puerto Rico ayudaría no solo a resolver problemas existentes, pero a evitar otros. En una isla de extensión territorial limitada, los humedales son el ecosistema más importante.

Mientras mas informados estemos mejors decisions podemos tomar.

Si la ley dice que la franja de salvamento debe ser de x metros, eso no debe variar, no debe haber exepciones ni variaciones. Por algo se hizo la ley. hay que hacerla cumplir fiel y cabalmente

La ley de humedales, zona maritimo-terrestre y area de adaptacion Deben ser consolidades en una sola herramienta legal (ley y reglamentos) de Puerto Rico para facilitaar el proceso de acceso a informacion y referencia.

De todas la alternativas el trabajar con la dterminación de la zona maritima terrestre y la Ley de Humedales son las mas criticas.

Cualquier exito en ayudar a resolver el problema en nuestras zonas costeras debe tener una amplia divulgacion y educacion a la comunidad y a la comunidad estudiantil.

Considero que la flexibilidad con las construcciones en la zona maritimo terrestres y el descontrol del turismo naútico son la base para los problemas que, al presente, tienen muchos de nuestros sistemas costeros.

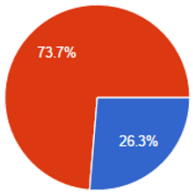
Se debe de respetar la ZMT por que es un bien de dominio publico. Se debe de garantizar el acceso a las playas de toda la población. Esto se consigue haciendo cumplir la reglamentación

Se debe brindar mayor atención y dirigir los esfuerzos en la implementación de los insturmentos legales existentes. Por tal razón, se identificó como prioridad la opción: "Implementación completa de la ley de humedales en Puerto Rico". De igual forma, procede en prioridad aquellas políticas publicas sobre retroceso (obligatorio y estatuto), ya

que de esta manera se puede reforzar el control para evitar los "desarrollos" en las zonas costeras, los cuales afectan en muchas ocasiones los recursos costeros y marinos del País.

Tendría que estudiar con mayor detenimiento los dos ejemplos de Florida pero ambos me parecen ejemplos interesantes y necesarios. En Puerto Rico los bancos te obligan a pagar un seguro basado en zona inundable pero no necesariamente hay conciencia sobre riesgos futuros por aumento en el nivel del mar. El reglamento que controla asuntos del ZMT es una herramienta buena pero no siempre bien implementada.

¿Considera que la señalización y rotulación sobre accesos públicos a la costa y las playas es adecuada?



Sí	**10**	26.3%
No	**28**	73.7%

Si su respuesta es NO, ¿cómo la mejoraría?

- Reparar mucha rotulación existente (e.g. el camino del Balneario Seven Seas a Playa Escondida en Fajardo). - Hacer un operativo para arrestar a ciudadanos que dañen letreros y hacerlo público a manera de escarmiento a otras personas. - Las notificaciones de la JCA de enterococos y coliformes fecales en los balnearios usualmente no están actualizadas.

Debe haber mas rotulacion y con mas indicadores flechas de direccion y reflectivos que sean visibles

Identificación de rampas, accesos etc y nueva rotulación además del uso de Google Earth, Goolge Maps y otras estrategias de GIS comunitario y gratuito para identificarlas.

Proveer información de los recursos en el area y educacional. Fomentar programas ONG que provean vigilancia y educación.

Estandarizando la rotulación que utilizan las agencias del gobierno central (Ej. DTOP- ACT-DRNA) con la que utilizan los municipios, en términos d esímbolos, colores, contenido y tipo de letras sobre la base de un sistema coordinado.

Las rotulaciones deben ubicarse un poco más retirado del area de impacto del oleaje. Muchos rotulos se pierden por el embate de la ola y se pierde el esfuerzo.

Entiendo que es una tarea monumental.

muchas veces no existe o es muy poca.

En costas urbanas el acceso es limitado y en ocasiones privado. En ese caso el problema no es la rotulación sino el acceso.

No es mejorarla, sino es desarrollarla por que es inexistente.

Deben estar dirijidos a la comunidad que se desean impactar, no deben ser generalizados; no todas las playas y/o ecosistemas en la Isla tienen la mismas caracteristicas y/o necesidades. Poca informacion sobre lugares peligrosos para banistas, ninguna informacion sobre especies reglamentadas en la pesca, ninguna informacion sobre reglamentos de proteccion.

La implementación de programas de tipo comunitario son necesarias en estas áreas para promover el sentido de pertenencia de las comunidades cercanas.

Muchas playas y acessos no estan rotulados.

La Junta de Playas debe reunir a los adminitradores de balnearios y municipios para desarrollar: 1) Página de internet y de facebook- donde utilizando últimos inventarios de playas (Barreto, M., 2015) se identifique nombre de la playa, fotos, tipo de pioblación que pudiera asistir, condición oleaje, marejadas, calidad del agua (info brindada por JCA) etc. De esta forma se une información de la academia, diferentes agencias y hasta se puede tener info de ciudadanos y ONG. **Existen diferentes inbventarios de playas ninguno esta claro cuáles playas son de mejor condicion y para que tipo de población. Información digital es más fácil de actualizar que rotulos. 2) Rótulos con un mismo formato, que contengan reglas básicas de seguridad, educación ambiental, contactos en emergencias (ambiental - vigilantes DRNA o emergencias de otro tipo), etc.

Es que de nada sirve un rótulo si permitimos los portones, verjas y demás construcciones en la zona de dominio público.

Tienen que ser más llamativos y visibles; el área de acceso debe estar bien definida.

Existen rotulos sobre seguridad, pero sobre accesos public aún falta mucho.

Tener una cobertura completa de la Isla para rotulacion y orientacion al publico.

Que todas las playas tengan el mismo tipo de rotulo, hemos visto lugares forrados de letreros dañados y deteriorados, que no se pueden leer. Se podrian hacer rotulos grandes que tengan toda la informacion en vez de poner 10 rotulos por toda la playa. Que tengan actividades permitidas y las que no.

Reemplazar rótulos perdidos o destruidos y poner nuevos rótulos.

No tengo opinion.

Mantenimiento ante nada.

Aumentar el número de rotulación, simplificar los diagramas y hacerlos en español, inglés y francés.

Presencia en mapas usados en aplicaciones de "smartphones". Letreros en carreteras.

Elige hasta tres áreas prioritarias y explique cuáles son los problemas críticos relacionados

HUMEDALES (HÁBITATS COSTEROS)

Deberian establecer politica publica referente a esto Ya el Ley de Aguas Limpia Seccion 404 atiende esto a nivel federal

El desarrollo desmedido, cambios en el drenaje natural de áreas, proyectos de control de inundaciones, la utilización desmedida de agua proveniente de acuiferos subterraneaos, especies invasivas, escorrentias contaminadas con sediment y otros contaminantes como pesticidas.

Mar Atlantico en Puerta de Tierra- construcciones implementadas sin Declaración de Impacto Ambiental por DTOP (area del Hamburguer) y por AFI en el "Paseo Lineal de Puerta de Tierra" Destrucción de Zona Marítimo Terrestre, de Arrecifes de Coral Acropora Palmata, de area protegida por el Endangered Species Act (ESA) y categorizada como Critical Habitat.

Reciben basura, Son vistos como áreas de mal olor, no se entiende la importancia de ls mismos en procesos de inundaciones, hábitat, etc. Se les elimina y son los escuds contra las marejadas

Educación, falta de implantación de las leyes (ej condado hay condominios que han dañado y eliminado manglares)

Contaminación por basura e introducción de desechos humanos. Aguas residuales y aguas de escorrentía contaminada.

La deforestación en el ecosistema de estos incurren en el corrimiento de tierra (landslides) y desprendimientos que incrementan el sedimento. La deforestación crea un desbalance ecológico entre flora y fauna disminuyendo la protección a los humedales.

contaminacion de los humedades usos no adecuados eliminacion de los humedales para hacer casas

Desarollo no-planificado, falta de controles en proyectos de construccion, descargas ilegales comerciales y domesticas.

-contaminacion -sobrepesca -pesca ilegal/ pesca furtiva -redes de pesca -construcciones ilegales- -obstruccion del flujo de agua

Interrupción de suministro de agua, acumulación de basura y pobre o ninguna rotulación.

La ignorancia y el menosprecio de la gente ante los manglares y los acuíferos principalmente. Se debe prohibir la construcción en estas zonas que a la larga afectan a otras zonas, provocando inundaciones, sequías, etc.

desvalorizacion de los humedales, muchas veces debido a que los mismos estan en un cierto nivel de degradacion y la sociadad no ha adquirido el valor que tiene. hay que darle mayor valorizacion a los servicios ambientales que estos proveen.

Su delimitación.

Caño Tiburones - muchos áreas de acceso, disposición inadecuada de desperdicios (chatarra, vertederos clandestinos), cacería, vertedero (lixiviados), manejo en function de las aves acuáticas y para el turismo de naturaleza, desarrollos en la zona de amortiguamiento. Pantano Espinar - tenencia privada, propuestas de desarrollo

Uno de los problemas críticos en estos hábitas costeros es la construcción desmedida que afecta la integridad y hasta la existencia de los mismos.

Deforestacion provocaria un impacto directo a los recursos biologicos del pais.

Relleno, construcción, contaminación y extracción de agua.

- Tiende a ser un área de alta demanda para usos urbanos, particularmente turísticos (no sostenibles). - Falta de espacios para 'migración de habitat' por estar 'estrangulados' por usos urbanos. - Poca áreas de hábitat costero protegido (playa, bosque seco costero, costa rocosa)

Si se eligen los humedales como áreas de prioridad, de una vez se brega con varios problemas (desperdicio en las costas, cambio climático y alza del nivel del mar, pescaderías) ya que estas áreas inciden sobre todas los temas de preocupación en cuanto a las costas.

Destruccion de humedales por diversas causas.

Nuestros criaderos

1. Modificaciones de la hidrología 2. Contaminación y aumento en cargas de nutrientes 3. Rellenos y deforestación

Educacion y Orientación a la ciudadania sobre la importancia de éstos para lacontinuidad de la vida.

relleno illegal de humedales, como basurero, para ganar acceso al mar o para construer desvio de Fuentes de agua dulce hacia el humedal, se altera el cauce de la fuente de agua dulce hacia el humedal poda ilegal

Pérdida de Biodiversidad Contaminación del agua

Contaminación Destrucción del hábitat

Humedales herbaceos en estado grave de degradacion de habitat luego del abandono de agricultura y eutroficacion. Restauracion es posible, si el DRNA lo quiere hacer.

RIESGOS COSTEROS (CAMBIOS CLIMÁTICOS, INCREMENTO DEL NIVEL DEL MAR, INUNDACIONES)

Adaptation

Ignorar por completo estatutos de planificacion.

1. Inundaciones costeras 2. Erosión de playas 3. Aumento del nivel del mar exacerbará los anteriores (1 y 2) con aumento en la vulnerabilidad y posibles consecuencias para las comunidades y la infraestructura

Falta de educación No hay planes reales de adaptación Falta de fondos para trabajar este asunto

Educación e investigaciones cientificas,

Propiedades ubicadas en zonas suceptibles a inundacion. Asignacion y falta de herramienta legales y fondos para desalojar zonas y reubicar residentes a areas seguras.

Las areas turisticas que estan cerca de las costas se veran afectadas y las personas que de escasos recursos que viven cerca tambien se veran afectadas. Las inundaciones afectan a todos parte es por la falta de conciencia que hay y tiran la basura en los alcantarillados y eso afecta mucho y a todos.

-Falta de conocimiento sobre riesgos y vulnerabilidades en el público, en las agencias y en los líderes. -Falta de políticas públicas para reducir riesgos y vulnerabilidades/aumentar resiliencia/planes de adaptación. -Necesidad de tener una visión integral sobre problemas y soluciones.

Area Norte - Vega Baja, Arecibo, Barceloneta, etc. Area Suroeste - Rincon, etc. Area Sureste - Yabucoa, Maunabo, Patillas, etc.

Falta de educación a las comunidades bajo riesgo, se deben presentar casos existentes (ej. Islas del Pacífico) para que se vea cuán cercano se está a la exposición del aumento del nivel del mar.

Reglamentos de construcción en la zona marítimo/terrestre. Eliminación de seguros para los que no cumplan.

La construcción desmedida en los espacios marítimo - terrestre y el paso vehicular incrementan el desprendimiento de tierra y las barreras naturales disminuyen. El robo de arena en las playas debilitan estos ecosistemas.

1. Cuando el nivel del mar aumente 3' perderemos los aeropuertos LMMIA y Ceiba, las plantas de tratamiento de aguas usadas principals, etc. Hay que reducir nuestro consumo de combustibles fosiles y hay que preparar la costa.

Mucha informacion cientifica, poca que la comunidad pueda entender.

Va a pasar, se tiene que tomar cartas en el asunto.

Erosión, pérdida del recurso de playa, pérdida de la propiedad e infraestructura como carreteras.

construcciones cercanas al mar. ademas de estar en riesgo por el incremento en el nivel del mar, van limitando el acceso a las playas.

Costa Noreste de Puerto Rico incluyendo la Zona Metropolitana Erosión de costa en la Costa Oeste y Norte de la Isla.

comunidades establecidas en áreas adyacentes al mar infraestructura como carreteras, plantas de aguas sanitarias, de generacion de electricidad, etc, en areas adyacentes al mar perdida de terreno, en el caso de PR que es una Isla

Los problemas mas criticos es falta de conocimiento de la ciudadania sobre como actuar en una emergencia, los efectos del cambio climatico, mejores practicas de construccion para prevenir impactos a hogares en tiempo de clima extremo.

Mar Atlantico en Puerta de Tierra- construcciones implementadas sin Declaración de Impacto Ambiental por DTOP (area del Hamburguer) y por AFI en el "Paseo Lineal de Puerta de Tierra" Destrucción de Arrecifes de Coral los cual sirven de barrera natural contra marejadas. Destrucción de Alcantilado debido a la deforestación masiva a causa de la construcción, debilitando la integridad del talud.

Hay mucha construcción donde no debe estar y bien poca información o datos empíricos sobre su impacto en la ZMT. Este es un buen área para hacer proyectos de servicio comunitario con estudiantes como el Proyecto Sandwatch de Sea Grant.

Es una situación real a la que no se le ha prestado mucha atención, sobre todo no se le ha hecho claro al ciudadano común que es parte del problema.

Educacion y Orientación a la ciudadania, sobre la realidad que ya está presente del cambio climatico. Mucha gente lo percibe como q solo afectará Antártida, etc

Seguir construyendo en areas muy cercana a la costa provocaria erosion, inundaciones y perdida de playas.

DESPERDICIOS MARINOS

Pérdida de hábitats y poblaciones marinas.

Problema mundial.

Problema de descarga de aguas usadas o de escorrentia al mar, lo cual causa contaminación, problemas de salud publica y degradación de hábitats marinos.

Problemas criticos: falta de sentido de pertenencia para proteger los recursos costeros, uso de bolsas plasticas execesivo, necesitamos mejor estrategia de reciclaje en todos los municipios.

Educacion e implementation de leyes mas rigurosas.

Esta destruyendo la flora y fauna del area costera y mucha de las personas dependen de la pesca como fuente economica y tambien afecta el turismo interno e internacional.

Educación, unión con otros esfuerzos de ciudadanos.

-contaminacion por plantes de tratamiento -vida marina interaccionando con desperdicios tales gomo gomas, bolsas, globos de helio -

No se ha hecho la conexión entre la montaña y la costa, no se entienden las consecuencias.

Además de afectar a la salud de distintas especies y organismos marinos, se afecta el mercado de la pesquería, negocio que alimenta parte del turismo. Otras actividades acuáticas como el buceo y snorkeling se ven afectadas.

Controles estrictos y vigilados de lo que puede introducirse a las áreas marinas y costeras.

En TODAS las Playas de la isla pues no existe un sistema de reciclaje/manejo de basura eficiente. No existen agentes de la ley que pongan en vigor las leyes existentes de botar basura- nadie recibe multa por arrojar/dejar basura.

Contaminacion del mar problemas con las especies que confunden la basura con alimento. tortugas,etc.

Documentar, ilustrar y educar sobre la disposición de basura y escombros en nuestros cuerpos de agua dulce y como estos llegan al mar. Además establecer un programa de monitoreo de tipo y origen de los desperdicios marinos en nuestra jurisdicción.

daño a la vida marina

Hacer cumplir realmente la ley de reciclaje y evitar la entrada en los puertos de materiales que no sepamos como disponer de ellos luego. Tener mas vigilancia en las playas para evitar q dejen despedicios.

Dificil determinar dado el trafico de navios en el Caribe.

Boquerón Fajardo Parguera

Este es un problema que se agrava al no haber Fuentes alternas para disponer de los desechos domesticos y que es necesario trabajar arduamente para reciclar y eliminar los desperdicios hacia el mar.

3. Vienen de tierra-adentro, y hay que tener mejor "enforcement" de las leyes de arrojar basura y control de erosion.

Grandes cantidades de basura proveniente de diversos puntos dentro de las cuencas.

El volume de desperdicios incrementa y en ocasiones, se acumula en areas con acceso limitado, complicando el proceso de limpieza. Ademas, de ser un problema de estetica (afectando el turismo local/extranjero), representa un problema de manejo desperdicios que require fondos para ser eficiente y promover la disposicion y/o reciclaje de los mismos.

Plasticos Tapas de botellas de agua El interminable uso de las bolsas plásticas

IDENTIFICACIÓN DE SITIOS PARA EL DESARROLLO DE FACILIDADES ENERGÉTICAS

N/A

Buena manera para facilitar y dirigir el desarollo.

PR no tiene un plan definido para desarrollar las facilidades energéticas.

Es infraestructura costosa y que se espera que tenga una larga vida util, debe ser ubicada en un lugar que no sea susceptible a eventos climatologicos, prevenibles, como el aumento en el nivel del mar

2. Para prevenir y detener el cambio climatico hay que moverse a energia removable... no 6% sino 96%. Ahora es casi imposible establecer un proyecto de estos aqui. Por lo tanto, hay que encontrarles espacio adecuado.

No entiendo que significa esto?! En el mar? por oleaje? viento? gas?

EIS

Escasos y pobres estudios que evidencien la potencialidad del espacio geográfico seleccionado.

Este tema es muy pero muy importante por que hay que buscar Fuentes alternas de energia, como es el Impulso Marino, Energia producida por viento y otros. Por lo que hay que explorar todas las areas disponibles para implanter estos proyectos.

RECURSOS OCEÁNICOS Y DE LOS GRANDES LAGOS

Todos los lugares que ubiquen las grandes marinas de Puerto Rico.

Contaminación

N/A

Falta de operación adecuada en las reservas naturales para proteger y conservar los recursos marinos. Requiere mejoramiento en vigilancia, participación de usuarios y educación del publico.

- Sedimentación - Desperdicios de origen terrestre y marino -Sobre pesca -Cambio Climático / Acidificación -Áreas de mucho uso recreativo (botes/jetskis) y problemas asociados con malas prácticas (anclas; vertidos; velocidad excesiva)

Problemas criticos: fuentes de contaminacion terrestre fuera de control, 33% de las consrucciones en PR son ilegales, mal uso del recurso por parte de los turistas(impactos directos) y pescadores (sobrepesca).

NPI

Tampoco que quiere decir con esto?

El oceano puede ser feunte de produccion de energia, abasto de alimentos, transporte, etc

ACUACULTURA

Si se disenan y construyen adecudamente, no debe presentar un problema, sino una solucion al uso adecuado de terrenos en la zonas costeras.

Para seguridad alimentaria deberian permitir estras operaciones ya se han ido dos o tres fuera de PR ya que el proceso es burocratico e inalcansable

Lo peor que quedes hacer en humedales costeros.

Existe en PR? No conozco mucho sobre que se esta haciendo para promover esta act en PR

Creando una industria de acuicultura con la reglamentación e implementación adecuada para evitar contaminación al ambiente pudiera ser una parte de crecer la economía de Puerto Rico.

No tengo criterios para contestar.

Actividad muy limitada en la region de PR.

Maximizar el recurso pesca de forma controlada, sin explotar los arrecifes o las especies silvestre

ACCESO PÚBLICO A LAS COSTAS Y PLAYAS

Portones, privatización. falta de acción

N/A

Puede ser falta de reformas en las reglamentaciones existentes, poca implementación de leyes existentes o ambas.

1. Obstrucciones y limitación del acceso a las playas 2. Problemas de seguridad para los usuarios 3,. Rotulación clara que indique los usos compatibles y limitaciones en cada playa

La construcción desmedida en los espacios marítimo - terrestre y el paso vehicular incrementan el desprendimiento de tierra y las barreras naturales disminuyen. El robo de arena en las playas debilitan estos ecosistemas.

Visitar nuevas cosntrucciones costeras en las áreas norte, este, sureste y suroeste, a los fines de verificar si cumplen con dicho requisito.

las playas deben de ser de todos. cada vez hay menos playa. en un futuro, por tener estructura cercanas al mar, al momento que no haya arena, no habra playas publicas y habran mas estorbos publicos (casa abandonadas porque el mar entra a las mismas).

El que seamos una isla, rodeada de agua y con hermosas playas y el hecho de que el acceso a las playas debe ser libre de costo, el disfrute de las mismas viene con una responsabilidad que no se ha logrado instituir entre los que las disfrutan.

Garantizar el acceso público a las costas y playas es un derecho que debe ser garantizado, pero estoy de acuerdo con que hay algunas áreas que por su alto valor ecológico y sentisitividad el libre acceso al public debe ser controlado. Es muy lamentable, pero el libre acceso a estas áreas redunda en el pobre manejo de las áreas y gran presencia de basura entre otros problemas.

El Acceso a las Playas es un asunto que debe ser prioritario pq cada vez mas vemos propiedades tapando la vista al mar y el acceso a llegar libremente a las costas.

La mayoria del publico que va a las playas y areas costeros no son concientes y arrojan la basura a los suelos y la contaminan. Hay que educar a las personas y penalizarlas si no hacen las cosas bien.

Es un derecho y la realidad es que no se respeta el acceso publico al mar. Se debe garantizar el acceso físico y visual. Respetar la reglamentacion y la altura, distancia y separación de los edificios

Construcciones privadas y privadas-publicas no deben crear restricciones a las costas/playas.

Mentalidad de las personas Falta de acción por el gobierno No se cumplen las leyes y reglamentos

Importante para crea conciencia

education environmental assessment

¿Cómo puede el Programa de Manejo de la Zona Costanera fortalecer y mejorar su capacidad para abordar con mayor eficacia los problemas costeros?

Más iniciativas educativas que sean creativas y lleguen al público. Mas educación a los que toman decisiones que pueden afectar el uso del suelo. Mas coordinación entre agencias que toman decisiones que pueden tener un impacto para alinear las políticas públicas.

Mayor educación, uso de voluntarios- hay muchos jubilados que estan buscando que hacer con su tiempo.

Educación - comunidades, ciudadanía, currículos de enseñanza, instituciones públicas y privadas, Plan de Educación de Recursos Costeros Consejos de apoyo técnico Alianzas con los gobiernos municipales (Municipios)y federales (agencias)

Esta encuesta es un buen ejemplo de que estan utilizando herramientas sencillas, pero con alto valor informativo para planificar y manejar los problemas presentes y planificar para evitar problemas en el futuro.

Unir esfuerzos con entidades con mayor presencia comunitaria y de mayor actividad de voluntarios (Sierra Club, Fideicomiso, SJBEP y otros grupos de base comunitaria activos en las áreas especificas).

entran en los medios de comunicacion como TV, donde se puedan ver casos en otros lugares sobre los efectos del incremento del nivel del mar, beneficios de los humedales y libre acceso a las playas

Fomentado y respaldando participación comunitaria en programas/organizaciones. Tener una sección que se encargue de escuchar preocupaciones, querellas que emiten los ciudadanos y sus comunidades.

Están haciendo un gran trabajo sigan como van.

Si llevan a cabo un proyecto, denle seguimiento y mantenimiento. No es cuestion de reinventar la rueda.

Necesitan tener mas presencia en las comunidades, darle mas visibilidad a sus programas, ser mas eficientes en el cumplimiento de reglamentos y leyes ambientales, ofrecer programas educativos de mercadeo social innvadores para cambiar comportamiento de la gente.

. Community,local based stewardship.

Ayudando al proceso de planificacion: identificando prioridades segun los riesgos y las soluciones disponibles.

Creando alianzas con los ONGs, negocios e industrias para poner en vigor la reglamentación existente que promueve el uso sustentable de la zona maritima terrestre.

mayor contacto con los ciudadanos

A través de la inclusión de la comunidad en distintas actividades educativas, de restauración de ecosistemas y de conservación. Sin el cambio de las acciones humanas que afectan los ecosistemas antes mencionados no habrán buenos resultados a largo plazo. Al tratar estos problemas desde la raíz (educando niños a temprana edad y deteniendo la contaminación antes que llegue al cuerpo de agua) se notarán los efectos.

Este programa debe formar alianzas con otros grupos, agencias y divisiones dentro de la agencia a la que pertenece para crear un plan en donde se incluya todos los aspectos que incluye el manejo de la zona costanera. La vision de ver cada ente a parte es lo que ha creado que el manejo y toma de desiciones sea lento o no el mas acertado de acuerdo a las politicas de manejo y principalmente de conservacion.

Involucrar a la comunidad

Creando mas programas de conocimiento ciudadano. La gente no conoce el trabajo que realizan.

Mayor exposición en la Prensa y en los Medio. Entiendo que PMZC hace mucho por PR pero los asuntos se quedan tras bastidores o se discute entre personas involucradas. Entiendo que debe tener mayor protagonismo y también dar a conocer su trabajo a aquellas personas que no esten involucradas. Los habitates deben saber que tenemos personas capacitadas y oficinas en esta isla que SI hacen un buen trabajo.

Tener dientes fuertes.

Debe infromar mas al publico

1. Desarrollar y ptimizar os sistemas de apoyo a la toma de decisiones (Ej. Portales y visualizadores como herramientas analísitcas) 2. Desarollar y apoyar la implementación de políticas públicas 3. Aumentar y fortalecer la diseminación de la información sobre la gestión integral de la zona costanera y recursos marinos y costeros. 4. Fortalecer la coordinación con los gobiernos locales fomentando la participación ciudadana en los procesos de toma de decisiones y la implantación de proyectos en la zona costanera.

- Simposios regionales - Activando una red de humedales (como la red de playas) - lazos a nivel de ciudadanos con otras islas del Caribe

Preparar talleres y orientaciones para nuestros políticos donde reconozcan nuestra realidad de Isla, nuestra vulnerabilidad. Que verdaderamente legislen con eso en mente y no con la creencia de que somos un gran continente. Hacerlos que se interesen verdaderamente en nuestros recursos naturales para el disfrute de las futuras generaciones tambien. De nada valen todas las iniciativas q el DRNA pueda tener si quienes tienen el poder está trabajando en contra de ellas.

Desarrollar proyectos con las comunidades.

Tratar de garantizar que se respite la politica pública. Otorgar multas a quienes no cumplan con la reglamentacion applicable. que sea una unidad de enforcement

Contacto frecuente con la comunidades. Acceso a herramientas de obtención de datos y visualización de los mismos. Videos. webinar y otroas referencias en la web.

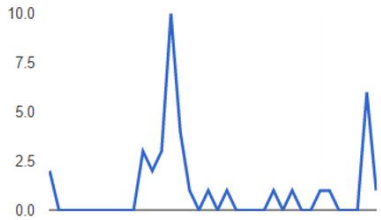
Permitiendo la participacion publica, no solo en las reunions que son requisites.

Buscar un mejor apoyo de los ciudadanos. Ellos solo no pueden hacer todo se necesita la cooperacion de todos.

Tener mayor participación de voluntarios y ONG que atienden estos recursos costeros.

Promover proyectos de participación comunitaria en el manejo resiliente de los ecosistemas marinos.

Number of daily responses




PROGRAMA DE MANEJO
ZONA COSTANERA


ESTADO LIBRE ASOCIADO DE PUERTO RICO
DRNA
DEPARTAMENTO DE RECURSOS NATURALES Y AMBIENTALES