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

August 2010

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Introduction

This is the fifth 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 four areas identified as high priority (energy and government facility siting, ocean resources, coastal hazards and tidal wetlands). These priority areas were determined using input from a survey administered to stakeholders that included state and nonprofit agencies, municipalities, academia and CRMC staff (See Appendix A). 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. The survey results were compiled, and the two enhancement areas receiving the most “high priority” rankings from stakeholders (tidal wetlands and coastal hazard areas) have been addressed in this assessment and strategy. Two additional enhancement areas, energy and government facility siting and ocean resources, were added based on the CRMC’s current and projected management activities. The initial draft of this assessment and strategy was announced and posted on the CRMC website for public comment for a period of 30 days, however no additional public comments were received during that time.

The major focus of CRMC’s planning efforts since the last assessment has been the development of an Ocean Special Area Management Plan. The Ocean SAMP is a strategy for zoning Rhode Island’s offshore waters using an ecosystem approach that involves scientific research and public input to help develop policy. This approach looks comprehensively at the area’s characteristics, resources, uses, and constraints. Ocean SAMP research addresses topics related to proposed renewable energy development in Rhode Island’s offshore waters.

Another emerging area of importance has been the effects of climate change, particularly sea level rise. In 2008, the CRMC adopted Section 145 Climate Change and Sea Level Rise into the RI Coastal Resources Management Program. This section states that:

> The Council will review its policies, plans and regulations to proactively plan for and adapt to climate change and sea level

> rise. The Council will integrate climate change and sea level rise scenarios into its operations to prepare Rhode Island for these new, evolving conditions and make our coastal areas more resilient.

This policy is the driving force behind many of the changes proposed within this assessment and strategy.

Due to the limited resources available under the section 309 program, and considerable tasks proposed for high priority areas, this document does not include a strategy for those areas identified as medium and low priority. The strategy for program enhancement immediately follows the Assessment in each of the areas identified as high priority, with a summary 5-year strategy following the Wetlands section.

Summary of Past 309 Efforts

Program activities since the last assessment are summarized below:

Ocean Resources

The Rhode Island Aquatic Invasive Species (AIS) Management Plan was approved by the Federal Aquatic Nuisance Species Task Force on November 7, 2007. Since then, two years of AIS monitoring have been conducted using established rapid assessment survey protocols.

Energy and Government Facility Siting

The Ocean Special Area Management Plan has been completed and adopted by the CRMC. Research projects conducted through the University of Rhode Island that have assessed marine transport, critical habitats for fish, marine animals and birds, geology, meteorology, and other topics within the SAMP boundary form the scientific foundation of the SAMP. In addition, an extensive stakeholder process has been conducted. Using the best available science, along with public input and involvement, the SAMP identifies areas most suitable for renewable energy zones where other offshore uses will not be compromised.

Coastal Hazards

A regional sediment management study has been initiated with the US Army Corps of Engineers. Shoreline change maps have been created that show shoreline erosion and accretion rates for the RI Coast, and are used in determining construction setbacks.

Section 145 Climate Change and Sea Level Rise has been added to the RICRMP. This section summarizes the most recent science relating to climate change and sea level rise and establishes a baseline prediction of future sea level rise for planning purposes. In addition, a Coastal Hazards chapter has been added to the Metro Bay Special Area Management Plan.

The CRMC is participating in a regional LiDAR project led by the US Geological Survey and the URI Environmental Data Center. As part of the project, LiDAR data will be acquired for the entire state of Rhode Island and used to create high-resolution elevation models.

Tidal Wetlands

Updates have been made to the RI Coastal and Estuarine Habitat Restoration Strategy, as well as the criteria for the evaluation of Trust Fund projects. The CRMC has continued to administer the Fund and coordinate with the state Habitat Restoration Team. Since 2006, the CRMC has administered awards totaling $1.15 million to 44 different habitat restoration projects.

Cumulative and Secondary Impacts

Regulations have been developed for the protection of submerged aquatic

vegetation. RICRMP Section 300.18 Submerged Aquatic Vegetation and Aquatic Habitats of Particular Concern recognizes established SAV habitats designated for protection, establishes a requirement and protocol for performing SAV surveys, and includes design guidance that references the Burdick and Short methodology for applicants proposing residential boating structures (docks).

The Urban Coastal Greenway policy was developed and adopted by the CRMC (see description under Special Area Management Planning, below).

Special Area Management Planning

The Urban Coastal Greenways Policy was created and adopted as part of the update to the Metro Bay Special Area Management Plan. This policy is intended to promote protection of coastal water resources and preservation and enhancement of shoreline public access while recognizing the particular needs and constraints of redevelopment projects within the urbanized areas of northern Narragansett Bay. Development of this policy included a detailed habitat assessment and zoning of the SAMP area, the creation of new options for applicants required to meet coastal buffer zone requirements, and an extensive outreach process involving a variety of stakeholders. Since its adoption, over a linear mile of Urban Coastal Greenway projects have been permitted along the Metro Bay shoreline. Two of those projects, both of which include storm water management and public access components have been constructed to date.

Work has begun on the Aquidneck Island SAMP; coastal development regulations were developed as one of its first components. A habitat assessment has also been completed, which will provide the basis for the habitat chapter of the SAMP.

For information on the development of the Ocean SAMP, please see the previous section, Energy and Government Facility Siting, above.

Ocean Resources

Section 309 Enhancement Objective
Planning for the use of ocean resources

Resource Characterization
Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.
1. In the table below characterize ocean and/or Great Lakes resources and uses of state concern, and specify existing and future threats or use conflicts.

Resource or use	**Threat or use conflict**	**Degree of threat** (H,M,L)	**Anticipated threat or use conflict**
Wind energy	n/a at present	H	Recreation, transportation, shipping, fishing

2. Describe any changes in the resources or relative threat to the resources since the last assessment.

The proposal of offshore wind energy generation facilities in state and federal waters off the coast of RI has created potential conflicts with a variety of resources and uses. These potential conflicts are being addressed through the development of an Ocean SAMP, which has involved the inventorying and mapping of these various uses and resources within the OSAMP area and analyses to determine areas for siting wind energy projects that would minimize these conflicts. For a more detailed description of the OSAMP process, please see the Energy Facility Siting section of this document.

Management Characterization
Purpose: To determine the effectiveness of management efforts to address those problems
described in the above section for the enhancement objective.
1. For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

Management categories	**Employed by state/territory** (Y or N)	**Significant changes since last assessment** (Y or N)
Comprehensive	**Y**	**Y**

ocean/Great Lakes management plan or system of Marine Protected Areas		
Regional comprehensive ocean/Great Lakes management program	**Y**	**Y**
Regional sediment or dredge material management plan	**Y**	**Y (USACE Regional Sediment Management Plan)**
Intra-governmental coordination mechanisms for Ocean/Great Lakes management	**Y**	**Y (Bays, Rivers and Watersheds Coordination Team, RIGL § 46-31)**
Single-purpose statutes related to ocean/Great Lakes resources	**Y**	**Y (Marine Resources Development Plan, RIGL § 46-23-6(1)(A)**
Comprehensive ocean/Great Lakes management statute	**N**	**N**
Ocean/Great Lakes resource mapping or information system	**Y**	**Y (Ocean SAMP)**
Ocean habitat research, assessment, or monitoring programs	**Y**	**Y (Ocean SAMP)**
Public education and outreach efforts	**Y**	**Y (Ocean SAMP)**
Other (please specify)		

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

a) Characterize significant changes since the last assessment;
b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
c) Characterize the outcomes and effectiveness of the changes.

Northeast Regional Ocean Council

The CRMC participates in the Northeast Regional Ocean Council at the executive level, and participates on the Hazard Mitigation subcommittee (please see the Coastal Hazards section of this document for further details).

Regional Sediment Management Plan, Ocean SAMP

For more information on the USACE-sponsored regional sediment management plan, please see the Coastal Hazards section of this document. For more information on the Ocean SAMP, please see the Energy Facility Siting section of this document.

Bays, Rivers and Watersheds Coordination Team

The Bays, Rivers and Watersheds Coordination Team was created by the RI General Assembly in 2004, who concluded that:

> The formation of an [state executive] interagency group for the coordination of the functions, programs, and regulations that affect the bays, rivers, and watersheds is the most effective way to transcend the limited responsibilities and jurisdictions of each agency, address complex issues using an ecosystem-based approach, and provide for continuity over time. *(RIGL Sec. 46-31)*

This group, which includes the CRMC has created a Systems Level Plan, published in 2008, with the following goals:

1. Develop and apply ecosystem-based management principles to protect and restore Rhode Island's fresh, estuarine and marine waters and watersheds, and the human and economic values that derive from them.

2. Guide the development of Rhode Island's "water-reliant economy" so that natural resources, including renewable energy are utilized sustainably, and enhanced in their utilization.

Priority Needs and Information Gaps

Please see the Energy Facility Siting section of this document.

Enhancement Area Prioritization

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

High __X___
Medium _____
Low _____

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

Yes ___X___
No _____

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

Please see the Energy Facility Siting section of this document.

Energy Facility Siting

Section 309 Enhancement Objectives
Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance.

Resource Characterization
Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.
1. In the table below, characterize the types of energy facilities in your coastal zone (e.g., oil and gas, Liquefied Natural Gas (LNG), wind, wave, Ocean Thermal Energy Conversion (OTEC), etc.) based on best available data. If available, identify the approximate number of facilities by type.

Type of Energy Facility	**Exists in CZ** (# or Y/N)	**Proposed in CZ** (# or Y/N)	**Interest in CZ** (# or Y/N)	**Significant changes since last assessment** (Y or N)
Oil and gas facilities	**4**	**N**	**N**	**N**
Pipelines	**Y**	**N**	**Y**	**N**
Electric transmission cables	**Y**	**Y**	**Y**	**Y**
LNG	**N**	**N***	**Y**	**N**
Wind	**N**	**Y**	**Y**	**Y**
Wave	**N**	**N**	**N**	**N**
Tidal	**N**	**N**	**N**	**N**
Current (ocean, lake, river)	**N**	**N**	**N**	**N**
OTEC	**N**	**N**	**N**	**N**

Solar	**N**	**N**	**N**	**N**
Other (please specify)				

*LNG import terminal proposed for Mt. Hope Bay, Fall River, MA

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

The most significant change in proposed energy facilities in Rhode Island is the proposal for two wind power generation facilities off the coast of Rhode Island by developer Deepwater Wind. The first is a 20 MW facility to be located in state waters off the coast of Block Island, and the second is a larger facility located in federal waters of the southern RI coast. The company Deepwater Wind was chosen as a result of a competitive state RFP process for wind-generation facilities.

3. Does the state have estimates of existing in-state capacity and demand for natural gas and electric generation? Does the state have projections of future capacity? Please discuss.
(Taken from the RICRMC Ocean SAMP Draft 7/23/2010, Chapter 8: Renewable Energy):

National Grid procures the electricity it supplies to Rhode Island from multiple sources; for the period July 1, 2007 to June 30, 2008 the mix was as follows: natural gas (31.4%), nuclear (27.5%), imported electricity (12.4%), coal (11.2%), hydro power (4.7%), oil (3.8%); a diversity of other sources provided the remaining nine percent (9%), see Figure 8.2 (Rhode Island Office of Energy Resources 2010).

Natural gas is not an energy resource indigenous to New England, and therefore must be brought into the region by interstate natural gas pipelines from other states in the Northeast, Texas and Louisiana, the Trans-Canada pipeline from Canada into New York and Vermont, and by the offshore buoy-based offshore LNG receiving facilities Northeast Gateway Deepwater Port located off the coast of Massachusetts (U.S. Energy Information Administration 2009; U.S. Department of Energy 2004; Rhode Island Office of Statewide Planning 2002; Excelerate 2010). Petroleum products, home heating oil and transportation fuels, as well as some liquefied petroleum gas are supplied to Rhode Island through the Port of Providence, which is a sub-regional center for the distribution of these fuels.

Demand for electricity in the region and the nation as a whole is projected to increase in the coming decades. For example, the most recent forecast by the U.S.

Energy Information Administration estimates that annual electricity consumption will increase
from 3,873 terawatt-hours (TWh) in 2008 to 5,021 TWh in 2035. This increase represents a 29% increase in demand, requiring an additional 1,148 TWh of production by 2035 (U.S. Energy Information Administration 2010). Likewise, the Independent System Operator New England (ISO-NE) forecasts that the overall annual electricity usage of New England will increase by 10,810 GWh between 2009 and 2018, from current levels of 131,315 GWh to 142,125 GWh (see Table 8.1). Rhode Island accounts for a portion of this increase in energy within the region, as ISO-NE predicts that total electricity use will increase from 8,460 GWh in 2009 to 9,025 GWh in 2018, requiring an additional 565 GWh of energy production to meet anticipated annual electricity needs. The largest increase in peak loads is projected during the summer months, when an additional 235 MW of production capacity is expected to be required to meet the 2018 summer demand (ISO New England Inc. 2009a). Increases in energy efficiency, or efforts to decrease energy consumption may lower the amount of energy required in the future. However, if these projections are accurate and demand continues to rise into the future, New England will require greater generation capacity to meet the region's need for electricity.

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

(Taken from the RICRMC Ocean SAMP Draft 7/23/2010, Chapter 8: Renewable Energy):

Developing renewable energy in Rhode Island is one option to help meet the increasing demand for energy, to add to the energy mix of the state and to also help mitigate the effects of global climate change by reducing the amount of greenhouse gases emitted into the atmosphere from energy production. Legislation and initiatives adopted in Rhode Island, including the Renewable Energy Standard, the Systems Reliability and Least-Cost Procurement Act, the Regional Greenhouse Gas Initiative (RGGI), and the Long-Term Contracting Standard for Renewable Energy recognize the need for greater diversification of the state's energy resources and a commitment to renewable energy development in the state.

Enacted in 2004, the Renewable Energy Standard (RES) mandates a minimum share of electricity generation within the state come from renewable sources. As stated within the RES:

> "It is in the interest of the people, in order to protect public health and the environment and to promote the general welfare, to establish a renewable energy standard program to increase levels of electric energy supplied in the state from renewable resources.

> More specifically, Rhode Island's RES has the goals of (i) diversifying the energy sources supplying electricity consumed in the state, (ii) stabilizing long-term energy prices, (iii) enhancing environmental quality, including the reduction of air pollutants, carbon dioxide emissions, that adversely affect public health and contribute to global warming, and (iv) creating jobs in Rhode Island in the renewable energy sector."

Rhode Island's Renewable Energy Standard, enacted in June 2004, requires electric utility providers within the state to supply 16% of their retail sales from renewable resources by the end of 2019. The target began at 3% by the end of 2007, increasing by an additional 0.5% per year through 2010, an additional 1% per year from 2011 through 2014, and an additional 1.5% per year from 2015 through 2019. In 2020, and in each year thereafter, the minimum renewable energy target established in 2019 must be maintained unless the Rhode Island Public Utilities Commission determines that the standard is no longer necessary. Electric distributors may meet these targets by purchasing certificates from approved renewable energy generators, paying Alternative Compliance Credits to the Rhode Island Renewable Energy Development Fund (equal to $60.92/MWh in 2009), or a combination of both (Rhode Island Public Utilities Commission 2009; DSIRE 2010). If renewable energy credits are purchased, the Renewable Energy Standard requires that a certain percentage come from new sources (see Table 8.3). In addition, the legislation that created Rhode Island's Renewable Energy Standard also directed the Rhode Island State Energy Office to authorize the Rhode Island Economic Development Corporation to integrate and coordinate all renewable energy policies within the state to maximize their impact.

The most recent piece of legislation enacted within Rhode Island regarding renewable energy is the Long-Term Contracting Standard for Renewable Energy that was signed into law in 2009. Under this act energy distributors in Rhode Island (i.e. National Grid) are required to sign 10- to 15-year contracts to buy a minimum of 90 MW of its electricity load from renewable developers and up to 150 megawatts from utility-scale offshore wind energy facilities developed off the coast of Rhode Island. These long-term contracts, referred to as Power Purchase Agreements, outline how much, and at what price, energy from a renewable energy producer will be purchased by a utility company. Power purchase agreements provide assurances to developers that the power produced by a project will be purchased at a stated price, which may in turn aid a developer in obtaining financing for a project. In addition, power purchase agreements define the purchase price of the renewable energy over many years, allowing utility companies to identify energy costs from the renewable source well in advance.

The findings of the *RIWINDS Phase I Wind Energy Siting Study* commissioned by the Rhode Island Office of Energy Resources and completed by Applied Technology and Management Inc., concluded in April 2007 that the goal of meeting 15 percent of Rhode

Island's energy needs (equivalent to 400-450 MW) with wind energy was achievable, and that 98 percent of the wind opportunity is offshore.

Management Characterization

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

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

The CRMC has enforceable policies specifically related to energy facilities as outlined in RICRMP Section 300.8 Energy-Related Activities and Structures. This section establishes requirements for energy-related activities including all operations and structures involved in power generation and petroleum processing, transfer, and storage on a shoreline feature or its contiguous area or within tidal waters. The recently adopted Ocean Special Area Management Plan contains policies and regulations specific to the siting, design, fabrication, installation and monitoring of offshore utility-scale wind energy generation facilities.

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

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

3. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.

a) Characterize significant changes since the last assessment;
b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
c) Characterize the outcomes and effectiveness of the changes.

Significant changes within all management categories for Energy Facility Siting are related to the development of an Ocean Special Area Management Plan, which has recently been approved by the RI CRMC. The process of the OSAMP development (a CZM-driven change under Section 306) has included extensive research, monitoring and GIS analysis of the ecology, ocean resources, existing and future uses within the SAMP boundary, which includes approximately 1,467 square miles (3,800 square kilometers) of portions of Block Island Sound, Rhode Island Sound and the Atlantic Ocean. The study area begins 500 feet from the coastline in state waters, from the mouth of Narragansett Bay seaward, and all federal waters within the boundary.

There has been an extensive public education and outreach component to the OSAMP development process, including public workshops, monthly stakeholder meetings and CRMC OSAMP subcommittee meetings that are open to the public. A website has been created for the OSAMP (http://seagrant.gso.uri.edu/oceansamp/) through Sea Grant that contains information on the OSAMP development process, a calendar of OSAMP-related events, research summaries, links to the draft chapters and technical reports, static maps of ocean resources and uses created for the OSAMP as well as an interactive web-based map viewer.

The Ocean SAMP was approved by the RI CRMC on October 19, 2010. The process of its development has generally been viewed as a success, and the Bureau of Ocean Management (formerly the Minerals Management Service), through the Atlantic Governor's Consortium, has recognized Rhode Island as a leader in offshore renewable energy siting.

Priority Needs and Information Gaps

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

Gap or need description	**Type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority** (H,M,L)
Continued monitoring and research; updates to datasets and maps	Data	H
Updates to relevant sections of OSAMP	Policy	H
Public outreach & communication for final adopted document	Communication and outreach	H

Updates to the datasets and maps contained in the Ocean SAMP will likely incorporate ecological data such as those related to avian and possibly fisheries studies. Future research may include additional geologic studies of the SAMP area.

Enhancement Area Prioritization

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

High ___X__
Medium _____
Low _____

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

This enhancement area, in particular the development of the Ocean SAMP has been a major focus of CRMC activity since the last assessment. The adoption of the Ocean SAMP will influence activities having a broad range of socioeconomic and ecological impacts to the state.

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

Yes ____X__
No _____

Energy Facility Siting / Ocean Resources Strategy

I. Issue Area(s)

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

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

II. Program Change Description

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

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

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

The proposed program change will involve the adoption and implementation of the Ocean SAMP, which will provide a balanced approach to the development and protection of Rhode Island's ocean-based resources. It will also serve as guidance for the siting of future offshore energy generation facilities.

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

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

The strategy addresses the anticipated need for continued research and updating of the Ocean SAMP and communication and outreach efforts related to the final document.

IV. Benefit(s) to Coastal Management

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

The anticipated effect of the program change is a balanced approached to the development and protection of Rhode Island's ocean-based resources as well as a simplified site-selection process for offshore energy generation facility processes.

V. Likelihood of Success

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

The likelihood of success of this strategy is high, given the support the Ocean SAMP development process has received from the public and state and federal government agencies.

VI. Strategy Work Plan

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

for the annual budget estimates. If the state intends to fund implementation activities for the proposed program change, describe those in the plan as well. Further detailing of annual tasks, budgets, benchmarks, and work products will be determined through the annual award negotiation process.

Total Years: 2
Total Budget: $265,000
Final Outcome(s) and Products:

Year(s):1-2
Description of activities: Ocean SAMP communication and outreach
Outcome(s): Public events, CRMC staff training, Ocean SAMP and CRMC website content, printed outreach materials
Budget:$53,000

Year(s):1-2
Description of activities: Ocean SAMP research and monitoring
Outcome(s): updated avian, fisheries and geologic data and map products
Budget:$53,000

Year(s): 3-5
Description of activities: Ocean SAMP revisions and updates
Outcomes(s): incorporation of updated research data and map products into Ocean SAMP, submission of program changes
Budget: $159,000

VII. Fiscal and Technical Needs

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

The development of the Ocean SAMP has been supported through the State of Rhode Island Office of Energy Resources, the R.I. Economic Development Corporation, the U.S. Department of Energy, and the Rhode Island Sea Grant College Program.

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

The CRMC has partnered with URI researchers from various departments including the Department of Ocean Engineering and the Department of Natural Resources Science to obtain the data necessary for the SAMP's completion. In addition, the CRMC has partnered with the URI Environmental Data Center to create GIS products including an internet-based map server.

Coastal Hazards

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

Resource Characterization
Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.
1. Characterize the level of risk in the coastal zone from the following coastal hazards: (Risk is defined as: "the estimated impact that a hazard would have on people, services, facilities and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage." *Understanding Your Risks: Identifying Hazards and Estimating Losses. FEMA 386-2. August 2001*)

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

***** Localized high levels of risk in areas such as barrier headlands

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

3. If the level of risk or state of knowledge of risk for any of these hazards has changed since the last assessment, please explain. (see combined response below)

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

Coastal hazards presenting the highest level of risk in Rhode Island include flooding, coastal storms and associated storm surge, sea level rise and other climate change impacts and shoreline erosion. The impacts of these hazards are interrelated: along with wind and wave damage; coastal storms and their associated storm surges lead to flooding and accelerated shoreline erosion; climate change may increase the intensity of coastal storms, and sea level rise has an impact on flood zone boundaries, which increases the area affected. Detailed risk assessments for these hazards will be conducted using the high-resolution elevation data that will be obtained through a USGS Regional LiDAR project to be completed in 2011. However, there is sufficient data currently available to categorize the risk level for these hazards as high.

Flooding risk is outlined by current FEMA flood zone maps, and has been emphasized by recent episodic events such as the storms of March of 2010 that resulted in severe flooding throughout much of the state. The Federal Emergency Management Agency is planning a restudy of flood zone maps for Washington, Kent and Newport counties in 2011, which will include the identification of Costal A zones for these counties. The US Army Corps of Engineers has produced hurricane inundation maps for the RI Emergency Management Agency, which incorporate Sea, Lake and Overland Surges from Hurricanes (SLOSH) model results.

Shoreline erosion and accretion rates have been calculated for the entire RI shoreline and in 2007 were published as Shoreline Change Maps, which have been adopted as part of the RICRMP. These maps identify areas of higher risk due to shoreline erosion, namely barrier headlands and selected areas within Narragansett Bay. Future assessments will use higher resolution elevation data provided by regional LiDAR along with sea level rise predictions to predict changes in erosion rates.

Recent data on global rates of sea level rise as well as RI tide gauge data indicate that the rate of sea level rise in RI is accelerating. Over the last 100 years, sea levels have risen 0.56 feet (0.17 m) globally. The average rate of rise during the years between 1961 and 2003 was 0.071 inches per year (1.8 mm/yr), and between 1993 and 2003 the rate nearly doubled to 0.12 inches per year (3.1 mm/yr) (IPCC, 2007). This trend has been outlined in RICRMP Section 145 Climate Change and Sea Level Rise, adopted in March of 2008. The findings included in this section, based on the most up-to-date available climate change science, have been used to establish a baseline prediction of 3 to 5 feet of relative sea level rise by 2100. This baseline will be updated as additional data become available.

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

Type of hazard	**Number of communities that have a mapped inventory**	**Date completed or substantially updated**
Flooding	21 (see discussion below)	Flood zone maps to be updated 2011
Storm surge	21 (see discussion below)	SLOSH model results published 2009
Geological hazards (including Earthquakes, tsunamis)	Unknown	Unknown
Shoreline erosion (including bluff and dune erosion)	21	CRMC Shoreline Change Maps published 2007
Sea level rise	Please see discussion below	
Land subsidence	0	

Statewide maps of FEMA flood zones, hurricane inundation zones and shoreline erosion rates are available to communities as described above. Much of the additional data necessary to perform inventories of areas affected by coastal hazards (such as the location of public and private structures and infrastructure) are available through the Rhode Island Geographic Information System website, however not all coastal communities have the capacity or technological expertise to utilize this information. At present, 10 of the 21 coastal Rhode Island communities have hazard mitigation plans that have been approved by RIEMA. Several communities have received grants and are working with RIEMA to bring their hazard mitigation plans up-to-date. A vulnerability assessment and inventory for the municipalities within the Metro Bay SAMP boundary (Providence, East Providence, Pawtucket and Cranston) is included in the recently adopted Coastal Hazards chapter of the Metro Bay SAMP. Communities such as South Kingstown have performed more detailed hazard vulnerability assessments using localized high-resolution elevation data. However, high resolution elevation data is not available statewide and has been a long-standing data gap recognized by CRMC. Additionally, hazard mitigation plans and other planning efforts to date have not addressed sea level rise.

The CRMC is now participating in a regional project funded through the American Recovery and Reinvestment Act and led by USGS to obtain LiDAR data for the Northeast region. URI's Environmental Data Center (EDC) is the local lead organization for this project which will provide high resolution elevation data for the entire state. These data are expected to be made available in 2011, and will be used to perform a wide range of analyses including coastal hazard vulnerability assessments, including assessing vulnerability to sea level rise. With this in mind, the CRMC is currently working with the EDC, the URI Coastal Resources Center (CRC), the Nature Conservancy and Statewide Planning to use existing elevation datasets to produce several derivative products (such as maps of inundation zones) that will be made available to communities to help them perform hazards vulnerability assessments. The goal of this collaboration, funded by Sea Grant, is to create frameworks for assessments that can be easily updated when better-quality elevation data become available. Additionally, the project team will be working with a selected community on a pilot project that will produce community-based inventories and vulnerability analyses.

Management Characterization

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

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

Management categories	**Employed by state/territory** (Y or N)	**Significant changes since last assessment** (Y or N)
Building setbacks/ restrictions	Y	Y
Methodologies for determining setbacks	Y	Y
Repair/rebuilding restrictions	Y	N
Restriction of hard shoreline protection Structures	Y	N
Promotion of alternative shoreline stabilization methodologies	Y	Y
Renovation of shoreline protection	Y	N

Structures		
Beach/dune protection (other than setbacks)	Y	N
Permit compliance	Y	N
Sediment management plans	Y	Y
Repetitive flood loss policies, (e.g., relocation, buyouts)	N	N *
Local hazards mitigation planning	Y	N**
Local post-disaster redevelopment plans	N	N
Real estate sales disclosure requirements	Y	N
Restrictions on publicly funded infrastructure	Y	Y
Climate change planning and adaptation strategies	Y	Y
Special Area Management Plans	Y	Y
Hazards research and monitoring	N	N
Hazards education and outreach	Y	Y
Other (please specify)		

* discussions currently underway in the communities of Warwick and Cranston regarding buyout of properties with repetitive flood losses in the Pawtuxet River floodplain

** see previous section for non-CZM driven program activities related to local hazards mitigation planning

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

a) Characterize significant changes since the last assessment;
b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
c) Characterize the outcomes and effectiveness of the changes.

Management categories with significant changes regarding coastal hazards since the last assessment include building setbacks and restrictions, promotion of alternative shoreline protection structures, methodologies for determining setbacks, sediment management plans, restrictions on publicly funded infrastructure, climate change planning and adaptation strategies, SAMPs and hazards education and outreach. All changes listed were CZM-driven using Section 306 funding unless otherwise noted. In most cases, there is not yet sufficient information to assess the effectiveness of these changes, however the CRMC will continue to evaluate their outcomes and their impacts on coastal zone management in the short and long term.

Building Setbacks / Restrictions

Shoreline Change Maps containing erosion rates for the RI shoreline were created for the CRMC by the URI Department of Geosciences and published in 2007; this was a Section 306, CZM-driven change. Erosion rates from these maps are used to determine construction setbacks along the coast, as described in the existing RICRMP Section 140 Setbacks:

> The minimum distance of a setback shall be not less than 30 times the calculated average annual erosion rate for less than four dwelling units and not less than 60 times the calculated average annual erosion rate for commercial, industrial or dwellings of more than 4 units.

Rhode Island's statewide building code, based on the 2006 International Building Code (IBC), complements the NFIP minimum standards for buildings located within the 100-year floodplains. The 2006 IBC includes provisions for incorporating a freeboard (a factor of added safety above the anticipated flood level) as well as utilizing a coastal A-zone, in which buildings located within specified A-zones that are vulnerable to high wave activity would require V-zone construction standards (International Code Council (ICC), 2006). State legislation passed in 2007 authorized the CRMC to collaborate with the State Building Commissioner and adopt freeboard calculations to accommodate sea level rise and minimize storm-induced impacts to structures, in accordance with R.I.G.L. § 23-27.3-100.1.5.5. Current RI State Building Code (SBC) requires a one-foot freeboard standard for all new construction and reconstruction that meet threshold requirements.

Additionally, SBC requires that structures built in Coastal A-zones subject to wave heights of 1.5 or more must be built to V-zone construction standards.

Promotion of Alternative Shoreline Stabilization Methodologies

The concept of "Living Shorelines" is now well-established in the Eastern United States and is recognized and accepted as a valid restoration and coastal management strategy by NOAA. The principle of Living Shorelines is, essentially, using living and organic materials to restore habitat along areas of the coast that have historically been artificially hardened with bulkheads and seawalls. Living shorelines are achieved through the placement of salt marsh plants, shellfish, and various substrate materials to enhance the environmental value of these areas. Living shorelines serve to improve habitat, provide natural and sustainable erosion control and flood and storm water management. They also enhance the natural resilience of these areas to better withstand sea level rise and the effects of coastal storms. Most of the existing and active Living Shoreline programs are located in the Mid-Atlantic, Chesapeake Bay, and Gulf Coast regions of the United States. The Northeast, however, has equally-serious problems with coastal erosion, sea-level rise, and the long-term historic loss of natural shoreline and coastal wetlands due to bulk heading and structural protection techniques.

Rhode Island has nearly 400 miles of coastline, more than half of which are located within Narragansett Bay. Over 133 miles are hardened, (25 percent of the shoreline) with greater than 75 percent of these represented by bulkheads, revetments, and seawalls (Narragansett Bay Estuary Program). These areas and adjacent shores are even more susceptible to the negative impacts of sea level rise and storm-related coastal erosion. Since the last assessment, the CRMC has received a congressional appropriation to investigate living shorelines and other alternative shoreline stabilization methodologies and determine their suitability for application in Rhode Island. The CRMC is working with Save the Bay to perform shoreline assessments, construct pilot living shoreline projects and update CRMC policy to promote the use of non-structural shoreline stabilization. The project team has convened a Shoreline Adaptation Working Group and is planning a technical workshop for October 2010, which will inform policy and regulatory changes. This partnership is a non-CZM driven effort, funded by a 2009 Congressional appropriation.

Sediment Management Plans

The Rhode Island South Shore Regional Sediment Management Study has been initiated by the USACE. The purpose of the study is to develop a comprehensive approach for the optimum management of sediment within the Rhode Island South Shore headland-barrier system. Sediment is a very valuable but limited resource in coastal areas of Rhode Island and throughout the Northeast. Understanding the complexities of sediment movement through mapping and modeling will allow for the

development of planning strategies that target hazard resiliency in regard to the many homes, businesses, and public infrastructure located within the south shore region. Sediment management is one of the most cost efficient ways to protect our vulnerable coastal resources, properties and infrastructure especially in light of rising sea levels due to climate change.

This is a multi-phased Corps project that that is anticipated to be completed in five years. The federal (non-CZM) funding received to date has been used for the initial investigation, development of a project Scope of Work, compilation of existing data inventories and forecast resources, and identification of study partnerships. The Block Island Wave Buoy (CDIP Station 44097) has been deployed and records wave height, period and direction, and water temperature. Real time data from the Block Island Wave Buoy is accessible to all through the NOAA National Data Buoy Center. Wave generation and transformation modeling are underway. Continued data collection, wave and hydrodynamic modeling, characterization of coastal geology and geomorphology, sediment budget and development of a regional sediment management plan are slated for completion in FY13.

Restrictions on Publicly Funded Infrastructure

Rhode Island's South Shore coastal ponds and a frequently low-lying mainland are protected from the forces of the open ocean by a chain of low, narrow barriers. Their importance as buffers against storms, the continuing pressures to build upon them and a long history of disasters during hurricanes have made the regulation of activities on barrier a primary concern of the Coastal Resources Management Council. Several barriers that had all structures destroyed in 1938 and 1954 are again developed.

Changes to restrictions on publicly funded infrastructure incorporated since the last assessment include changes to RICRMP Section 210.2 Barrier Islands and Spits (a Section 306, CZM-driven change). These changes prohibit construction or expansion of public infrastructure and shoreline protection structures on barriers, and eliminate special exceptions for development in these areas (under Prohibitions):

> 5. The construction of new infrastructure or utilities or expansion of existing infrastructure or utilities shall be prohibited on all barriers. Such infrastructure or utilities shall include but not be limited to public or private water, electric, gas and sewer lines. This prohibition does not apply to individual, on-site water supply systems and onsite wastewater treatment systems, or onsite bottled gas supply. Additionally, this prohibition does not apply to such ancillary activities as the installation of cable and/or telephone lines that will service an existing individual structure.

Information regarding climate change, sea level rise and barrier processes has been added to the findings in Section 210.2:

> The Council accepts climate change models that indicate that sea level rise rates will accelerate and it is likely that the frequency of intense storms will increase as global temperatures rise (IPCC 2007). The combination of more severe storms and higher sea levels will impact the barriers. Storm surge overwash is the mechanism that causes barriers to migrate landward and also increase in elevation (Otvos and Carter 2007; Riggs and Ames 2007). This increased elevation will become increasingly important as sea level rises. Studies of the underlying geology, sediment supply and coastal processes to barrier systems in the Outer Banks and the Gulf of Mexico point to a threshold, that once past, leads to barrier disintegration (Culver et. al. 2007; Sallenger et. al. 2007). Shoreline protection structures are particularly unsuitable for construction on the barriers because these structures interfere with the overwash processes that supply sediment to the back barrier, eventually leading to a situation where the barrier does not build in elevation and is much more likely to breach or drown in place.

Climate Change Planning and Adaptation Strategies

Since the last assessment, climate change has become a central topic of many of the CRMC's planning efforts. RICRMP Section 145 Climate Change and Sea Level Rise was adopted in March of 2008 to establish a baseline prediction for sea level rise that could be used to guide future planning efforts and program changes (a Section 306, CZM-driven change). These will include additional changes to the RICRMP and SAMPs, as well as changes to the Coastal and Estuarine Habitat Restoration Strategy and Land Conservation Plan. As described above, the CRMC is involved in an effort led by USGS and locally by the URI EDC to obtain LiDAR data for the New England region. An outcome of this effort will be a seamless high-resolution elevation dataset for the entire state. This dataset will be a vital component in planning for and adapting to future climate change and sea level rise impacts. Additionally, the CRMC participates in the Northeast Regional Ocean Council's Hazard Mitigation subcommittee, and provides feedback on regional work plans and individual mitigation projects.

Special Area Management Plans

Major changes to SAMPs include the addition of a Coastal Hazards chapter to the Metro Bay SAMP entitled, Natural Hazards: Hurricanes, Floods, and Sea Level Rise in the

Metro Bay Region Special Area Management Plan: Analysis of Issues and Recommendations for Action. The objective of this chapter is to advise the communities, state and local government, and the public on the relevant coastal hazard issues in the Metro Bay Region and propose recommendations to effectively address and mitigate those hazards. The chapter makes a number of specific recommendations for policy and regulation changes as well as management actions, many of which are applicable statewide. These recommendations are summarized in the chapter's Executive Summary. The chapter also includes an inventory of land-based risks from coastal hazards within the Metro Bay SAMP boundary as well as Social, Economic and Critical Facilities Risk Exposure Maps for the entire state.

The Ocean SAMP, which is currently in draft form and is discussed further in the Energy Facility Siting section of this assessment, contains a chapter that addresses global climate change and its implications, including changes in air and ocean temperatures, storminess, precipitation and weather patterns, sea level rise and ocean acidification. Among the policies proposed within the Ocean SAMP Climate Change chapter is that of encouraging offshore renewable energy production as mitigation for potential climate change impacts. Both SAMP activities are Section 306 CZM-driven changes.

Hazards Research and Monitoring

Significant research and monitoring activities related to coastal hazards include two white papers on sea level rise. The first, *Sea Level Rise and the Status of Digital Terrain Data for South Shore of Rhode Island* produced for CRMC by URI graduate student intern Nathan Vinhateiro summarizes the current science related to SLR predictions for the next century. It also contains an inventory of terrain models and other digital planning tools that exist for Rhode Island's south shore communities and depicts scenarios and potential impacts of sea level rise. The second white paper, produced by intern Momin Malik is entitled *Survey of State Initiatives for Conservation of Coastal Habitats from Sea-Level Rise.* This paper summarizes the actions that other states have taken to protect essential habitats, such as wetlands and estuaries, from the anticipated rise in sea levels caused by anthropomorphic climate change. Local sea level rise trends continue to be updated using local tide gauge data.

Hazards Education and Outreach

Since the last assessment, there have been several (Section 306, CZM-driven) education and outreach efforts related to coastal hazards. A presentation on coastal hazards was given to Council members in February of 2010 as part of the CRMC Coastal Education series. A CRMC-sponsored public workshop on climate change and sea level rise was held in Narragansett in 2007. The CRMC is a partner in the Rhode Island Flood Awareness and Climate Change Taskforce (FACCT), a unique coalition of agencies working together to address the threats posed to Rhode Island coastal communities from the hazardous impacts of climate change and flooding. This group has worked

together to offer various trainings, such as workshops on Coastal Construction and Retrofitting Flood-prone Structures, to engineers, architects, building officials, and others throughout the state. RI FACCT is composed of the following agencies: Rhode Island Emergency Management Agency, Rhode Island Building Code Commission, Coastal Resources Management Council, Rhode Island Sea Grant, and the University of Rhode Island Coastal Resources Center. FACCT has recently put out its first document, RI FACCT Sheet #1, Rebuilding After a Storm, Permitting Procedures for Repair and Rebuilding after a Storm: Coastal & Residential Structures. Copies of this document will be available at local Building Officials' offices. RI FACCT will continue to work to provide useful trainings and informational bulletins and handouts to improve the resilience of Rhode Island coastal communities.

The CRMC with support from URI CRC is also developing a Storm Smart Coasts website for Rhode Island to connect to the national Storm Smart Coasts Network, an online resource for coastal decision makers that provides information on coastal hazard and climate change resiliency.

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

Contextual measure	**Number of communities**
Number of communities in the coastal zone required by state law or policy to implement setbacks, buffers, or other land use policies to direct develop away from hazardous areas.	Requirements implemented by state regulatory agencies
Number of communities in the coastal zone that have setback, buffer, or other land use policies to direct develop away from hazardous areas that are more stringent than state mandated standards or that have policies where no state standards exist.	None; see above. State implements buffer zone and coastal setback requirements for all coastal areas statewide.

Priority Needs and Information Gaps

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

Gap or need description	**Type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority** (H,M,L)
Mapping of Sea Level Rise Inundation Zones	Data	H (to be addressed through URI EDC / CRC collaborative project)
Sea Level Rise Regulations*	Regulatory	H
Update Shoreline Change Maps	Data	H
Address Structures on Eroding Shorelines	Regulatory	M

*****Need for development of regulations under newly created Section 145 of RICRMP

Enhancement Area Prioritization

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

High ____x_
Medium _____
Low _____

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

This enhancement area was given the highest priority ranking in the stakeholder survey administered by CRMC. Additionally, coastal hazards and sea level rise in particular have been topics of focus for many ongoing program activities. This is largely due to recent scientific findings on climate change and sea level rise as well as episodic events that have had impacts to the RI coastal zone.

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

Yes ___x___
No _____

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

Given the high priority assigned to this enhancement area, coastal hazard considerations, particularly the effects of sea level rise, will be incorporated into existing policy and strategies over the next five years. Planned changes include updates to the RICRMP, SAMPs, Coastal and Estuarine Habitat Restoration Trust Fund and the Coastal and Estuarine Land Conservation Plan.

Coastal Hazards Strategy

I. Issue Area(s)

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

☐ Aquaculture Cumulative and Secondary Impacts

☐ Energy & Government Facility Siting Wetlands

X Coastal Hazards

☐ Marine Debris

☐ Ocean/Great Lakes Resources

☐ Public Access

☐ Special Area Management Planning

II. Program Change Description

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

☐ A change to coastal zone boundaries;

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

☐ New or revised local coastal programs and implementing ordinances;

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

☐ New or revised Special Area Management Plans (SAMP) or plans for Areas of Particular Concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,

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

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

Updates to the RICRMP will be made to incorporate coastal hazard and sea level rise considerations into the appropriate sections, Such as section 150: Coastal Buffer

Zones. This will include the identification of areas of particular concern that are low-lying and prone to increased flooding under future sea level rise scenarios and the development of policy and regulations to minimize risks in these areas through mechanisms such as building restrictions and increased buffer zone requirements. It will also include the development of more detailed policy regarding alternatives to structural shoreline protection, and guidance on stabilization methods such as living shorelines. Shoreline Change Maps will be updated to provide an accurate basis for determining coastal construction setbacks. Unlike the current maps, the map updates will take sea level rise predictions into consideration in an effort to project future rates of shoreline erosion. The CRMC is currently partnering with the URI Coastal Resources Center and Applied Science Associates to secure funding to develop a shoreline erosion model for Rhode Island, the results of which would likely be incorporated into CRMC's shoreline change maps.

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

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

Updates to the RICRMP will address the need for an updated sea level rise policy. The newly-created RICRMP Section 145 and its detailed findings regarding climate change and sea level rise will provide the foundation for incorporating these considerations into all aspects of RI coastal zone management. These changes will complement non-309-funded efforts to improve inventories of coastal hazards risks and improve resiliency at the community level, and to improve public awareness of coastal hazard risks.

IV. Benefit(s) to Coastal Management

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

The anticipated effects of these program changes include the increased protection of coastal resources in areas most vulnerable to the impacts of coastal hazards, namely those related to climate change and sea level rise. These effects are expected to be seen statewide.

V. Likelihood of Success

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

The likelihood of attaining the proposed program changes is high, as the CRMC has already recognized climate change, sea level rise and their impacts as priority areas of concern, and has begun to incorporate these considerations into many of its planning efforts. The CRMC will continue its outreach, education and coordination activities to build support for coastal hazards policies. These activities will include public workshops, working with individual communities to improve their adaptation strategies, and continued coordination with state agencies.

VI. Strategy Work Plan

Total Years:5
Total Budget:$132,500
Final Outcome(s) and Products:

Year(s):1-2
Description of activities: Updates to shoreline change maps and incorporation of sea level rise data as well as erosion modeling results
Outcome(s): Updated shoreline change maps; new predicted future shoreline change maps
Budget: $53,000

Year(s):3
Description of activities: adoption and implementation of draft alternative shoreline stabilization policy, regulations and guidance
Outcome(s): revised RICRMP Section 300.7 that includes alternative shoreline stabilization policy and regulations; technical guidance document for alternative shoreline stabilization design
Budget: $26,500

Year(s):4
Description of activities: Revisions to RICRMP to incorporate sea level rise considerations
Outcome(s): Revised RICRMP Section 150 (Coastal Buffer Zones) and other revisions as determined necessary
Budget: $26,500

Year(s):5
Description of activities: Climate change adaptation and shoreline stabilization education and outreach
Outcome(s): public and professional workshops; outreach materials related to RICRMP revisions and alternative shoreline stabilization guidance
Budget: $26,500

VII. Fiscal and Technical Needs

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

The CRMC in coordination with the URI CRC has secured Sea Grant funding for the work being done in coordination with the URI EDC described below. The regional LiDAR project is funded through an ARRA grant awarded by USGS.

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

The greatest technical need for carrying out the proposed strategy is the GIS capacity and mapping expertise needed to map coastal inundation zones. CRMC will enter into a cooperative agreement with the URI EDC to produce a seamless statewide terrain dataset using existing high-resolution elevation data. The EDC will also provide technical assistance to produce derivative products from this dataset such as maps of coastal inundation zones, and to perform a local-scale hazards assessment for a pilot community. Once statewide LiDAR data become available through the USGS regional project, these products will be updated with the new elevation data. In addition, the CRMC is pursuing funds in partnership with the URI Coastal Services Center and Applied Science Associates to develop a stochastic shoreline erosion model for RI.

Wetlands

Section 309 Enhancement Objective
Protection, restoration, or enhancement of the existing coastal wetlands base, or creation of new coastal wetlands

Resource Characterization

1. Extent, status, and trends of wetlands in the Rhode Island coastal zone:

Wetlands type	**Current extent** (acres)	**Trends in acres lost since 2006** (Net acres gained & lost)	**Acres gained through voluntary mechanisms since 2006**	**Acres gained through mitigation since 2006**	**Year and source(s) of Data**
Tidal (Great Lakes) vegetated	4,107	0.18	75	63*	CRMC permit data and RIDEM, 2007[1]
Tidal (Great Lakes) non-vegetated	11,727	0	0	0	CRMC permit data and RIDEM, 2007[1]
Non-tidal/ freshwater	112,000 (statewide)	Unknown (data available through 2005)	Unknown (data available through 2005)	Unknown (data available through 2005)	RIDEM, 2007 [1]
Other (please specify) Eelgrass beds	465.5	Unknown	93	Unknown	Bradley, 2007[2]

*wetland mitigation requirement for Sakonnet River Bridge project per RICRMP section 300.12 was .36 acres. Mitigation activities consisted of hydrologic restoration of an impaired salt marsh resulting in restored area of 63 acres

1. RIDEM, 2007 State of the State's Waters (305b) Report (published biennially by RIDEM; 2009 report not yet available)

2. Bradley, M., K. Raposa and S. Tuxbury, 2007. *Report on the Analysis of True Color Aerial Photography to Map and Inventory Zostera marina L. in Narragansett Bay and Block Island, Rhode Island*

By the mid-1980s, Rhode Island had lost approximately 37% of its estimated original wetlands (both tidal freshwater and salt marsh). Some reports of wetland and coastal habitat losses have been as high as 50 percent of colonial inventories. These losses were largely due to mosquito ditching, dredge material fill, fill for development, roadway development and dikes. From the 1950s to the 1990s alone, Rhode Island experienced a net loss of over 300 acres or 10% of its estuarine marshes. As of the mid 1990s, salt marshes in Rhode Island were estimated to comprise over 3500 acres of the

state's estuarine habitat within the Narragansett Bay estuary and along the South Shore coastal pond region. Of that area, nearly half or over 1700 acres have been impacted by human activities such as ditching and impoundments.

Submerged aquatic vegetation (SAV) losses to the estuaries have been dramatic: there are less than 100 acres of seagrass beds in Narragansett Bay, the coastal ponds have seen reductions up to 41% over thirty years and water quality conditions are not adequate to support eelgrass resources in many coves and embayments. Scientific evidence suggests that the most important factor contributing to the continuing decline of eelgrass has most likely been the introduction of increasing amounts of anthropogenic nitrogen to Narragansett Bay particularly since the 1950s, as the year-round human population near the water substantially increased both around Narragansett Bay and in the Salt Pond Region (Short , 1996). An analysis report published in 2007 by NBNERR, the URI EDC and Save the Bay suggested that there may have been recent gains in the extent of eelgrass in Narragansett Bay, but differences in mapping methods between 1996 and 2006 make direct comparisons difficult. The report suggests greater frequency of mapping and the use of proven mapping methods that include aerial photograph interpretation and ground-truthing via field mapping in future years.

Since the adoption of the Rhode Island Coastal Resources Management Program (RICRMP) in 1976, the CRMC has protected all coastal wetlands, regardless of size. Any filling or alteration is strictly prohibited in approximately 90% of the state's remaining salt marshes (those abutting Types 1 and 2 waters, and Types 3,4,5 & 6 waters which have been designated for preservation) (RICRMP, Section 210.3). Activities within 200 feet of coastal wetlands are also regulated. Priority use development impacts, such as marinas, are permitted in areas that affect fringe marsh, although mitigation at a 2:1 area ratio under Section 300.12 of the CRMP is required. There have been few such impacts since 2006, limited to transportation projects such as the Sakonnet River Bridge improvements that were permitted in 2008. This project resulted in a loss of less than 0.2 (5500 s.f.) acres of salt marsh. Recently adopted Submerged Aquatic Vegetation (SAV) regulations (RICRMP Sec. 300.18) seek to avoid, minimize and mitigate impacts to SAV, and will provide a mechanism for tracking future permitted losses and gains in eelgrass habitat.

The latest RIDEM State of the Waters Report, which details permitted freshwater wetland losses and gains, was published in 2007 and includes loss/gain information for the years 1999 through 2005. During this period, freshwater wetland losses permitted by RIDEM and CRMC were minimal (4.5 acres). It is assumed that continued administration of strong avoidance and minimization requirements through both freshwater wetland permitting programs has preserved this trend, however specific loss/gain information after 2005 is not yet available.

The CRMC maintains a database that includes acres of wetlands restored by projects that received funding from the state Coastal and Estuarine Habitat and Restoration Trust Fund (Trust Fund) administered by CRMC. These projects represent the majority of wetland acreage gained through voluntary mechanisms since 2006, and mainly include salt marsh restoration through removal of fill, invasive species and/or tidal restrictions. Recent restoration efforts such as the South Coast Restoration Project sponsored by the US Army Corps of Engineers and CRMC and eelgrass transplant projects conducted by Save the Bay have resulted in significant gains (over 40 acres since 2006) in eelgrass acreage.

Quantitative measures for this enhancement area such as total acres of habitat restored are derived from project information for the state Coastal and Estuarine Habitat Restoration Trust Fund as well as the RI Habitat Restoration Portal website. The CRMC plans to coordinate with the inter-agency state Habitat Restoration Team to collect additional data from projects not funded through the Trust Fund and to update Restoration Portal information.

Threats to Coastal Wetlands

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

The priority threats to coastal wetlands include development along the coast, fill, tidal restrictions, and the introduction of invasive species. An emerging threat is the increasing rate of sea level rise that is the result of global climate change.

Development/Fill

Historically, roads, dredge and fill operations, residential and commercial development, and sedimentation from overland runoff and vegetation removal are some of the major causes of wetland loss and degradation. Downtown Providence, Newport, the Navy facility at Quonset Point, and many other low lying coastal communities in Rhode Island are built on what was once coastal wetland. It is estimated that 60% of Rhode Island's salt marshes have been filled with mud and sand dredged during navigation projects or waste material derived from upland sources (Save the Bay 2002). Increased development in upland coastal areas can threaten existing coastal wetlands by preventing their landward migration as rates of sea level rise increase due to global climate change.

Alteration of Hydrology

Construction of dikes, roads and rail crossings has resulted in the degradation of many marshes in Rhode Island. Restriction of tidal flow by installation of small culverts or drainage pipes under roads and rail beds leads to changes in salinity and alteration of the natural vegetation community due to a reduction in duration and frequency of tidal flooding. *Phragmites australis*, which is tolerant of these altered conditions, especially reduced salinity, often invades rapidly in areas that have been tidally restricted. *Phragmites* out-competes native salt marsh vegetation, and reduces local biodiversity. Some 1200 of the existing 3700 acres of salt marsh in Narragansett Bay are impacted by *Phragmites* and other invasive plant species (Save the Bay 2002)

Fish communities also suffer from tidal restrictions, as they rely on the natural tidal cycle to maintain populations in salt marshes. Marsh resident fish species, such as killifish (*Fundulus* spp.) spawn in concert with the tidal cycle, timing their spawning activity to coincide with the highest Spring tides, due ensure deposition of eggs in the highest portion of the marsh (Taylor et. al. 1979). When natural tidal cycles are interrupted or reduced, killifish spawning success is impaired. Tidal restrictions can reduce the amount of habitat available for estuarine-dependent fish that travel up into tidal creeks in search of food.

Mosquito ditching has impacted many marshes in Rhode Island. Mosquito ditches are very straight, narrow channels that were dug to drain the upper reaches of salt marshes. Historically, it was believed that ditching marshes would control populations of mosquitoes that breed there. It is now known that ditching, in fact, drains standing water which support populations of mosquito-eating fish (*e.g.*, killifish), leading to increases in mosquitoes. These fish are an important prey item for wading birds (herons and egrets), as well as larger, predatory fish species. Mosquito ditching alters natural patterns of groundwater drainage, which alters plant community composition, and nutrient cycling.

Pollution and Nuisance or exotic species

Polluted runoff from adjacent uplands has degraded Rhode Island salt marshes. Runoff from roads and other paved surfaces, and nutrient-rich runoff from fertilized lawns, agricultural areas, and septic systems has degraded marshes by encouraging growth of *Phragmites australis* and other invasive species. Forested buffer zones between populated areas and salt marshes have diminished as population growth in coastal areas increases. Approximately 58% of Narragansett Bay's marshes are impacted by polluted runoff. Some 30% of the Bay's marshes have inadequate or non-existent buffer zones (Save the Bay, 2002). In the salt ponds, nitrate-nitrogen loading from septic systems has contributed to a 41% decline in eelgrass beds over a 32-year period.

Sea Level Rise

As the rate of sea level rise increases, elevations in coastal wetlands cannot be maintained through normal accretive processes. As salt marshes and other coastal habitats become submerged, they migrate inland. However, coastal development has decreased the amount of upland open space adjacent to these habitats, limiting their ability to migrate landward. This is especially true in Rhode Island where a significant percentage of the state's coastal wetlands can be categorized as fringe marshes. Often these wetlands are backed by developed private lands or public infrastructure such as roads and railways, leaving limited upland areas of open space. An increase in the rate of relative sea level rise is likely to result in the protection of upland development, which could lead to significant losses of coastal wetlands and intertidal habitat.

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

Mapped Coastal Habitat Types

Habitat type	**CMP has mapped inventory** (Y or N)	**Date completed or substantially updated**
Tidal (Great Lakes) Wetlands	Y	2008
Beach and Dune Nearshore	Y	2004
Other (please specify) Eelgrass	Y	2007

An inventory of coastal habitats based on statewide 1999 true color aerial photography was published by the Natural Resources Assessment Group and the

Narragansett Bay Estuary Program in 2004. This report mapped submerged aquatic vegetation, coastal wetlands, deepwater habitats, and coastal features in southern Rhode Island and southeastern Connecticut. An additional coastal wetlands inventory report that identified impacted coastal wetlands and potential restoration sites for coastal Rhode Island was published by the US Army Corps of Engineers in 2008. Eelgrass habitats in Narragansett Bay and Block Island were mapped by the URI Environmental Data Center, Narragansett Bay Estuarine Research Reserve and Save the Bay using 2006 color aerial photography and with field mapping techniques. These maps were published in 2007 in a report analyzing trends in eelgrass gains and losses since 1996. Together, these efforts represent a statewide inventory of coastal habitats.

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

Coastal Habitat Restoration and Protection

Contextual measure	Cumulative acres for 2004-2010
Number of acres of coastal habitat restored using non-CZM or non-Coastal and Estuarine Land Conservation Program (CELCP) funds	227
Number of acres of coastal habitat protected through acquisition or easement using non-CZM or non-CELCP funds	Unknown

The number of acres of coastal habitat restored using non-CZM or non-CELCP funds represents the acres restored as a result of projects funded through the RI Coastal and Estuarine Habitat Restoration Trust Fund, administered by CRMC, as well as the acres restored as a result of the Allins Cove restoration project led by the US Army Corps of Engineers for which CRMC was the local sponsor.

Information regarding the area of coastal habitat protected through acquisition or easement using non-CZM or non-CELCP funds since 2004 is currently unavailable. However, an analysis of statewide conservation land data available through RIDEM could provide this information and is being considered by CRMC.

Management Characterization

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

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

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

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another

enhancement area or section of the document, please provide a reference rather than duplicate the information.
a) Characterize significant changes since the last assessment;
b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
c) Characterize the outcomes and effectiveness of the changes.

Wetland Protection Policies and Standards

On April 24, 2007, RICRMP Section 300.18 Submerged Aquatic Vegetation and Aquatic Habitats of Particular Concern was adopted by the CRMC. This section establishes the CRMC's policy to preserve, protect and where possible restore submerged aquatic vegetation habitats. It establishes standards that require SAV surveys to be submitted with applications for activities in areas where SAV presence has been determined by CRMC staff, and provides standard design options for minimizing impacts to SAV. It also establishes the policy that unavoidable SAV losses must be mitigated at an area ratio of 2:1 (See also Cumulative and Secondary Impacts). This was a Section 306 CZM-driven change that has resulted in a more detailed project review process that specifically addresses impacts to SAV habitats.

Wetland Restoration or Enhancement Programs

The primary wetland restoration or enhancement program administered by the CRMC is the state Coastal and Estuary Habitat Restoration Trust Fund and Strategy. Since the last assessment, the CRMC has continued to administer this program, which allocates $250,000 of state funding annually to the planning, design and construction of coastal and estuarine habitat restoration projects. Since 2006, the CRMC along with a Trust Fund Technical Advisory Committee comprised of various state and federal agencies and non-profit entities has awarded $900,000 of funding to 32 habitat restoration projects leveraging over $12M in non-state funding. These projects include restoration of salt marshes, anadromous fish habitat, eelgrass and shellfish beds. Trust Fund funded projects have resulted in a total of over 75 acres of habitat restored. Significant changes to this program include updates to the State Coastal and Estuarine Habitat Restoration Strategy, Trust Fund application forms and project evaluation criteria. These changes have simplified the application process, provided more detailed guidance to potential applicants, increased the transparency of the project evaluation and selection process and rectified discrepancies between the Trust Fund guidance and the state legislation that established the Trust Fund (go to www.crmc.ri.gov/habitatrestoration.html for updated Strategy and forms as well as a list of projects funded since 2006).

Wetland Acquisition Programs

The Departments of Commerce and Justice and the State Appropriations Act of 2002 (Public Law 107-77) directs the Secretary of Commerce to establish a Coastal and Estuarine Land Conservation Program (Program) "for the purpose of protecting important coastal and estuarine areas that have significant conservation, recreation,

ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses." The Program gives priority to lands that can be effectively managed and protected and that have significant ecological value. The Program was reauthorized in March of 2009 as part of the Omnibus Public Lands Management Act (Public Law 111-11). The law further directs the Secretary to establish guidelines that would make project selection within the Program a more objective and nationally competitive process. To meet this directive, the National Oceanic and Atmospheric Administration (NOAA) published Program guidelines (http://coastalmanagement.noaa.gov/pdf/CELCPfinal02Guidelines.pdf) that establish the Program's eligibility, and procedural and programmatic requirements for participation. Coastal states that submit grant applications under the Program must develop a NOAA–approved Coastal and Estuarine Land Conservation Program (CELCP) Plan. The CELCP Plan provides an assessment of priority land conservation needs and clear guidance for nominating and selecting land conservation projects within the state. As the lead CELCP agency for Rhode Island, the CRMC has developed and updated its state CELCP plan, which was submitted for federal review and approved in 2010.

In the past, significant funding for the Program was appropriated (FY 2002, $15.8 million; FY 2003, $36.7 million; FY 2004, $51 million), and projects were congressionally directed. As of FY2007, the Program is nationally competitive as outlined in the NOAA guidelines. Since this time, the CRMC has issued an annual Request for Proposals for acquisition projects. The CRMC works closely with applicants and RIDEM to develop final proposals for submission to the federal competition. Since the last assessment, there have been no RI projects selected for funding through CELCP.

Wetland Mapping

A coastal wetlands inventory, funded through the USACE Planning Assistance to States program and the Coastal and Estuarine Habitat Restoration Trust Fund was completed by USACE with CRMC staff input. The report published in 2008 (http://www.crmc.ri.gov/habitatrestoration/RI_Coastal_Wetlands_Inventory_2008.pdf). The inventory report identifies impacted coastal wetlands and potential restoration sites for coastal Rhode Island.

Special Area Management Plans

Since the last assessment, the Urban Coastal Greenways Policy for the Metro Bay SAMP was adopted by the CRMC. As part of the development of this policy, a habitat analysis was performed for the SAMP area to identify Areas of Particular Concern, which include areas of high value habitat such as wetlands. In order to protect the APCs, the UCG policy imposes stricter buffer zone requirements for development in these areas. A habitat inventory and analysis was also conducted for the western side of Aquidneck Island and will be the foundation for the Aquidneck Island SAMP habitat chapter, currently in development.

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

Habitat type	**CMP has a restoration plan** (Y or N)	**Date completed or substantially updated**
Tidal (Great Lake) Wetlands	**Y**	**2008**
Beach and Dune	**N**	
Nearshore	**Y**	**2008**
Other (please specify)		

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

Gap or need description	**Select type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority (H, M, L)**
Incorporate climate change and sea level rise into restoration and conservation policies	**Policy**	**H**
Perform analysis of effects of sea level rise on coastal wetlands using SLAMM or similar model to identify priority areas for acquisition and restoration	**Data**	**H**
Improve coordination of state and regional restoration partners	**Communication and Outreach**	**M**

through Habitat Restoration Team		

Enhancement Area Prioritization

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

High ___X__
Medium _____
Low _____

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

This enhancement area was ranked as a high priority based on results from the stakeholder survey conducted by CRMC. Climate change and sea level rise represent increased threats to sensitive coastal habitats, increasing the importance of their conservation and restoration. However, these factors also represent a shift in how we view restoration projects, changing how we might consider individual projects in terms of their design, life spans and long-term benefits. It is important that we adjust our thinking about restoration and conservation to incorporate these concerns.

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

Yes ___X___
No _____

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

Existing strategies for wetland restoration and acquisition will be updated to incorporate climate change and sea level rise considerations.

Wetlands Strategy

I. Issue Area(s)

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

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

II. Program Change Description

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

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

B. Describe the proposed program change(s) or activities to implement a previously achieved program change. If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the

proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)

Changes will be made to the existing state Coastal and Estuarine Habitat Restoration Strategy, Trust Fund guidance and evaluation criteria to incorporate information on climate change and sea level rise. These documents are referenced by state legislation (RIGL § 46.23.1) and are used to direct the project selection process. Changes will include revised restoration priority habitats and areas based on information gathered from climate change / sea level rise impact model results. Changes will also include new requirements for Trust Fund applicants to incorporate sea level rise into project designs and project lifespan estimates. The CRMC will continue to work with its restoration partners through the state Habitat Restoration Team to implement these changes.

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

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

The state Coastal and Estuarine Habitat Restoration Strategy guides the process of habitat restoration project selection. The evaluation criteria by which projects are scored to determine their suitability for funding are based directly on this strategy. Updating this strategy and supporting documents to include sea level rise and climate change considerations will help to ensure the success of future restoration projects.

IV. Benefit(s) to Coastal Management

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

Sea level rise is an important consideration when planning and designing habitat restoration projects, particularly those that incorporate changes in surface elevations and hydrology. Requiring applicants to plan for future sea level rise will ensure that funding is allocated to restoration projects that are successful, have a longer lifespan and provide greater benefits.

V. Likelihood of Success

Discuss the likelihood of attaining the proposed program change and implementation activities. The state or territory should address: 1) the nature and degree of support for pursuing the strategy and the proposed change; and, 2) the specific actions the state or

territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities.

The proposed change has a high likelihood of success given that the CRMC has made planning for sea level rise and climate change a priority within many of its program activities. The adoption of RICRMP Section 145 Climate Change and Sea Level Rise has created the foundation for updating CRMC's habitat restoration policies. In addition, federal guidance currently in development will be used to make further changes. The CRMC will work closely with the state Habitat Restoration Team to ensure continued support for these changes and their implementation.

VI. Strategy Work Plan

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

Total Years: 5
Total Budget: $132,000
Final Outcome(s) and Products: Updated Habitat Restoration Strategy and Guidance, RICELCP plan,

Year(s): 1-2
Description of activities: Information gathering from CRMC sea level rise policy, habitat modeling analysis and NOAA national guidance on climate change and habitat restoration,
Outcome(s): Sea level rise planning scenarios, SLAMM model outputs, technical guidance for project design and selection
Budget: $53,000

Year(s): 3
Description of activities: Draft revisions to the Habitat Restoration Strategy
Outcome(s): Updated Habitat Restoration Strategy, new prioritized list of potential restoration projects
Budget: $26,500

Year(s): 4
Description of activities: Coordinate with Habitat Restoration Team on Habitat Restoration Strategy changes
Outcome(s): Habitat Restoration Team meetings / workshops; revised Habitat Restoration Strategy and guidance draft
Budget: $26,500

Year(s): 5
Description of activities: Continued outreach and implementation of revised Habitat Restoration Strategy and guidance
Outcome(s): Public workshops, updated CRMC website
Budget: $26,500

VII. Fiscal and Technical Needs

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

While the State Coastal and Estuarine Habitat Restoration Trust Fund has been a valuable source of non-federal funding for habitat restoration projects, there are projects that go unfunded each year for lack of non-federal match. This illustrates the need for restoration funding at the state and local level. The Habitat Restoration Team will continue efforts to increase the amount allocated to the state fund, as well garnering support for individual projects in the RI General Assembly. In June of 2009, the CRMC was able to secure $3.5 million in ARRA funds through the NOAA Coastal Habitat Restoration program for the construction of six anadromous fish passage restoration projects whose earlier phases had been funded in part by the state fund.

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

Technical needs related to this program change include the ability to model the effects of future sea level rise on coastal wetlands and other habitats in order to identify areas of particular concern for restoration and conservation. The CRMC is currently partnering with the Nature Conservancy to perform modeling using SLAMM in discrete

areas of the state, but additional technical assistance would be needed to run such an analysis statewide, once high-resolution elevation data become available through regional LiDAR efforts.

5-Year Budget Summary by Strategy

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

Strategy Title	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
Wetlands	$26,500	$26,500	$26,500	$26,500	$26,500	**$132,500**
Coastal Hazards	$26,500	$26,500	$26,500	$26,500	$26,500	**$132,500**
Energy Facility Siting / Ocean Resources	$53,000	$53,000	$53,000	$53,000	$53,000	**$265,000**
Total Funding	**$106,000**	**$106,000**	**$106,000**	**$106,000**	**$106,000**	**$530,000**

Special Area Management Planning

Section 309 Enhancement Objective

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

Resource Characterization

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

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

Geographic Area	Major conflicts	Is this an emerging or a long-standing conflict?
Aquidneck Island	Potential for inconsistence development patterns when land is excised	Emerging Issue – U.S. Navy is in process of excising federal land to local redevelopment authority
Metro Bay Region	Potential for loss of access and loss of habitat value during redevelopment. Conflict between local zoning and CRMC water types	Long-standing issue: to be resolved through SAMP and local zoning/planning coordination
RI off-shore waters	Potential resource and user conflicts in open ocean areas adjacent to RI	Emerging Issue – due to off-shore wind turbine project proposal
Greenwich Bay	Implementation of standard buffer policy under CRMP Section 150	Long-standing issue of redevelopment pressure on existing lots and lack of space for required buffers

The six Special Area Management Plans (SAMP) that are currently implemented by the CRMC collectively represent a divergent range of coastal resources and uses.

Salt Pond SAMP
The CRMC's first SAMP was adopted in 1984 to manage the economically valuable and environmentally sensitive coastal salt ponds and their associated land areas along Rhode Island's south shore. The Salt Pond Region SAMP reflected the recognition that effective coastal zone management at times requires more than regulating activities at the shoreline. Representing the CRMC's first watershed-based approach to coastal zone management, the Salt Pond Region SAMP regulates major development projects and other use activities that occurred within a thirty-two square mile watershed area that covers the entirety of Rhode Island's south shore, and extended several miles inland from the coast encompassing portions of four coastal communities: Westerly, Charlestown, South Kingstown, and Narragansett.

Narrow River SAMP
The Narrow River SAMP followed in 1986. This SAMP also instituted a watershed-based approach, but in this case, it was applied to an estuarine river system. However, despite the differences in the ecological characteristics of each SAMP area, the idea to transcend the limitations inherent in applying environmental protection measures according to political boundaries (i.e., municipal boundaries), was common to both SAMPs. In each case, the resultant boundaries identified meaningful ecosystems for the purpose of regulating activities on a watershed wide basis.

Pawcatuck River and Little Narragansett Bay SAMP
The Pawcatuck River and Little Narragansett Bay SAMP takes the idea of transcending political boundaries for the purpose of applying environmental protection measures, to the state level. This is CRMC's only current interstate SAMP. Similar to the Narrow River SAMP, this SAMP also regulates activities within the watershed of an estuarine river. But it also covers activities that occur in the more oceanic coastal waters of Little Narragansett Bay.

Metro Bay SAMP *(formerly Providence Harbor SAMP)*
Providence Harbor is Rhode Island's largest urban waterfront area. Commercial shipping brings petroleum products and other goods that an entire regional economy relies upon to the heavily developed industrial waterfront that dominates much of the harbor. But the waterfront area is changing as residential communities along the harbor seek more mixed-use projects, sometimes conflicting with designated water-dependent industrial uses. And recreational uses, such as marinas, characterize certain stretches of the waterfront. The Metro Bay SAMP seeks to balance these various uses, provide for increased public access and also improve water quality through implementation of the SAMP's Urban Coastal Greenway program. The Metro Bay SAMP was adopted by the CRMC on October 10, 2006

Greenwich Bay SAMP
The most recently adopted SAMP is the Greenwich Bay SAMP. Greenwich Bay is an estuary—a semi-enclosed inlet of the sea in which seawater is diluted with fresh water. It contains five protected coves with five square miles of shallow water and is embraced by a 26-square-mile watershed. Greenwich Bay is a highly productive estuary that has provided people with food, shelter, transportation, trade, and recreational opportunities for centuries. However, the impacts of land uses in bordering Warwick and East Greenwich, and, to a smaller degree, West Warwick, have led to a serious water quality decline in the bay. The Greenwich Bay SAMP describes the present status of the bay, characterizes its watershed, identifies sources of pollution, and recommends steps to help government work with communities to restore, protect, and balance uses of Greenwich Bay for this and future generations. The R.I. Coastal Resources Management Council (CRMC) coordinated with Warwick, East Greenwich, government agencies, and community organizations to prepare the Greenwich Bay Special Area Management Plan (SAMP), which CRMC adopted on May 10, 2005.

Aquidneck Island SAMP – see description below regarding new SAMP since last assessment in2006.

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

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

SAMP title	**Status** (new, revised, or in progress)	**Date approved or revised**
Aquidneck Island – coastal development regulations	New; habitat chapter now in progress	Adopted by CRMC on April 7, 2009
Metro Bay SAMP – Ports/working waterfront chapter	In progress	
Metro Bay SAMP - Hazards chapter	New	Adopted by CRMC on September 9, 2009
Salt Pond and Narrow River SAMPs – Section 920 (nitrogen removal systems)	Revised	Adopted by CRMC on January 22, 2008
Greenwich Bay SAMP – Section 680 (commercial fishing docks)	Revised	Adopted by CRMC on January 22, 2008

Ocean SAMP	New	Adopted by CRMC on October 19, 2010

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

a) Characterize significant changes since the last assessment (area covered, issues addressed and major partners);
b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
c) Characterize the outcomes and effectiveness of the changes.

Aquidneck Island SAMP

The CRMC developed this SAMP in collaboration with the three island communities of Portsmouth, Middletown, and Newport, the Aquidneck Island Planning Commission (AIPC), Naval Station Newport, Rhode Island Sea Grant/University of Rhode Island Coastal Resources Center, and other partners. This SAMP is a CZM-driven effort (306 funds) that will help implement the three communities' vision for future development along Aquidneck Island's western shore, especially for areas of planned Navy land excise. The AI SAMP address specific policy and development standards for this region and include public access requirements, open space and habitat preservation, potential CRMC water type designation changes, and natural hazard resilience, among other issues. The CRMC Aquidneck Island Coastal Development (ACD) Regulations provide a permitting option for new coastal development within identified growth centers along the west side of the island. The policy also aims to preserve the valuable natural and recreational corridors and aspects within this region. The SAMP boundary is based on the Aquidneck Island West Side Master Plan boundary area, and the ACD regulations support the Aquidneck Island West Side Master Plan, other local plans, and all state and federal CRMC requirements.

Metro Bay SAMP

With research support assistance from RI Sea Grant/URI Coastal Resources Center the CRMC developed and adopted the "Hazards chapter to address concerns for sea level rise and storm impacts to this densely developed and economically important region of the state. It was a CZM-driven effort (306 funds) and is describe in more detail in the Hazards section of this 309 Assessment. The "Ports" chapter has been drafted with public review and input on content and scope regarding the current status of and future development potential for this primarily industrial waterfront area. The chapter is still under development to incorporate comments and new maps with more current data. Local municipal efforts to provide for mixed-use residential/commercial development have caused concern by affected waterfront industrial uses and state officials. The CRMC expects that the outcome of this Ports chapter would provide a framework for

preserving critical water-dependent uses and accommodating some levels of mixed-use and recreational development desired by local communities.

Salt Pond Region and Narrow River SAMPs

The CRMC adopted these CZM-driven (306 funds) changes to both SAMPs to address the status of nitrogen removal onsite wastewater treatment systems (OWTS) technology as approved in Rhode Island pursuant to the Department of Environmental Management (DEM) "Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems." The outcome f this change results in effective regulation consistency for the requirement of nitrogen-removal OWTS throughout the watersheds of these two SAMPs. DEM promulgated a watershed-wide rule based on the precedent and need as defined by the CRMC within the SAMPs.

Greenwich Bay SAMP

Working closely with the commercial shellfish industry of Greenwich Bay, CRMC staff developed policy and standards for the legalization of pre-existing commercial docks that pre-dated the CRMC. The result of these CZM-driven (306 funds) efforts has been effective identification and permitting of commercial docks within the three primary coves of Greenwich Bay that support the shellfish industry. These amendments were the result of implementing recommendations contained in the Greenwich Bay SAMP.

Ocean SAMP

The Rhode Island Ocean Special Area Management Plan, also known as the Ocean SAMP, will serve as a federally recognized coastal management and regulatory tool. Using the best available science and data, the Ocean SAMP will provide a balanced approach to the development and protection of Rhode Island's ocean-based resources and will provide the framework for development of renewable offshore energy resources. The Ocean SAMP development effort involves the highest application of GIS spatial management tools. The Ocean SAMP will be an adaptive planning tool that promotes a balanced and comprehensive ecosystem-based management approach to the development and protection of Rhode Island's ocean-based resources. Further, it will contribute to the mitigation of, and adaptation to, global climate change as well as facilitate coordination between state and federal agencies and the people of Rhode Island for development of offshore renewable energy resources.

Priority Needs and Information Gaps

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

Gap or need description	**Type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority** (H,M,L)
GIS-based permitting system to more effectively track permitting and enforcement actions within SAMP areas	Data system requirements	M
Incorporating climate change initiatives within the SAMPs to address changing conditions	Regulatory and policy	M

Enhancement Area Prioritization

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

High _____
Medium __x___
Low _____

Priority issues related to this enhancement area have been addressed in the Ocean Resources and Energy Facility siting section of this document, which discusses development of the Ocean SAMP. While work on other SAMPs is planned or in progress, the Ocean SAMP has been given the highest priority within the program and the majority of efforts are currently focused there.

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

Yes _____
No ____x__

While implementation strategies exist for the individual SAMPs and their elements have been incorporated elsewhere in this document, there are currently no plans to develop a unified strategy for SAMPs in general.

Public Access

Section 309 Enhancement Objective

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

Resource Characterization

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

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

Type of threat or conflict causing loss of access	**Degree of threat** (H,M,L)	**Describe trends or provide other statistics to characterize the threat and impact on access**	**Type(s) of access affected**
Private residential development (including conversion of public facilities to private)	**H**	Opposition by private property owners continues to be significant	State, local and other Designated Rights-of-Way* (ROW)
Non-water dependent commercial/industrial uses of the waterfront (existing or conversion)	**M**	Effects mitigated through public access plan requirements	Boat ramps, walking paths, kayak launching sites
Erosion	**M**	Localized impacts	**Designated ROWs**
Sea level rise/ Great Lake level change	**L**	Impact may increase with future sea level rise	**Designated ROWs, Section 335 public access sites, local ROWs, access at certain state and local parks**
Natural disasters	**M**	May increase with climate change impacts and sea	

		level rise	
National security	**L**	Remains minimal	**Designated ROWs**
Encroachment on public land	**H**	Increasing with rate of coastal development	**Designated ROWs**
Other			

* ROWs are typically paths that provide legal public access to the shore

Despite the current economic downturn, coastal development continues to occur, and especially in the case of residential property, opposition to public access remains high. Recent examples include the proposed abandonment of a long-standing and significant town ROW by the new owner of an adjacent waterfront residential property. Because CRMC requires a public access plan in the case of marinas and commercial or industrial developments, some of the impact on public access can be ameliorated. Erosion has recently impacted some CRMC designated ROWs by washing out the pathways that led to these sites. While erosion may not be a coast-wide problem, it tends to significantly impact public access when it occurs, often eliminating previously safe access sites entirely. The impacts of sea level rise on public access are low at present, but in time, many CRMC designated ROWs may be lost as they tend to have discrete boundaries that are relatively close to the shore. Immediately after September 11th, 2001, some designated ROWs were affected by exclusion zones established in the vicinity of certain bridges, but the effect of national security policy overall has been minimal. Private encroachment on public land continues to threaten public access as CRMC and other ROWs are routinely landscaped into oblivion or obstructed.

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

No imminent new threats to public access have been identified since the last assessment, however, sea level rise is certain to have an impact in time. Similarly, climate change and the more powerful hurricanes and other storms that are projected as a result will likely have devastating effects on ROWs exposed to more oceanic conditions, such as along the south shore beaches from Narragansett to Westerly.

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

Data is currently lacking for this contextual measure, but staff is attempting to procure funding for a GIS mapping course to gain the skills necessary to map all CRMC ROWs. The map and related digital products (i.e on-line survey) could be interactive so the public can find a

ROW of interest, examine its current status, and be in an informed position to comment on if not demand actions to protect and enhance existing ROWs. At the time of this writing CRMC has not developed a plan to conduct a public opinion survey on the adequacy of access to the shore. Staff is currently enrolled in two GIS mapping courses and upon completion in December 2010 will begin a GIS mapping project for CRMC designated ROWs. When the map is made available on the CRMC website, a survey can be included to address public opinion regarding CRMC ROWs.

Contextual measure	**Survey data**
Number of people that responded to a survey on recreational access	**N/A in all cases**
Number of people surveyed that responded that public access to the coast for recreation is adequate or better.	
What type of survey was conducted (i.e. phone, mail, personal interview, etc.)?	
What was the geographic coverage of the survey?	
In what year was the survey conducted?	

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

Demand for public access remains high as borne out by the significant summer season spike in phone calls, emails, and drop-ins complaining about aggressive neighbors and other problems that hinder the public from using lawfully provided rights of way. While an on-line survey needs to be developed and implemented, the harbor management plan review process provides opportunities to meet with local harbor commissions and residents to discuss the topic of public access. CRMC requires all HMPs to address, analyze, and plan for improvements to CRMC ROWS and other types of public access.

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

Types of public access	Current number(s)	Changes since last assessment (+/-)	Cite data Source
(CM) Number of acres in the coastal zone that are available for public (report both the total number of acres in the coastal zone and acres available for public access)	N/A [1]		
(CM) Miles of shoreline available for public access (report both the total miles of shoreline and miles available for public access)	420 total miles: below MLW all available for public access [1]	none	RICRMP Section 200.A.2
Number of State / County / Local parks and number of acres	17 state parks with coastal access (total acres n/a)[1]	CRMC to verify with RIDEM Parks & Recreation	DEM Parks and Recreation website
Number of public beach/shoreline access sites	224 CRMC designated ROWs and at least 344 other public access sites have been identified and promoted	+3	CRMC 2009-10 annual ROW report and "Public Access to the Rhode Island Coast" publication.
Number of recreational boat (power or non-power) access sites	183 marinas, 40 state boat ramps	CRMC to verify with RIDEM Division of Fish and Wildlife	CRMC marina database, DEM Fish & Wildlife website
Number of designated scenic vistas or overlook points	8 scenic roadways based on correspondence with RIDOT, there are no coastal scenic overlooks officially designated by the state		RIDOT
Number of State or locally designated perpendicular rights-of way (i.e. street ends,	224 state ROWS	+3	CRMC 2009-01 annual ROW report

easements)			
Number of fishing access points (i.e. piers, jetties)	CRMC in process of obtaining information from RIDEM Division of Fish and Wildlife		
Number and miles of coastal trails/boardwalks	N/A [1]		
Number of dune walkovers	Information stored in permit database but database does not accommodate searches – finding data is thus a protracted and torturous affair		
Percent of access sites that are ADA compliant access	18% of coastal boat ramps are ADA compliant [1]	CRMC to verify with RIDEM Division of Fish and Wildlife	DEM – F&W website
Percent and total miles of public beaches with water quality monitoring and public closure notice programs	Total miles N/A but, out of 238 beaches identified in Rhode Island (though not all are under the state's jurisdiction) 51% (n=118) are subject to water quality monitoring and public closure notices	CRMC to verify with RI Dept. of Health	Rhode Island Dept of Health?
Average number of beach mile days closed due to water quality concerns	N=178 (note: 6,732 = sum of beach days at 118 beaches cited above w/Memorial Day to Labor Day beach day period)	CRMC to verify with RI Dept. of Health	Rhode Island Dept of Health?

1. CRMC can contact all coastal municipalities & appropriate state agencies to compile data on acres available for public access via fishing access sites, parks, miles of coastal trails, ADA compliant access, etc.

Management Characterization

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

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

Management categories	**Employed by state/territory** (Y or N)	**Significant changes since last assessment** (Y or N)
Statutory, regulatory, or legal system changes that affect public access	Y (Metro Bay SAMP)	Y
Acquisition programs or policies	Y (CELCP)	Y
Comprehensive access management planning (including GIS data or database)	N	N/A
Operation and maintenance programs	Y (w/in municipal harbor management plans)	Y (see "Other" below)
Alternative funding sources or techniques	Y (CELCP)	Y
Beach water quality monitoring and pollution source identification and remediation	Y	CRMC to verify with Narragansett Bay Estuary Program
Public access within waterfront redevelopment programs	Y	Y
Public access education and outreach	Y	Y (see "Other" below)
Other (please specify)	N	N

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

a) Characterize significant changes since the last assessment;

b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and

c) Characterize the outcomes and effectiveness of the changes.

Significant changes to this enhancement area since the last assessment include:

Metro Bay SAMP

Development and adoption of the Urban Coastal Greenways policy for the Metro Bay SAMP. Please see the Cumulative and Secondary Impacts section of this document for a description of this activity.

CELCP

The CRMC updated the Rhode Island Coastal and Estuarine Land Conservation Plan, which was submitted and approved by NOAA. Please see the Wetlands section of this document for further information on CELCP.

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

The CRMC published *Public Access to the Rhode Island Coast* (available at: www.crmc.ri.gov/publicaccess/ri_access_guide.pdf) in cooperation with RI Sea Grant and the URI Coastal Resources Center in 1993 and the publication was updated in 2004. Sea Grant also maintains a website, "A Daytripper's Guide to Rhode Island," as a companion tool to the printed guide (http://seagrant.gso.uri.edu/daytrip/#). The website contains interactive maps of "natural places and coastal areas" for users to explore.

Priority Needs and Information Gaps

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

Gap or need description	**Type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority** (H,M,L)
Web-based GIS map of public access sites	**Data / capacity**	**H**
Grass roots public access	**Communication/outreach**	**H**

advocacy		

Enhancement Area Prioritization

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

High _____
Medium ___X__
Low _____

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

This enhancement was ranked highly in the 309 stakeholder survey administered by CRMC. However, given the recent focus of the program on marine spatial planning for ocean resources and energy facility siting through the Ocean SAMP development, those enhancement areas have been given higher priority for this assessment than public access. Based on shoreline privileges promulgated in the Rhode Island Constitution, the CRMC has a statutory mandate to promote public access. Strong resistance to public access particularly by waterfront property owners creates the need to treat public access as an area that requires constant scrutiny and enhancement.

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

Yes _____
No ___X___

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

There are currently no plans to develop a public access strategy per se, however CRMC can provide a valuable service to the public by producing web-based GIS maps and other products to help them locate ROWs and other public access locations. This can also provide a hub through which the public can have instant access to information and assistance regarding their interest in using and protecting public access.

Aquaculture

1. Section 309 Enhancement Objective
Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone, which will enable States to formulate, administer, and implement strategic plans for marine aquaculture

Resource Characterization
Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.
1. Generally characterize the private and public aquaculture facilities currently operating in your state or territory.

Type of existing aquaculture facility	**Describe recent trends**	**Describe associated impacts or use conflicts**
Shellfish farms (35)	Modest growth	Fisheries use conflicts
Marine Ornamental facility (1)	Stable	n/a

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

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

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

Mapping	**Y**	**N**
Aquaculture education & outreach	**Y**	**Y**

There were 3 basic changes to the RI Aquaculture Plan: 1) a 5% area cap for aquaculture in the coastal ponds; 2) no harvest of wild shellfish (mollusks) from aquaculture leases; and 3) the creation of a recreational aquaculture permit for private dock owners. The first two changes are to minimize user conflict; the third change is for outreach, education and recreation.

Enhancement Area Prioritization

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

High _____
Medium _____
Low __X___

The priority for this enhancement area is low because there are no federal policies for permitting aquaculture beyond state waters.

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

Yes _____
No __X____

While there are not plans to develop an overall strategy, criteria will be developed over the next few years for open ocean aquaculture in consultation with the NOAA aquaculture staff.

Cumulative and Secondary Impacts

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

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

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

Provide the following information for each area:

Geographic area	**Type of growth or change in land use**	**Rate of growth or change in land use** (% change, average acres converted, H,M,L)	**Types of CSI**
Metro Bay and suburban areas	Waterfront development and redevelopment	M	Impacts to public access, coastal buffers, coastal water quality
Metro Bay and suburban areas	Shoreline protection	M	Loss of coastal buffer zones, loss of intertidal habitat due to increase in hardened shoreline structures

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

Sensitive resources	**CSI threats description**	**Level of threat** (H,M,L)
Intertidal habitat, wetlands and buffer zone vegetation	Loss due to coastal development, hardened shoreline structures and invasive species	M
Waterbodies / water quality	Impacts from increased stormwater runoff	H

Management Characterization

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

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

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

*See Energy Facility Siting and Ocean Resources section for information on research and mapping related to the Ocean SAMP

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

Policies and Regulations

Significant changes since the last assessment include the adoption and implementation of the Urban Coastal Greenways policy for the Metro Bay SAMP region, which includes regulations and guidance related to coastal buffer zones. The goals of the policy are to improve water quality and public access within the SAMP boundary while allowing more extensive buffer zone management. The policy focuses on the use of Low Impact Development storm water management practices and the planting of sustainable, non-invasive vegetation as means

of preserving buffer zone functions while accommodating urban development and redevelopment. Maps of habitat resources and areas of particular concern (APCs) were created as part of the development process for this policy. The SAMP area was then divided into various zones, which provide the basis for the specific Urban Coastal Greenway requirements. Since the adoption of this policy, over a mile of urban coastal greenway has been permitted and over 500 linear feet of greenway has been constructed.

Another significant change under the policy category was the adoption of RICRMP Section 300.18 Submerged Aquatic Vegetation and Aquatic Habitats of Particular Concern. This section establishes the CRMC's policy to preserve, protect and where possible restore submerged aquatic vegetation habitats. It establishes standards that require SAV surveys to be submitted with applications for activities in areas where SAV presence has been determined by CRMC staff, and provides standard design options for minimizing impacts to SAV. It also establishes the policy that unavoidable SAV losses must be mitigated at an area ratio of 2:1 (See also Wetlands).

The CRMC is currently developing policy and guidance related to the use of living shoreline techniques to address coastal erosion and the cumulative effects of shoreline hardening. Please see the Coastal Hazards section of this document for a detailed description of these efforts.

Priority Needs and Information Gaps

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

Gap or need description	**Type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority** (H,M,L)
Please see needs and gaps listed under the Wetlands and Coastal Hazards Section of this document.		

Enhancement Area Prioritization

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

High _____

Medium _X____
Low _____
Briefly explain the level of priority given for this enhancement area.

Much of the activity surrounding cumulative and secondary impacts includes implementation of policies and regulations already adopted by the CRMC, and concerns related to this enhancement area are being incorporated into strategies relating to other enhancement areas such as Wetlands and Coastal Hazards. The CRMC will continue to address this enhancement area through its ongoing management activities.

2. Will the CMP develop one or more strategies for this enhancement area?
Yes _____
No __X____

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

There will not be a specific strategy developed for Cumulative and Secondary Impacts, however the concerns outlined above will be incorporated into the various efforts detailed in other sections of this assessment (see Wetlands and Coastal Hazards).

Marine Debris

Section 309 Enhancement Objective
Reducing marine debris entering the Nation's coastal and ocean environment by managing uses and activities that contribute to the entry of such debris

Resource Characterization
Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.
1. In the table below, characterize the significance of marine/Great Lakes debris and its impact on the coastal zone.

Source of marine debris	**Extent of source** (H,M,L)	**Type of impact** (aesthetic, resource damage, user conflicts, other)	**Significant changes since last assessment** (Y or N)
Land Based – Beach/Shore Litter	**H**	Aesthetic, resource damage, public health risk, user conflicts	**Unknown (data available through 2006)**
Land Based – Dumping	Prohibited but extent unknown / not measured	Aesthetic, resource damage, public health risk, user conflicts	**N**
Land Based – Storm Drains and Runoff	**H**	Aesthetic, resource damage, public health and water quality risk, user conflicts, impacts to storm water management infrastructure	**N**
Land Based – Fishing Related (e.g. fishing line, gear)	**H**	Aesthetic, resource damage, user conflicts	**N**
Ocean Based – Fishing (Derelict	**H**	Resource damage, user conflicts	**N**

Fishing Gear)			
Ocean Based – Derelict Vessels			
Ocean Based – Vessel Based (cruise ship, cargo ship, general vessel)			
Hurricane/Storm	**M (potentially high)**	Episodic and dependent upon location / type of storm event	

Management Characterization

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

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

Management categories	**Employed by state/territory** (Y or N)	**Employed by local governments** (Y, N, Uncertain)	**Significant changes since last assessment** (Y or N)
Recycling requirements	**Y**	**Y**	**N**
Littering reduction programs	**N**	**N**	**N**
Wasteful packaging reduction programs	**N**	**N**	**N**
Fishing gear management programs	**N**	**N**	**N**
Marine debris concerns in harbor, port, marine, &	**Y**	**Y**	**N**

waste management plans			
Post-storm related debris programs or policies	**Y**	**N**	**N**
Derelict vessel removal programs or policies	**Y**	**N**	**N**
Research and monitoring	**N**	**N**	**N**
Marine debris education & outreach	**N**	**N**	**N**
Other (please specify)			

Level of priority
(H,M,L)
Enhancement Area Prioritization
1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

High _____
Medium _____
Low ___X__

This enhancement area was ranked as medium priority in the stakeholder 309 survey conducted by CRMC. Though a concern, it is not currently a focus of planning and program change activities. It is an area that is being addressed by the RI Dept. of Environmental Management through a partnership with the organization Clean the Bay, with funding from the NOAA Marine Debris program.

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

Yes _____
No _X_____

A strategy will not be developed for this enhancement area by CRMC since it is currently being addressed by other state agencies.

Appendix A: RI CRMC 309 Assessment Stakeholder Survey

Rhode Island Coastal Resources Management Program Enhancement Areas (2010)

Please indicate priority issues for future coastal management by checking the appropriate column below.

ISSUE	PRIORITY High	Medium	Low
Tidal Wetlands Protecting, preserving, improving and creating wetlands through regulatory and non-regulatory programs and innovative techniques			
Coastal Hazard Areas Directing development and redevelopment away from hazardous areas; preserving and restoring protective functions of natural shoreline features; preventing and minimizing storm threats; anticipating and managing the effects of potential sea level rise			
Public Access Improving, maintaining and protecting public access through regulatory, planning, and innovative funding techniques			
Marine Debris Developing and/or revising programs that reduce the amount of marine debris in the coastal zone			
Cumulative and Secondary Impacts Developing, revising and/or enhancing procedures and policies to provide cumulative and secondary impacts control			
Special Area Management Planning Developing and implementing special area management plans for important coastal regions			
Ocean Resources Developing and enhancing planning and coordination mechanisms to ensure meaningful state participation in ocean resource development management and decision-making			
Energy and Government Facility Siting Enhancing existing procedures and planning processes, and improving policies and standards associate with energy-related and government facilities siting and activities			
Aquaculture Enhancing existing procedures and planning processes, and improving policies and standards associated with aquaculture facilities and activities			
Other Please use this space to identify other priority areas			