

Program Assessment and Strategy for Enhancement

**Performed Pursuant to Section 309 of the
Coastal Zone Management Act of 1972 as
Amended**

**Prepared by the
Rhode Island Coastal Resources Management
Council**

FINAL
August 2015

Table of Contents

Introduction	3
Summary of Recent 309 Achievements	4
Assessment	6
Wetlands.....	6
Coastal Hazards.....	14
Public Access.....	23
Marine Debris	30
Cumulative and Secondary Impacts.....	33
Special Area Management Planning	37
Ocean and Great Lakes Resources.....	39
Energy and Government Facility Siting.....	43
Aquaculture	45
Strategy	48
Wetlands Strategy	48
Coastal Hazards Strategy	53
Five Year Budget Summary by Strategy	56
Summary of Stakeholder and Public Comment	57
References	60

Introduction

The Coastal Zone Enhancement Program encourages state and territorial coastal management programs to strengthen and improve their federally approved coastal management programs in one or more of nine areas. These “enhancement areas” include wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management plans, ocean and Great Lakes resources, energy and government facility siting, and aquaculture. The enhancement program was established under Section 309 of the Coastal Zone Management Act (CZMA), as amended.

Every five years, states and territories are encouraged to conduct self-assessments of their coastal management programs to determine problems and enhancement opportunities within each of the nine enhancement areas—and to assess the effectiveness of existing management efforts to address identified problems. Each coastal management program identifies high priority management issues as well as important needs and information gaps the program must fill to address these issues.

This is the sixth Assessment and Strategy that the Rhode Island Coastal Resources Management Council (CRMC) has submitted under §309 of the federal Coastal Zone Management Act. Five previous assessments were prepared. As in previous assessments, this one is directed at the nine §309 enhancement areas delineated by the Congress. Each is discussed in a separate chapter using a template provided by the National Oceanic and Atmospheric Administration (NOAA).

This document combines the section 309 Assessment and Strategy requirements into a single document. It contains an assessment of the RICRMP for each of the nine areas contained in section 309, and the Council's strategy for enhancing the RICRMP in the two areas identified as high priority (Coastal Hazards and Wetlands). These priority areas were determined using input from an online survey administered to stakeholders that included state and nonprofit agencies, municipalities, private sector trade organizations, academia and CRMC staff. Stakeholders were asked to rank each of the nine enhancement areas as a high, medium or low priority. They were also given the opportunity to suggest areas of priority outside the nine enhancement areas and provide additional comments. The survey results were compiled, and the two enhancement areas receiving the most “high priority” rankings from stakeholders (wetlands and coastal hazards) have been addressed in this assessment and strategy. Concurrently, CRMC completed Phase I assessments for all nine enhancement areas, the results of which are included in this document. The results of these assessments contributed to the identification of wetlands and coastal hazards as high priority areas and provided the basis for further (Phase II) analyses and strategy development.

Summary of Recent Section 309 Achievements

Since the last assessment cycle, significant progress has been made towards the goals and objectives set out in the 2010-2015 Assessment and Strategy, specifically towards implementation of the strategies developed for the enhancement areas of Ocean Resources / Energy Facility Siting, Wetlands and Coastal Hazards.

The Ocean SAMP, a marine spatial planning document that provides recommendations for offshore energy project siting, was formally adopted by the CRMC in October of 2010, and approved as a routine programmatic change by NOAA in 2011. Since then, agency activities have focused on its implementation. This has included supplemental research, the development of a future scientific research agenda and outreach via marine spatial planning trainings and an International Marine Spatial Planning Symposium. In 2012 applications were submitted by developer Deepwater Wind for a 5MW wind energy project within the Renewable Energy Zone established by the SAMP. In 2013 a biennial review of the SAMP was conducted that identified accomplishments as well as opportunities for improvement of the SAMP process. In the spring of 2015, the first SAMP five-year update process was initiated.

A working group was formed in 2013 to provide feedback for the development of a state coastal wetland habitat restoration strategy. A document has been drafted and additional research, assessment and modeling conducted to refine the strategy objectives. A workshop was held in cooperation with the Narragansett Bay National Estuarine Research Reserve, EPA and Save The Bay in April of 2014, which was attended over 100 researchers, ecologists, managers and restoration practitioners throughout the southern New England region. This workshop provided feedback on research and management needs for coastal wetland restoration that is being used to refine the existing strategy document. The CRMC received funding through NOAA's Coastal and Ocean Climate Applications program, and in partnership with RI Sea Grant, The Nature Conservancy and Save The Bay has used the Sea Level Affecting Marshes Model (SLAMM) along with recent LiDAR elevation data to assess projected sea level rise impacts to coastal salt marshes at various sea level rise scenarios. The effort has identified opportunities for land conservation, restoration and adaptation, and will be incorporated into the Beach SAMP process to inform program changes that further address sea level rise. The resulting maps from the SLAMM analysis have been adopted into the RICRMP as a planning tool. In addition, the CRMC-funded RI Salt Marsh Assessment (RISMA) was completed by Save The Bay and results compiled in a final report in December of 2014. This report summarizes a two-year, three-tiered effort conducted at 39 marshes throughout the state to evaluate current marsh condition and the potential impacts of sea level rise. Results from both the SLAMM and RISMA efforts have been incorporated into a draft coastal wetlands restoration strategy that has been developed and vetted via a diverse group of stakeholders and restoration practitioners. The strategy will help to inform future program changes and the CRMC's habitat

restoration funding program. The CRMC has partnered with the RI Department of Environmental Management to include a coastal freshwater wetland component in the strategy using funding from EPA's Wetland Program Development Grant program.

In the past five years, much of the focus of the RI CRMC has been on climate change and sea level rise as they relate to coastal hazards and the resilience of coastal communities. A Shoreline Change Special Area Management Plan, also referred to as the Beach SAMP is now in development (<http://www.beachsamp.org/>) that is focused on science-backed policies and planning tools to assess vulnerability and improve resilience to coastal hazards, particularly storm surge, sea level rise and erosion. Through partnerships with the scientific and academic community and an intensive stakeholder engagement process, the objectives of the Shoreline Change SAMP are to:

1. Gather new data and information on what areas, resources or infrastructure may be impacted by erosion, flooding or sea level rise;
2. Identify tools and best practices that have been used effectively elsewhere to deal with shoreline change;
3. Provide educational and outreach opportunities for people to learn more and provide their comments and opinions; and
4. Improve state policies to better address the impacts of shoreline change.

Completed products of the Beach SAMP effort include internet accessible STORMTOOLS maps (<http://www.beachsamp.org/maps/stormtools/>) that show inundation levels of 25, 50, and 100 year return periods throughout the state, with 1, 2, 3, and 5 foot sea level rise scenarios. These maps are intended to support coastal analysis and planning for storms and sea level rise. Products in development include updated shoreline change maps for the entire Rhode Island shoreline including Block Island.

Assessment

Wetlands

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

Note: For the purposes of the Wetlands Assessment, wetlands are “those areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” [33 CFR 328.3(b)].

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. *Using 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)	96621.2 (10.6% of state)	
Net change in total wetlands (in acres)	from 1996-2011	from 2006-2011
	-688.5	-71.4
Net change in freshwater (palustrine wetlands) (gained or lost)*	from 1996-2011	from 2006-2011
	-685.4	-70.5
Net change in saltwater (estuarine) wetlands (gained or lost)*	from 1996-2011	from 2006-2011
	-2.9	-2.9

Net change in Unconsolidated Shore wetlands (% gained or lost)	from 1996-2011	from 2006-2011
	-0.2	2.0

How Wetlands Are Changing*		
Land Cover Type	Area of Wetlands Transformed to Another Type of Land Cover between 1996-2011 (Acres)	Area of Wetlands Transformed to Another Type of Land Cover between 2006-2011 (Acres)
Development	-711.7	-57.8
Agriculture	6.2	9.3
Barren Land	-19.6	-3.3
Water	15.3	-11.6

If you add up the total for wetland area lost 1996 to 2011 in the second table above, it equals -708 acres. The difference between that and the first table highlights changes that have occurred in wetland condition, or type compared to those land covers most likely to be associated with actual losses. Some of those changes may include changes of wetland to natural upland categories, or vice-versa. Many of these additional changes are associated with timber, or silviculture, activities which (depending on the management practices in your area) may result in additional losses (not noted in table 2 above). It should also be noted that some of the above changes may not reflect permanent wetland losses and that changes to water may reflect a loss of vegetative wetlands, but could also be associated with gains in unvegetated wetland types (such as unconsolidated bottom), which C-CAP does not map.

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	Y
Wetlands programs (e.g., regulatory, mitigation, restoration, acquisition)	N

2. *For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:*
 - a. *Describe the significance of the changes;*
 - b. *Specify if they were 309 or other CZM-driven changes; and*

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

The CRMC received funding through NOAA’s Coastal and Ocean Climate Applications program, and in partnership with RI Sea Grant, The Nature Conservancy and Save The Bay has used the Sea Level Affecting Marshes Model (SLAMM) along with recent LiDAR elevation data to assess projected sea level rise impacts to coastal salt marshes at various sea level rise scenarios. The effort has identified opportunities for land conservation, restoration and adaptation, and will be incorporated into the Beach SAMP process to inform program changes that further address sea level rise. The resulting maps from the SLAMM analysis have been adopted into the RICRMP as a planning tool. This effort also included a critical wetlands analysis that identified important wetland complexes based on size and avian habitat value. This and other summary data on predicted wetland gains and losses are being incorporated into the state coastal wetlands restoration strategy, which is supported by Section 309 funding.

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.*

This enhancement area was ranked highly in our stakeholder survey and has been the focus of many of the agency’s state and regional coordination activities, e.g. the EPA’s Southern New England Region Coastal Watershed Restoration Partnership and the Upper Narragansett Bay Water Quality Study led by the RI Bays, Rivers and Watersheds Coordination Team. There is a consensus among decision makers, restoration practitioners and other stakeholders that the impacts of sea level rise to coastal wetlands represent an urgent threat.

In-Depth Resource Characterization:

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	Sea Level Rise	Throughout coastal zone
Stressor 2	Development	Throughout coastal zone
Stressor 3	Nutrient Input	Throughout coastal zone

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.*

Extensive peat degradation, vegetation die-off and increased marsh surface ponding has been documented in salt marshes throughout the state as part of the RI Salt Marsh Assessment (Raposa et al. 2014). It is hypothesized that these changes are the result of increased flooding of the marsh surface due to rising sea levels. This hypothesis is supported by recent observations documenting the average rate of increase in RI marsh elevation (1 to 2mm/yr) as significantly lower than the current rate of sea level rise (7.5mm/yr from 2000-2013, as recorded at Newport tide station). Recent studies (Carey et al., 2014) have also shown that accretion rates in marshes have not increased in the last 30 years in part due to warming temperatures and higher decomposition rates of the organic matter in the marsh. The results of the SLAMM model also show extensive marsh losses to open water due to sea level rise.

Development represents a confounding factor to the threat of sea level rise because dense coastal development can create barriers that prevent marshes from migrating inland as sea levels rise. In addition, development can increase nutrient inputs to marshes which have been shown to reduce belowground biomass and reduce the resilience of salt marsh to sea level rise impacts (Watson et al., 2014) substrate.

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
New and Emerging Restoration Techniques such as Thin Layer Deposition / Beneficial Re-use of Dredged Material on marsh surfaces	Effectiveness of these techniques has not yet been tested in the New England region. Results of projects currently in progress will inform their future use in RI.

Herbivory	Body of work on crab herbivory in MA marshes identifying it as significant stressor; more info needed on how herbivory and SLR interact as stressors, particularly in RI marshes.
-----------	---

In-Depth Management Characterization:

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

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

Management Category	Employed By State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Wetland assessment methodologies	Y	N	Y
Wetland mapping and GIS	Y	N	Y
Watershed or special area management plans addressing wetlands	Y	N	N
Wetland technical assistance, education, and outreach	Y	Y	Y
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.*
 - Describe significant changes since the last assessment;*
 - Specify if they were 309 or other CZM-driven changes; and*
 - Characterize the outcomes or likely future outcomes of the changes.*

Please see the Summary of Recent Section 309 Achievements section of this document for descriptions of the RI Salt Marsh Assessment (RISMA) assessment effort and the Sea Level Affecting Marshes Model mapping / GIS effort. Information from both of these efforts will be incorporated into the Shoreline Change SAMP and may inform future policy and regulation changes. As part of both efforts, the resulting information was presented at multiple venues to diverse audiences that included state agencies and planning bodies, municipal planning professionals, conservation organizations and the general public. A regional workshop on salt marshes and sea level rise that included

presentations on both efforts was organized in April 2014 by the Narragansett Bay Estuarine Research Reserve, Save The Bay, EPA and CRMC. Outreach to 21 coastal municipalities was conducted under the SLAMM effort through a series of targeted and public workshops to gain input on the model results and explain the resulting maps and how they may be used for coastal planning. The maps have been made available to the general public both via ArcGIS online and in PDF format on the CRMC website.

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 results of the SLAMM modeling effort have emphasized the importance of CRMC's policies and regulations establishing upland buffer zones adjacent to coastal wetlands. These upland areas from which development has been restricted represent potential future wetland migration corridors.

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: Coastal land acquisition / protection

Description: Given the extensive coastal wetland losses predicted to occur as a result of increased rates of sea level rise, priority should be given to preserving and protecting low-lying upland areas that can serve as potential wetland migration corridors. The applicability of existing tools for assessing coastal wetland vulnerability to climate change and sea level rise (e.g. CCVATCH, Marsh Futures, etc.) should be explored and the tools refined for use in prioritizing coastal land acquisition / protection in Rhode Island.

Management Priority 2: Evaluating effectiveness of new coastal wetland restoration and enhancement methodologies

Description: New methodologies such as elevation enhancement through thin layer deposition of dredged materials and artificial wetland creation should be explored to address the emerging threat of increased rates of sea level rise. These methodologies should be evaluated in the context of improving wetland function and resilience to climate change and sea level rise.

Management Priority 3: Reevaluating traditional restoration methodologies

Description: The effectiveness of traditional restoration methodologies, such as increasing tidal exchange should be reevaluated in the face of rising sea levels.

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	Need more information on marsh migration processes, role of <i>Phragmites</i> , topography, upland landscape characteristics in marsh migration; information on effectiveness of marsh intervention actions at improving resilience to climate change and sea level rise; potential role of restored wetlands as carbon sink / GHG mitigation measure.
Mapping/GIS	Y	Mapping of marsh vegetation community changes over time, mapping of marsh transition zones, mapping of marsh transgression / migration if it is occurring
Data and information management	Y	Clearinghouse for future marsh assessment data and standardization of monitoring parameters so that trends can be analyzed and tracked over time
Training/capacity building	N	
Decision-support tools	Y	Validation of SLAMM model outputs, vulnerability assessments, prioritization tools to evaluate different marsh intervention actions
Communication and outreach	Y	Outreach to communicate importance of coastal land protection, functions and values of coastal wetlands and the effects of climate change and sea level rise on those functions and values, and to explain new restoration techniques such as thin layer deposition of dredged sediments.
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.*

Since the last assessment, a great deal of effort has been put into assessing and modeling the impacts of sea level rise on Rhode Island's coastal wetlands. The resulting information has been incorporated into program guidance for the CRMC's habitat restoration program. There is also a great deal of emerging science, such as that connected to the Waquoit Bay National Estuarine Research Reserve's "Bringing Wetlands to Market" project, on the role of wetlands as carbon sources or sinks and their potential for greenhouse gas mitigation and use in voluntary carbon markets. We would like to make further use of this information as well as the stakeholder input gathered as part of these efforts to update the RI CRMP, and create a habitat restoration section within the program that highlights these emerging issues and threats to coastal wetlands.

Coastal Hazards

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

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. **Flooding:** *Using data from NOAA’s State of the Coast “Population in the Floodplain” viewer and summarized by coastal county through NOAA’s Coastal County Snapshots for Flood Exposure, indicate how many people were located within the state’s coastal floodplain as of 2010 and how that has changed since 2000. You may 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	98,504	108,690	10.3%
No. of people in coastal counties	1,048,319	1,053,959	0.5%
Percentage of people in coastal counties in coastal floodplain	9.4%	10.3%	NA

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,” 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	Percent of Coastline
Very low (>2.0m/yr accretion)		
Low (1.0-2.0 m/yr accretion)		
Moderate (-1.0 to 1.0 m/yr) stable	244	100%
High (-1.1 to -2.0 m/yr) erosion		
Very high (<-2.0 m/yr) erosion		

The CRMC, as part of its current 309 Project of Special Merit, is updating the existing shoreline change maps for the entire state and creating new maps for Block Island. These maps will be used to conduct a more detailed vulnerability assessment and identify and characterize at-risk areas.

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”, 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	Percent of Coastline
Very low	110	45%
Low	135	55%
Moderate		
High		
Very high		

The CRMC, as part of its Shoreline Change SAMP development effort has developed STORMTOOLS (<http://www.beachsamp.org/resources/stormtools/>), intended to be a web-based service that provides an online user interface for multiple coastal planning tools. These include inundation maps that display inundation areas for multiple sea level rise and coastal storm scenarios. These tools will be used to conduct more detailed vulnerability assessments and identify and characterize at-risk areas.

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 ¹ (H, M, L)
Flooding (riverine, stormwater)	H
Coastal storms (including storm surge)	H
Geological hazards (e.g., tsunamis, earthquakes)	L
Shoreline erosion*	H
Sea level rise	H
Great Lake level change	n/a
Land subsidence	L
Saltwater intrusion	unknown
Other (please specify)	

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:			
<i>elimination of development/redevelopment in high-hazard areas²</i>	Y (through CMP established buffers and setbacks)	N	N
<i>management of development/redevelopment in other hazard areas</i>	Y	Y	N
<i>climate change impacts, including sea level rise or Great Lake level change</i>	Y	Y	Y
Hazards planning programs or initiatives that address:			
<i>hazard mitigation</i>	Y	Y	Y
<i>climate change impacts, including sea level rise or Great Lake level change</i>	Y	Y	Y
Hazards mapping or modeling programs or initiatives for:			
<i>sea level rise or Great Lake level change</i>	Y	Y	Y
<i>other hazards</i>	Erosion	Y	Y

¹ 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*

² Use state’s definition of high-hazard areas.

2. Briefly state how “high-hazard areas” are defined in your coastal zone.
In general, “high hazard” refers to areas delineated on FEMA Flood Rate Insurance Map within the VE Zone, or areas with a 1 percent or greater chance of flooding in a given year and an additional hazard associated with coastal storm waves. These include the ocean shrorefront of the towns of Westerly, Charlestown, South Kingstown and Narragansett, which are vulnerable to coastal flooding with a considerable amount of existing development in flood-prone areas (Salt Ponds SAMP, RICRMC 1999).
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:*
 - 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.*

The Shoreline Change SAMP (in progress) represents a significant hazards planning effort that will include new mapping and modeling initiatives for sea level rise and coastal flooding under various storm scenarios and for erosion rates along the entire RI shoreline including Block Island. Portions of this project have received 309 Project of Special Merit funding, including the statewide update of shoreline erosion rate maps and coastal policy development. Other project components, including green infrastructure planning, adaptation strategy development and municipal outreach have received funding from multiple state and federal sources.

Enhancement Area Prioritization:

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

High X
Medium
Low

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

This enhancement area was ranked highest priority in our stakeholder survey. Recent major coastal storms have emphasized the importance of coastal hazards planning, and the Shoreline Change SAMP process is already underway and a major focus of the agency’s efforts since the last assessment.

In-Depth Resource Characterization:

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

1a. **Flooding In-depth** (for all states besides territories): Using data from NOAA’s *State of the Coast* “Population in the Floodplain” viewer and summarized by coastal county through NOAA’s Coastal County Snapshots for Flood Exposure, 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				
	Under 5 and Over 65 years old		In Poverty	
	# of people	% Under 5/Over 65	# of people	% in Poverty
Inside Floodplain	24,419	22%	10,245	9%
Outside Floodplain	86,576	78%	103,588	91%

1b. **Flooding In-depth** (for all states besides territories): Using summary data provided for critical facilities, derived from FEMA’s HAZUS and displayed by coastal county through NOAA’s Coastal County Snapshots for Flood Exposure, 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	55	20	35	5	0	35
Coastal Counties	521	63	78	17	16	39

2. *Based on the characterization of coastal hazard risk, what are the three most significant coastal hazards 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	Coastal Storms / Surge	Throughout coastal zone
Hazard 2	Sea Level Rise	Throughout coastal zone
Hazard 3	Erosion	High erosion areas to be identified through shoreline change map updates

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

These hazards have been identified through the Shoreline Change SAMP stakeholder process as most significant and are the focus of the SAMP. The significance of these hazards has been reinforced by the STORMTOOLS maps that show flooding scenarios for various return periods. Post-Superstorm Sandy assessments indicate that these hazards are of the greatest significance to the state.

4. *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
Salt water intrusion, elevation of the groundwater table due to SLR	Measurements of changes in groundwater salinity and coastal water table depths over time
Economic impacts of adaptation practices	Economic analysis related to adaptation options
Combined effects of stormwater flooding and coastal storm surge	Modeling that couples both processes to produce projected future tidal inundations
Municipal emergency permitting processes	Example emergency permitting process policy
Use of coastal hazard financing districts to fund mitigation / adaptation	Model ordinance for municipal coastal hazard financing districts

In-Depth Management Characterization:

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

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

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:			
<i>Shorefront setbacks/no build areas</i>	Y	N	N
<i>Rolling easements</i>	Y	N	N
<i>Repair/rebuilding restrictions</i>	Y	N	N
<i>Hard shoreline protection structure restrictions</i>	Y	N	N
<i>Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)</i>	Y	N	N
<i>Repair/replacement of shore protection structure restrictions</i>	Y	N	N
<i>Inlet management</i>	Y	N	N
<i>Protection of important natural resources for hazard mitigation benefits (e.g., dunes, wetlands, barrier islands, coral reefs) (other than setbacks/no build areas)</i>	Y	N	N
<i>Repetitive flood loss policies (e.g., relocation, buyouts)</i>	N	N	N
<i>Freeboard requirements</i>	Y	N	N
<i>Real estate sales disclosure requirements</i>	N	N	Y (Coastal Property Guide, 2014)*
<i>Restrictions on publicly funded infrastructure</i>	Y	N	N
<i>Infrastructure protection (e.g., considering hazards in siting and design)</i>	Y	N	N
<i>Other (please specify)</i>	Y (Marina resiliency guidelines, harbor management plan guidance, business and historic district resiliency guidance)	N	N
Management Planning Programs or Initiatives:			
<i>Hazard mitigation plans</i>	Y	Y	Y (Comprehensive plan technical assistance to meet RIEMA requirements)
<i>Sea level rise/Great Lake level change or climate change adaptation plans</i>	Y	Y	Y
<i>Statewide requirement for local post-disaster recovery planning</i>	Y (planning guidance)	Y	Y
<i>Sediment management plans</i>	Y	N	N

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)
<i>Beach nourishment plans</i>	Y	Y	(individual projects initiated)
<i>Special Area Management Plans (that address hazards issues)</i>	Y	N	Y (Shoreline Change SAMP)
<i>Managed retreat plans</i>	Y (via existing regulations)	N	N
<i>Other (please specify)</i>	Green Infrastructure planning and implementation (in process)	Y	Y
Research, Mapping, and Education Programs or Initiatives:			
<i>General hazards mapping or modeling</i>	Y	N	Shoreline Change SAMP
<i>Sea level rise mapping or modeling</i>	Y	N	Shoreline Change SAMP
<i>Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks)</i>	Y	N	Shoreline Change SAMP
<i>Hazards education and outreach</i>	Y	Y	Shoreline Change SAMP
<i>Other (please specify)</i>	Y	Y	Sea Level Affecting Marshes Modeling

*<http://www.beachsamp.org/resources/coastalpropertyguide/>

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?*

Eight of Rhode Island’s 21 coastal communities have been able to use state management efforts to participate in the FEMA Community Rating System which has resulted in savings in National Flood Insurance Premiums for their residents. These communities are Bristol, Charlestown, East Providence, Middletown, Narragansett, North Kingstown, Pawtucket and Westerly.

Identification of Priorities:

1. *Considering changes in coastal hazard risk and coastal hazard management since the last assessment and stakeholder input, identify and briefly describe the top one to*

three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively address the most significant hazard risks. (

Management Priority 1: Coastal resiliency assistance to state and local government and individuals.

Description: Develop guidance for state agencies, local governments and individuals for coastal flooding / surge resiliency. Promote FORTIFIED and Code Plus building standards in high hazard areas.

Management Priority 2: Science based coastal hazards management.

Description: Integrating new maps and data (STORMTOOLS, shoreline change maps) into coastal vulnerability index to inform coastal zone management decision making.

Management Priority 3: Green infrastructure.

Description: Implement, monitor and evaluate green infrastructure and assist municipalities to improve / protect stormwater treatment in the coastal zone.

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	Economic, Engineering, Groundwater impacts from SLR
Mapping/GIS/modeling	Y	Groundwater, Riverine and coastal flooding interface, economic impacts
Data and information management	Y	Centralized online viewer for coastal hazards information, data clearinghouse and standardization of data relevant to Shoreline Change SAMP
Training/Capacity building	Y	"Adaptation 101" program for municipal planners, state agencies; training of boards, councils, newly-elected / appointed decision makers; training of legal and judicial community, realtors and building community
Decision-support tools	Y	Maps, economic valuation tool for cost-benefit analysis of adaptation options
Communication and outreach	Y	Communication with property owners in high hazard areas, realtors, communication of information to all state employees via Executive Climate Change Coordinating Council
Other (Specify)		

Enhancement Area Strategy Development:

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

Yes x

No

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

The Shoreline Change SAMP will continue to be an area of focus for the agency, and over the next five years will likely result in changes to the RICRMP, as well as additional outreach and education efforts.

Public Access

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

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

Public Access Status and Trends			
Type of Access	Current number	Changes or Trends Since Last Assessment (↑,↓,-,unknown)	Cite Data Source
Beach Access Sites	There are seven state beaches in Rhode Island	No change since last assessment	http://www.riparks.com/#
Shoreline (other than beach) access sites	1) 221 CRMC designated public rights-of-way to the shore (ROW) 2) 33 public access plans established via regulatory stipulations as promulgated by Section 335 of the RI Coastal Resources Management Program	1) A decrease in the number of ROWs from 224 to 221 since the last report period is due to a reporting error. Three potential ROWs in North Kingstown had been reported as having been designated. The CRMC ROW Subcommittee voted unanimously to request legal counsel and staff to schedule public hearings so the full Council could consider them for designation. No vote to designate - or not - these potential ROWs has been taken to date. 2) One additional public access plan has been established since the previous assessment	http://www.crmc.ri.gov/public-access/ROW_RI_2014.pdf
Recreational boat (power or nonmotorized) access sites	1) 52 coastal boat ramps 2) 25 coastal non-motorized vessel access points	1) Two new boat ramps have been established since the previous assessment: Gano Street, Providence and Sakonnet River Bridge, Tiverton 2) The 25 non-motorized vessel access points were designated since the previous assessment	1) DEM Recreational Fishing and Boating Access Guide database, 2014 (updates original 2003 hard copy map produced by Paul Jordan, DEM GIS Specialist) 2)

			http://www.exploreri.org/waterTrails.php (use interactive mapper on website and select “hand carry boat launches”)
Number of designated scenic vistas or overlook points	Four coastal scenic roadways	The eight scenic roadways listed in the previous assessment include the four shown at left, with significant stretches along the coast; the other four are inland. The previous assessment reported no officially designated coastal scenic overlooks, and while this is technically accurate, all four roadways listed here include scenic vistas of the coast and in some cases parking areas where motorists can stop and enjoy if not “official”, at least de facto scenic vistas/overlooks. Having established all this, there is no change since the previous assessment, only more specific information regarding coastal scenic vistas associated with the four roadways	http://www.dot.ri.gov/community/scenicroadways.php
Number of fishing access points (i.e. piers, jetties)	84 salt water fishing access sites	--	DEM Recreational Fishing and Boating Access Guide database, 2014 (updates original 2003 hard copy map produced by Paul Jordan, DEM GIS Specialist)
Coastal trails/boardwalks	<p>No. of Trails/ Boardwalks</p> <p>1) Two “Urban Coastal Greenway” trails established via regulatory stipulations as promulgated by the CRMC’s Metro Bay Special Area Management Plan (SAMP)</p> <p>2) East Bay Bike Path (13.8 miles)</p> <p>3) Newport Cliffwalk</p>	<p style="text-align: center;">↑</p> <p>1) Two additional urban coastal greenway have been established since the previous assessment</p>	<p>1) http://www.crmc.ri.gov/publicaccess/ROW_RI_2014.pdf</p> <p>2) http://www.riparks.com/Locations/LocationEastBay.html</p> <p>3) http://www.cliffwalk.com/</p> <p>4) Personal communication, Dave Reis, CRMC Supervising Biologist</p>

	<p>(3.5 miles)</p> <p>4) One “Coastal Greenway” trail established via regulatory stipulations as promulgated by the CRMC’s Aquidneck Island SAMP</p>		
--	--	--	--

Public Access Status and Trends			
Type of Access	Current number¹⁷	Changes or Trends Since Last Assessment (↑,↓,-,unknown)	Cite Data Source
<p>Number of acres parkland/open space</p>	<p>Total sites</p> <p>1) Eight coastal state parks</p> <p>2) 15,856 acres total</p> <p>.....</p> <p>Sites per miles of shoreline</p>	<p>1) One additional coastal state park (Rocky Point) has been established since the previous assessment</p> <p>2) 80 acres of coastal state park land (Rocky Point) has been acquired since the previous assessment</p>	<p>1) http://www.riparks.com/#</p> <p>2) personal communication , Paul Jordan, DEM GIS Specialist</p>
<p>Other (please specify)</p> <p>1) Nature Preserves</p> <p>2) Coastal Natural Areas (these sites collectively provide physical, visual, and interpretive access)</p>	<p>1) John H. Chafee Nature Preserve</p> <p>2) Nine “Coastal Natural Areas” have been designated by the CRMC</p>	<p>No change since previous assessment</p>	<p>1) http://www.riparks.com/Locations/LocationJohnHChafee.html</p> <p>2) http://www.crmc.ri.gov/regulations/RICRMP.pdf [Section 210.4 (C)(2)]</p>

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.¹⁹ There are several additional sources of statewide information that may help inform this response, such as the Statewide Comprehensive Outdoor Recreation Plan,²⁰ the National Survey on Fishing, Hunting, and Wildlife Associated Recreation,²¹ and your state’s tourism office.

The Rhode Island State Land Use Policies and Plan, or, “*Land Use 2025, State Guide Plan Element 121, Report Number 109*” (Land Use 2025) cites the Rhode Island Comprehensive Outdoor

Recreation Plan, 2003 (SCORP, 2003) regarding the demand for coastal public access. The SCORP reported that three surveys – one of 1,400 Rhode Island households, one of State park and beach patrons, and one of State and municipal recreation managers – supported the position that *“significant needs continue for land and facilities to accommodate public demands for outdoor recreation and protection of natural resources.”* Regarding changes in the state’s population, the most recent SCORP, which updated the 2003 report in 2009, reported *“the largest percentage increases since 1990 have taken place in Washington County in the southern part of the state, which is host to salt water beaches and the largest state management areas.”*

Demand for coastal public access is periodically assessed by both of these State Guide Plan Elements. But not all demand is recreation based; in its assessment of what it calls The Shoreline Region, Land Use 2025 notes *“Rhode Island’s shoreline is remarkably diverse, including critical natural habitat, public and private beaches, summer colonies, historic villages, seaside estates, marinas and piers, and miles of rivers. But it also is a working shoreline, with Quonset and Davisville, oil tank farms, shipyards, naval installations, and major commercial fishing ports. Whether involved in maritime commerce, tourism, recreation, energy supply, military activities, or maintaining an ecosystem, coastal areas are an essential part of the history and future of Rhode Island.”*

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.*

The following is derived from a 3/17/15 email from Dave McLaughlin, Executive Director of Clean Ocean Access (COA), the leading NGO in the state when it comes to taking the initiative to protect and promote public access to the shore on Aquidneck Island. Aquidneck Island encompasses the Towns of Portsmouth, and Middletown, plus the City of Newport. COA is currently focused on adopting all CRMC ROWs on Aquidneck Island, already having adopted all 23 CRMC ROW’s in Newport. They are actively working toward adopting all ROWs in Portsmouth and Middletown. They have also presented a novel idea to CRMC, namely the adoption of the coastline in the vicinity of adopted ROWs to further establish the public interest in the shore and to promote beach cleanups and other activities. The COA email report requested by CRMC follows:

Newport

- Monitoring 23 adopted rights-of-way with bimonthly surveys and preparing to take pictures.
- Inspecting sign locations for final installment of new signs for harbor.
- Working with cliff walk commission on future restoration plans and making sure to protect public access.

Middletown

- Monitoring 1 adopted right-of-way with bimonthly surveys and preparing to take pictures.
- Monitoring 7 rights-of-way with bimonthly surveys and planning to re-energize adoption discussion.

Portsmouth

- Gathering information and talking with neighborhood groups to explore co-adoption of rights-of-way.

Island Wide

- Slowly sharing the idea proposed of adopting the coastline between access points.

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	1) RIGL 46-23-6 Powers and duties - Rights-of-way: included in CRMC's enabling legislation, this section promulgates CRMC's responsibility <i>"for the designation of all public rights-of-way to the tidal water areas of the state, and shall carry on a continuing discovery of appropriate public rights-of-way to the tidal water areas of the state"</i> 2) RICRMP Section 335 "Protection and Enhancement of Public Access to the Shore" 3) Metro Bay SAMP includes "Urban Coastal Greenway" policies that incentivize the establishment of shoreline public access pathways in Rhode Island's coastal urban areas 4) Aquidneck Island SAMP promulgates policies similar to the Metro Bay SAMP, but applies them to Aquidneck Island where coastal features run the gamut from coastal beaches to manmade shorelines	Y	No changes since last assessment as all the statutes and regulations listed were in place at that time

Operation/maintenance of existing facilities	Operation/maintenance provisions are typically included in permits issued by CRMC under Section 335 and the SAMPs	Y	As above
Acquisition/enhancement programs	Public access is enhanced in the case of CRMC designated ROWs under the agency's Adopt-An-Access initiative where the CRMC, municipalities, and adopting entities sign a MOU that establishes each signatory's responsibilities to protect, preserve, and promote public access to the shore	Y	Five new "Adopt-An-Access" MOUs have been signed since the previous assessment, bringing the total number of CRMC ROWs adopted to 35

- 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.*

The continued increase in the number of ROWs being adopted by various groups and individuals is a trend that is expected to continue. With the recent strong interest shown by Clean Ocean Access (among others), a NGO focused on clean water and public access on Aquidneck Island (Newport, Middletown, Portsmouth), the CRMC's Adopt-An-Access Program (Acquisition / management programs) has seen an increase in the number of adopted ROWs from 18 in 2014 to 35 so far to-date. The significance of this trend includes greater public awareness of CRMC's ROW responsibilities and improved public access as adopting entities take on the primary responsibilities of keeping ROWs open, accessible, safe, and clean. Municipalities, typically responsible for the costs of these activities, are realizing savings in labor costs as NGOs and others assume the responsibility of maintaining CRMC ROWs. The Adopt-An-Access Program is not a 309 driven initiative, rather it is an in-house program developed and administered by CRMC staff. The likely future outcome of this initiative is a steady increase in the number of CRMC ROWs being adopted by COA and other interested parties.

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

Public Access Guide	Printed	Online	Mobile App
State or territory has? (Y or N)	Y	Y	N
Web address (if applicable)	http://www.crmc.ri.gov/publicaccess.html	http://bit.ly/1bp9DRt	
Date of last update	2004	2014	
Frequency of update	10 years	Continual as new access sites are established	

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.

Two NGOs, Clean Ocean Access and Save The Bay, have recently engaged the CRMC to work collectively on the following tasks:

- 1) designate more ROWs, including potential ROWs that were reviewed but never designated
- 2) improve existing ArcGIS Online map of CRMC designated ROWs
- 3) increase the number of ROWs adopted under the Adopt-An-Access initiative
- 4) identify and remove obstructions to public access at ROWs
- 5) link beach cleanups and regular beach patrols with adopted ROWs
- 6) investigate the impact of “no parking” ordinances on public access at ROWs
- 7) develop a performance measure and metric regarding the benefits of public access to the shore

It is CRMC’s intent to meet with these groups to develop and implement new strategies to improve public access to the shore in Rhode Island as noted above.

Marine Debris

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. 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, unkwn)	Type of Impact ³ (aesthetic, resource damage, user conflicts, other)	Change Since Last Assessment (↑,↓,-,unknown)
<i>Land-based</i>			
Beach/shore litter	L	Aesthetic	N
Dumping	L	Aesthetic, resource damage	--
Storm drains and runoff	M	Resource damage	--
Fishing (e.g., fishing line, gear)	L	Resource damage	--
Other (please specify)			
<i>Ocean or Great Lake-based</i>			
Fishing (e.g., derelict fishing gear)	M	User conflicts	--
Derelict vessels	L	User conflicts, resource damage	--
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	unkwn	--	--
Hurricane/Storm	L (event dependent)	Aesthetic, resource damage, user	↑

³ You can select more than one, if applicable.

		conflicts	
Tsunami	n/a	n/a	n/a
Other (please specify)			

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.*

The process of Superstorm Sandy debris removal from the coastal zone is ongoing. The state has an abandoned vessel program and funding but the program is not fully implemented.

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	N	N
Marine debris removal programs	Y	N	Y

2. *For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:*
 - a. *Describe the significance of the changes;*
 - b. *Specify if they were 309 or other CZM-driven changes; and*
 - c. *Characterize the outcomes and likely future outcomes of the changes.*

Marine debris policy and removal programs are headed by the RI Department of Environmental Management with the CRMC acting as a partner in those efforts and participating in the Marine Debris Commission. In 2012, RI DEM received \$250,000 from NOAA’s Marine Debris Program to assess, remove and dispose of disaster debris located in and around Narragansett Bay as a result of Superstorm Sandy. The program involves debris removal from seven locations which have already been assessed. The locations, estimated amount and composition of debris at each site are as follows:

- Hull Cove, Jamestown - 10 tons of timber, dock pilings, Navy camels, fishing and smaller miscellaneous debris;
- Potter's Cove, Jamestown - 10 tons of timber, dock pilings and miscellaneous large debris;
- Ninigret Pond, Charlestown - 10 tons of timber, docks, vessel parts and miscellaneous debris;
- Common Fence Point, Portsmouth - .25 tons of vessel and miscellaneous debris;
- Block Island - 36 tons of fencing, metals, lumber and miscellaneous large and small debris;
- Card, Potter and Point Judith Ponds, South Kingstown - 38 tons of docks, pilings, boat boxes, skiffs, lumber and lawn ornaments; and
- Narragansett Bay National Estuarine Research Reserve, Prudence & Patience Islands - 10 tons of pilings, docks, derelict vessels, timber, construction debris and storage tanks.

In addition, a sonar assessment was conducted of Winnapaug Pond in Westerly to determine what debris should and should not be removed to preserve this sensitive area. Winnapaug Pond is a coastal pond located across from the Westerly shoreline that is a popular kayaking venue and contains critical habitats for fin fish and shellfish.

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.*

This enhancement area was not identified by stakeholders as a high priority, and the main debris policy and removal programs for the state are the purview of the RI Dept. of Environmental Management.

Cumulative and Secondary Impacts

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. *Using National Ocean Economics Program Data on population and housing, 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 2002)	Total (# of housing units)	% Change (compared to 2002)
2007	1,057,832	-0.71%	450,884	2.59%
2012	1,050,292		462,564	

2. *Using provided reports from NOAA’s Land Cover Atlas or high-resolution C-CAP data (Pacific and Caribbean Islands only), please indicate the status and trends for 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 Coastal Counties		
Land Cover Type	Land Area Coverage in 2011 (Acres)	Gain/Loss Since 2006 (Acres)
Developed, High Intensity	95,874.0	955.9
Developed, Low Intensity	59,748.2	1069.9

Distribution of Land Cover Types in Coastal Counties		
Land Cover Type	Land Area Coverage in 2011 (Acres)	Gain/Loss Since 2006 (Acres)
Developed, Open Space	31,176.4	-615.8
Grassland	13,027.7	14.7
Scrub/Shrub	8,470.4	594.5
Barren Land	8,067.8	880.5
Open Water	24,7227.5	32.0
Agriculture	39,510.9	-864.4
Forested	316,245.1	-1993.8
Wetlands	95,664.5	-71.4

Note: area within the state mapped by C-CAP is 915012.4 acres.

3. *Using provided reports from NOAA’s Land Cover Atlas or high-resolution C-CAP data (Pacific and Caribbean Islands only), please indicate the status and trends for developed areas in the state’s coastal counties between 2006 and 2011 in the two tables below. 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 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			
	2006	2011	Percent Net Change
Percent land area developed	185388.6 (20.3%)	186798.6 (20.4%)	1410.0 (0.8%)
Percent impervious surface area	82784.5 (9.0%)	83684.1 (9.1%)	899.5 (1.1%)

How Land Use is Changing in Coastal Counties	
Land Cover Type	Areas Lost to Development Between 2006-2011 (Acres)
Barren Land	24.0
Wetland	84.3
Open Water	23.8
Agriculture	547.1
Scrub/Shrub	68.5
Grassland	135.9
Forested	743.7

4. *Using data from NOAA’s State of the Coast “Shoreline Type” viewer, indicate the percent of shoreline that falls into each shoreline type. You may provide other information or use graphs or other visuals to help illustrate.*

Shoreline Types	
Surveyed Shoreline Type	Percent of Shoreline
Armored	14
Beaches	29
Flats	18
Rocky	7
Vegetated	33

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	Y	N
Guidance documents	y	Y	N
Management plans (including SAMPs)	y	N	N

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 enhancement area was not ranked highly in our stakeholder survey. Many of the cumulative and secondary impacts are currently addressed through existing RICRMP policy and regulation. Updates or changes to these are likely to fall under one of the other enhancement areas such as Wetlands.

Special Area Management Planning

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

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states and territories.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

- 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
RI Shoreline	Addressing risk from coastal hazards including erosion, coastal storms and storm surge, sea level rise and flooding

Management Characterization:

- 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	N	Y (see coastal hazards section)
SAMP plans	Y	N	Y

2. *For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:*
- Describe the significance of the changes;*
 - Specify if they were 309 or other CZM-driven changes; and*
 - Characterize the outcomes or likely future outcomes of the changes.*

Please see Coastal Hazards section of this document for more information regarding the Shoreline Change Special Area Management Plan.

Enhancement Area Prioritization:

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

High _____

Medium _____

Low _* please see coastal hazards section which contains information regarding the RI Shoreline Change SAMP currently in development

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

This area is addressed under the Coastal Hazards section of this document via discussion of the RI Shoreline Change Special Area Management Plan currently in development.

Ocean and Great Lakes Resources

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states and territories.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. *Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW),⁴ 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 (dollars)
Living Resources	74	1,492	15.7	72.0M
Marine Construction	20	116	6.0	13.0M
Marine Transportation	52	2,861	184.4	284.9M
Offshore Mineral Extraction	21	154	6.5	15.0M
Tourism & Recreation	2,086	31,542	558.0	1.3B
Ship and Boat Building	49	3,093	167.5	179.0M
All Ocean Sectors	2,302	39,261	938.2	1.9B

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2010)				
	Establishments (% change)	Employment (% change)	Wages (% change)	GDP (% change)
Living Resources	1.4	-15.0	-17.3	4.4

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2010)				
	Establishments (% change)	Employment (% change)	Wages (% change)	GDP (% change)
Marine Construction	-5.7	-54.7	-64.2	-65.4
Marine Transportation	-7.1	-4.0	9.9	43.0
Offshore Mineral Extraction	10.5	-37.4	-34.9	-31.9
Tourism & Recreation	4.5	0.4	9.9	10.7
Ship and Boat Building	-10.9	-16.4	5.3	-22.9
All Ocean Sectors	2.8	-2.4	6.5	7.5

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 (↑, ↓, -- or unkn)
Resource	
<i>Benthic habitat (including coral reefs)</i>	--
<i>Living marine resources (fish, shellfish, marine mammals, birds, etc.)</i>	↑
<i>Sand/gravel</i>	--
<i>Cultural/historic</i>	--
<i>Other (please specify)</i>	
Use	
<i>Transportation/navigation</i>	--
<i>Offshore development</i>	--
<i>Energy production</i>	↑ (Deepwater Wind Block Island wind project approved, installation beginning in 2015)
<i>Fishing (commercial and recreational)</i>	--
<i>Recreation/tourism</i>	--
<i>Sand/gravel extraction</i>	--
<i>Dredge disposal</i>	--
<i>Aquaculture</i>	--
<i>Other (please specify)</i>	

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)
<i>Living marine resources (fish, shellfish, marine mammals, birds, etc.)</i>	X		X								X	

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	N	N
Regional comprehensive ocean/Great Lakes management plans	Y	N	Y (Regional Planning Body efforts)
State comprehensive ocean/Great Lakes management plans	Y	N	N
Single-sector management plans	Y	N	Y

2. *For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:*
 - a. *Describe the significance of the changes;*
 - b. *Specify if they were 309 or other CZM-driven changes; and*
 - c. *Characterize the outcomes or likely future outcomes of the changes.*

The Rhode Island Shellfish Management Plan was completed in November 2014 in partnership with the URI Coastal Resources Center, RI Sea Grant and the RI Department of Environmental Management with the goals of:

- 1) Building an understanding of the economic, environmental and cultural values of the local resources and industries
- 2) Evaluating and, when needed, propose alternative management strategies and mechanisms for implementation and
- 3) Promoting science-based shellfish management decisions by increasing scientific research and outreach activities.

The development of the SMP was not a CZM-driven change but will likely result in changes in the coordination between RI CRMC and RIDEM for permitting and management of aquaculture.

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

Comprehensive Ocean/Great Lakes Management Plan	State Plan	State Plan
Completed plan (Y/N) (If yes, specify year completed)	Marine Resources Development Plan, 2006	Ocean Special Area Management Plan, 2010
Under development (Y/N)	N	N
Web address (if available)	http://www.crmc.ri.gov/strategicplanning/MRDP_Final_Jan10.pdf	http://seagrant.gso.uri.edu/oceansamp/
Area covered by plan	RI State Public Trust Coastal Waters (mean high water to three miles out to sea)	Ocean SAMP study area (see http://www.narrbay.org/d_projects/oceansamp/)

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 enhancement area was not ranked highly in our stakeholder survey and was not determined internally to be an area of high priority.

Energy and Government Facility Siting

Section 309 Enhancement Objective: Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance. §309(a)(8)5

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states and territories.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. In the table below, characterize the status and trends of different types of energy facilities and activities in the state’s or territory’s coastal zone based on best available data. If available, identify the approximate number of facilities by type. The MarineCadastre.gov may be helpful in locating many types of energy facilities in the coastal zone.

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 (↑,↓,-- or unknw)	(# or Y/N)	Change Since Last Assessment (↑,↓,-- or unknw)
<i>Energy Transport</i>				
Pipelines	Y	--	Y	Spectra Energy Algonquin Pipeline Expansion
Electrical grid (transmission cables)	Y	↑	N	--
Ports	Y	--	N	--
Liquid natural gas (LNG)	Y	--	N	--
Other (please specify)	N	--	N	--
<i>Energy Facilities</i>				
Oil and gas	N	--	N	--
Coal	N	--	N	--
Nuclear	N	--	N	--
Wind	N	--	Y	Deepwater Wind Block Island Project approved
Wave	N	--	N	--
Tidal	N	--	N	--
Current (ocean, lake,	N	--	N	--

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 (↑,↓,-- or unkwn)	(# or Y/N)	Change Since Last Assessment (↑,↓,-- or unkwn)
river)				
Hydropower	N	--	Y	--
Ocean thermal energy conversion	N	--	N	--
Solar	N	--	N	--
Biomass	N	--	N	--
Other (please specify)	N	--	N	--

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	N	N
State comprehensive siting plans or procedures	Y	N	N

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.*

This enhancement area was not given high priority in our stakeholder survey, and was not determined internally to be an area of high priority.

Aquaculture

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states and territories.)*

Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

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

Type of Facility/Activity	Status and Trends of Aquaculture Facilities and Activities		
	# of Facilities	Approximate Economic Value	Change Since Last Assessment (↑, ↓, -- or unkwn)
Shellfish farms	55	\$5M	↑
Marine ornamental facility	0	0	↓ (marine ornamental facility no longer in operation)

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.

The CRMC’s 2014 aquaculture report is currently in development. The 2013 aquaculture report can be found here: <http://www.crmc.ri.gov/aquaculture/aquareport13.pdf> and contains these highlights:

- The number of farms in Rhode Island increased from 38 farms in 2010 to 52 in 2013
- The total acreage under cultivation increased from 141 in 2010 to 176.55 in 2013
- Oysters remained the number one aquaculture product with 6,398,979 sold for consumption
- The farm gate value of aquaculture products for consumption was \$4,204,656, in 2013 an increase of \$1,877, 718 from 2010.

- Oyster seed sales from RI aquaculturists was valued at \$180,500 which was not part of the equation in 2010.
- Combined value of aquaculture products for consumption and seed sales was \$4,385,156 The number of aquaculture farm workers increased 21 percent from 79 in 2010 to 127 in 2013.

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	Y	N	Y
Other aquaculture statutes, regulations, policies, or case law interpreting these	Y	N	Y

2. *For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:*
 - a. *Describe the significance of the changes;*
 - b. *Specify if they were 309 or other CZM-driven changes; and*
 - c. *Characterize the outcomes or likely future outcomes of the changes.*

The RI Shellfish Management Plan, adopted in November of 2014 (www.rismp.org), has refined the CRMC’s aquaculture strategy. The plan was created through a comprehensive stakeholder engagement process and provides comprehensive policy guidance regarding management and protection measures for shellfish located in state marine waters. Recommendations of the plan include increased coordination between RIDEM and CRMC to clarify the regulatory processes for aquaculture and shellfish restoration and increased enforcement of shellfishing restrictions. The CRMC is working collaboratively with RIDEM to address the recommendations of the plan.

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.*

Aquaculture is a small but still moderately important industry for RI.

Strategy

This section addresses the two high priority enhancement areas identified by the CRMC through the Phase I Assessment process as well as the stakeholder engagement process and internal review, Wetlands and Coastal Hazards. A five-year strategy for program changes is outlined for each enhancement area.

Wetlands Strategy

I. Issue Area(s)

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

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

II. 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:** Incorporate newly acquired information on sea level rise impacts to coastal wetlands into a new or updated section of the RI Coastal Resources Management Program and coastal wetland monitoring and restoration strategies to

better inform wetland policy and potential intervention / restoration actions and to mitigate extensive wetland loss due to sea level rise.

- C. New information regarding the effect of sea level rise and climate change on the functions and values of coastal wetlands derived from various assessment efforts such as the RI Salt Marsh Assessment (previous state-funded effort) and the Sea Level Affecting Marshes Model (previous NOAA COCA-funded effort) as well as information gained during the stakeholder process related to the RI Coastal Wetland Restoration Strategy development (funded effort under previous 309 strategy) will be compiled and incorporated into the findings, policies and regulations within the RI CRMP where appropriate. Examples of this new information include research on wetland migration processes and the effectiveness of various restoration and enhancement methods such as Thin Layer Deposition (TLD) and living shorelines at improving resilience of coastal habitats. Whereas previous efforts were directed at the development of a statewide restoration strategy to direct restoration funding through state and federal programs, this proposed 309 effort would update and revise coastal policy and regulation under the RICRMP. This may include changes to setback and buffer zone policies or changes to the types of restoration activities that are permitted in coastal wetlands and requirements for restoration or enhancement projects.

III. Needs and Gaps Addressed

It is clear that sea level rise represents a significant threat to the resilience and persistence of coastal wetland habitats, and is likely to result in high levels of wetland loss over time. It is important that our policies and regulations address this threat and ensure the greatest level of protection for this important habitat. This may include changes to setback and buffer zone policies (RICRMP Section 150) or changes to the types of restoration activities that are permitted in coastal wetlands. It may be necessary to add a separate section within the RICRMP that addresses restoration / enhancement projects and establishes criteria for their implementation. In addition, the RICRMP needs to be supportive of projects that would facilitate the future inland migration of coastal wetlands and discourage the use of hardened shoreline structures (Section 300.7). The latest science on the impact of sea level rise on coastal wetlands and how it interacts with other stressors should be incorporated into all appropriate sections of the RICRMP.

IV. Benefits to Coastal Management

The anticipated effect of the strategy would be to facilitate projects that could enhance or restore coastal wetland habitats that are threatened by sea level rise, preserving their habitat value along with the multiple other ecosystem services they provide such as water quality improvement, support of fisheries, storm flooding protection and recreational and aesthetic value.

V. Likelihood of Success

The likelihood of attaining this strategy goal is high given that the majority of the information that is needed to make meaningful program changes has already been obtained through earlier phases of this effort. A diverse working group has already been established as part of the RI Coastal Wetland Restoration Strategy development process, and that group can be further engaged as program changes are developed. With the help of this working group, additional stakeholders can be engaged as well through broader outreach and education efforts prior to the public notice process for any proposed program changes.

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: Incorporate newly acquired information on sea level rise impacts to coastal wetlands into a new or updated section(s) of the RI Coastal Resources Management Program.

Total Years: 3

Total Budget: \$30,000

Year(s): 1-2

Description of activities: Analyze information gained from implementation of coastal wetland restoration / enhancement projects (e.g. hydrologic restoration, thin layer deposition) so that it can be incorporated into findings and policy.

Major Milestone(s): Summary reports on piloted coastal wetland restoration techniques

Budget: \$20,000

Year(s): 3

Description of activities: Incorporate information gathered from assessment efforts, coastal wetland restoration strategy development process and new

research on marsh migration into new or revised sections of the RICRMP, submit changes for NOAA approval.

Major Milestone(s): New or revised sections of the RICRMP

Budget: \$10,000

VII. Fiscal and Technical Needs

A. Fiscal Needs: The CRMC has secured \$3.25M from the Department of the Interior’s Post-Sandy Resiliency funding competition to plan, design and implement a pilot project utilizing Thin Layer Deposition or TLD methods to enhance elevations and beneficially re-use dredged materials within a salt marsh in Ninigret Pond along Rhode Island’s south coast. This project will provide valuable insights into the use of TLD methods as a viable coastal wetland restoration option. The CRMC has also partnered with the Narragansett Bay National Estuarine Research Reserve to develop a plan for extended monitoring of marsh enhancement / restoration projects (such as TLD), vulnerability assessment of RI marshes using tools such as CCVATCH or Marsh Futures and new research on marsh migration processes. The CRMC also plans to pursue in cooperation with RI Department of Environmental Management, EPA Wetland Program Development grant funding to create a more integrated and consistent approach to both freshwater and coastal wetland monitoring, assessment and restoration. . If funded, these efforts would provide the information necessary to update the current version of the state coastal wetland restoration strategy funded under the previous 309 strategy, as well as update the RICRMP as outlined in this 309 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).

The CRMC has partnered with several organizations in order to carry out the assessment and research efforts that were a precursor to the program changes that would be a result of this strategy. The pilot project in progress has sufficient funding for implementation and the CRMC is contracting with partners to complete the design, permitting and monitoring phases of the project. Making changes to the RICRMP to incorporate information on sea level rise and coastal wetlands can be accomplished with the current level of technical skill possessed by staff, however the effort could be enhanced by personnel with advanced mapping and GIS skills—something that could be pursued via an agreement with an entity such as the URI Environmental Data Center or The Nature Conservancy.

VIII. Projects of Special Merit (Optional)

Undertake mapping of salt marshes state wide, including information on condition relative to elevation and sea level rise.

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*):

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

II. 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:** Continue to develop the Shoreline Change Special Area Management Plan and update relevant sections of the RICRMP to incorporate new information on sea level rise, storm surge and coastal erosion. Create guidance and decision-making tools that can be used to evaluate different adaptation scenarios and actions. Create guidance for implementing coastal green infrastructure and “soft solutions” to address coastal hazards and stormwater management. Provide technical and financial assistance to municipalities to incorporate new guidance, tools and information related to coastal hazards into local decision-making.

- C. The CRMC will continue to develop new information, guidance and decision-making tools to address sea level rise, storm surge and erosion under the Shoreline Change SAMP and update sections of the RICRMP in addition to those previously funded under the current PSM. The guidance will include more quantitative, statewide mapping of highly vulnerable areas and the creation of a coastal risk index to illustrate the overall vulnerability of the coastline to the risks of coastal erosion, storm surge and wave action and sea level rise. The index will be based on new erosion and flood risk modeling, information about the convergence of coastal and freshwater flooding, and damage functions such as HAZUS MR3 (www.fema.gov/media-library-data/20130726-1621-20490-2085/mr3_fld_tm.pdf) developed by FEMA and those developed by the US Army Corps of Engineers as summarized in its North Atlantic Coast Comprehensive Study (www.nad.usace.army.mil/Portals/40/docs/NACCS/10A_PhysicalDepthDmgFxSummary_26Jan2015.pdf). Under this strategy, particular focus will be put on marinas and the development of a marina resilience checklist. The CRMC will also partner with the Institute of Business and Home Safety, CRC/RISG, the RI Building Commission and the RI builders Association and municipal officials to advance resilient building practices, such as the encouragement of FORTIFIED™ building standards and retrofits along the coast.

Guidance will be developed for the design and implementation of green infrastructure practices in the coastal zone that builds upon current work to develop conceptual designs for demonstration projects funded through the Department of the Interior's Hurricane Sandy resiliency program. This guidance will include practices to address coastal erosion as well as stormwater management. Relevant changes will be made to the RICRMP to incorporate this guidance.

The CRMC will continue its municipal outreach efforts through open-invite workshops that showcase newly developed maps, tools, guidance and information targeted at coastal adaptation decision-making processes. Model communities such as North Kingstown and Newport will continue to receive focused assistance to help incorporate newly developed information into updates of the municipalities' hazard mitigation and comprehensive plans as well as municipal ordinances. The CRMC is considering development of a pass-through grant program to provide targeted assistance to local decision makers, boards and commissions in using the tools developed (SLAMM, STORMTOOLS, shoreline change maps, coastal vulnerability index) to identify adaptation actions they can implement. The goal of these efforts would be to identify current barriers at the state and local level to implementing adaptation actions, and developing strategies to work through those barriers.

III. Needs and Gaps Addressed

This strategy will build upon the ongoing work related to the Shoreline Change SAMP development to provide state agencies, municipalities and individuals with the most up-to-date information on areas vulnerable to sea level rise, coastal storm surge and erosion, and provide assistance in using that information to plan for the future impacts of these coastal hazards by developing targeted coastal policies and ordinances. Current PSM work includes development of policies related to STORMTOOLS mapping, SLAMM maps and RICRMP Section 300.7 (Structural Shoreline Protection). Under the proposed strategy, additional RICRMP sections such as those dealing with permitting procedures will be updated to incorporate new information on wetlands migration, shoreline protection, sea level rise and shoreline change. In addition, the information compiled under the current PSM will be used to create a coastal vulnerability index that can be used to classify the shoreline in terms of coastal hazards risk. Where current efforts to identify vulnerable areas are focused on Washington County and are largely qualitative, the efforts under this strategy will be statewide and more quantitative. Existing information and that acquired under the current PSM related to flood risk, storm surge and erosion will be combined with damage functions to allow for the evaluation of different adaptation actions.

IV. Benefits to Coastal Management

The anticipated effect of this strategy is that the state, municipalities and individuals will incorporate the risks of sea level rise, coastal storm surge and erosion into their decision making and will plan for and adapt to these coastal hazards through changes to local policies and ordinances that address areas such as development, infrastructure, land use and land acquisition.

V. Likelihood of Success

The likelihood of success of this effort is anticipated to be high given that the CRMC has engaged in an extensive public education and outreach effort as part of the Shoreline Change SAMP development process. Regular stakeholder meetings have been held that are open to the public and discuss the findings and issues related to the Shoreline Change SAMP effort. The results of these efforts have been presented to various state and regional coordinating entities, and have gained a considerable amount of media attention.

VI. Strategy Work Plan

Strategy Goal: Continue to develop the Shoreline Change Special Area Management Plan and update relevant sections of the RICRMP to incorporate new information on sea level rise, storm surge and coastal erosion. Create guidance and decision-making tools that can be used to evaluate different adaptation scenarios and actions. Create guidance for implementing coastal green infrastructure and “soft solutions” to address coastal hazards and stormwater management. Provide technical and financial assistance

to municipalities to incorporate new guidance, tools and information related to coastal hazards into local decision-making.

Total Years: 5

Total Budget: \$420,000

Year(s): 1-2

Description of activities:

- Use new and updated information on coastal flooding, storm surge, erosion and wetland loss along with established damage functions to develop a statewide, quantitative coastal vulnerability index.
- Develop coastal green infrastructure guidance based on completed conceptual design process under DOI Hurricane Sandy-funded project.
- Develop marina resilience checklist
- Meet with Business and Home Safety, CRC/RISG, the RI Building Commission and the RI builders Association and municipal officials to discuss promotion of FORTIFIED™ building standards
- Discuss feasibility of pass-through grant program for targeted municipal assistance

Major Milestone(s):

- Draft coastal vulnerability index
- Final Green Infrastructure guidance document
- Draft marina resilience checklist
- Resilient building practices meeting / workshop with RI Building Commission, RIBA and municipal officials

Budget: \$160,000

Year(s): 3-5

Description of activities:

- Updates to RICRMP sections including emergency permitting procedures to incorporate coastal vulnerability index and other newly developed information
- Municipal outreach and capacity building through workshops, targeted assistance to model communities and potential pass-through grant program

Major Milestone(s):

- New / updated emergency permitting procedures and additional updates to RICRMP as deemed necessary as result of coastal vulnerability index and other 309 activities

- Open invite workshops and targeted municipal trainings on coastal vulnerability index, green infrastructure guidance, marina resilience checklist and FORTIFIED™ building standards
- Targeted technical assistance to model communities on one or more of newly developed decision-making tools
- If determined feasible, competitive RFP announcement for pass-through municipal grants for technical assistance using coastal vulnerability index and other newly developed decision-making tools to support adaptation actions.

Budget: \$260,000

VII. Fiscal and Technical Needs

A. Fiscal Needs: The CRMC has secured funds from multiple state and federal sources including the US Department of the Interior, US Department of Housing and Urban Development, the RI Bays, Rivers and Watersheds Coordination Team, RI Sea Grant and the RI Foundation for the development of the Shoreline Change SAMP. The project team will continue to pursue funding to support a broad scope of Shoreline Change SAMP-related efforts, particularly the coastal vulnerability index development. The budget for this strategy may increase as needs arise over the assessment period and the budget for the Wetlands strategy may be reduced accordingly in the future.

B. Technical Needs: The CRMC has executed agreements with entities such as the URI Environmental Data Center and the Roger Williams University School of Law to bring the necessary expertise and technical capacity to the Shoreline Change SAMP development process, and will continue to partner with similar organizations throughout the life of the project.

5-Year Budget Summary by Strategy

Strategy Title	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
Wetlands	\$10,000	\$10,000	\$10,000			\$30,000
Coastal Hazards	\$80,000	\$80,000	\$80,000	\$90,000	\$90,000	\$420,000
Total Funding	\$90,000	\$90,000	\$90,000	\$90,000	\$90,000	\$450,000

Summary of Stakeholder and Public Comment Process

An online stakeholder survey was distributed in November of 2014 that listed each of the nine enhancement areas and allowed respondents to rank them as low, medium or high priority. Respondents were also able to leave comments or suggest additional enhancement areas for the CRMC to consider. The survey was sent to 29 individuals who represented the coastal town planning offices, marine trades organizations, non-profit groups and conservation organizations listed below:

- Save The Bay
- Audubon Society of RI
- RI Shellfisherman's Association
- RI Builders Association
- RI Marine Trades Association
- Conservation Law Foundation
- Town of Westerly
- Town of Charlestown
- Town of South Kingstown
- Town of Narragansett
- Town of North Kingstown
- Town of East Greenwich
- City of Warwick
- City of Cranston
- City of Providence
- City of Pawtucket
- City of East Providence
- Town of Barrington
- Town of Warren

Thirteen of these individuals provided responses, some of which included comments. Examples of comments received:

"CRMC involvement is critically needed to address issues affecting the long-term health of the Narragansett Bay and the nearby ocean waters. Limited staff and financial resources should not be drained by directing them to areas that are better addressed through local land use and other regulatory authorities." (received 11/20/2014)

"Integrate the policy for Sea Level Rise into protective regulations. Continue to support communities in local planning (comp plans, public access designation, harbor management plans) with information about SLR. Improved and transparent enforcement policy on cumulative impacts in terms of sea level rise. Permits reviewed

and approved by staff versus council. Council involved in planning. Pursue rolling easements.” (received 11/25/2014)

“I would have listed all of these things as high priorities, but I’m not sure how helpful that would be. I would add habitat restoration as a high priority as well.” (received 11/21/2014)

High priority areas were identified by respondents as follows:

<u>Percent of Respondents</u>	<u>Program Area</u>
69%	Coastal Hazards
61%	Wetlands
53%	Public Access
27%	Cumulative and Secondary Impacts
23%	Marine Debris
15%	Ocean Resources
15%	Energy and Government Facility Siting
15%	Aquaculture
7%	Special Area

The feedback from the online survey was used to help determine which enhancement areas would be designated as high priority for this assessment. The draft strategy was posted on the CRMC website on May 28, 2015 with an invitation for further public comment. No further public comments were received.

REFERENCES

Carey, J.C., K.B. Raposa, C. Wigand and R.S. Warren, 2014. Salt Marshes and Sea Levels in Eastern Long Island. Unpublished MS.

Raposa, K.B.; R.L. Weber; M. Cole Ekberg; W. Ferguson, 2014. Dieback events accelerate ongoing *Spartina patens* decline in Rhode Island salt marshes. Unpublished MS.

Watson, E.B. A. J. Oczkowski, C. Wigand, A. R. Hanson, E. W. Davey, S. C. Crosby, R. L. Johnson, H. M. Andrews, 2014. Nutrient enrichment and precipitation changes do not enhance resiliency of salt marshes to sea level rise in the Northeastern U.S., *Climatic Change*, **125**, 3-4, 501