Section 309 Assessment and Strategy of Pennsylvania's Coastal Resources Management Program

Performed Under the
Coastal Zone Enhancement Grants Program
Section 309
Coastal Zone Management Act

Prepared by
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Pennsylvania Coastal Zone Management Program
309 Assessment

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Overview

Introduction

This assessment of Pennsylvania's Coastal Resources Management Program (CRM) is based on the Final Section 309 Guidance (June, 2014) published by the National Oceanic and Atmospheric Administration (NOAA). Section 309 of the Coastal Zone Management Act, as amended in 1990 and 1996 (PL 104-540) [revised by PL 96-464; PL 101-508], encourages states to revise their previous 309 assessments and develop new strategies to achieve program changes in one or more of the coastal zone enhancement areas:

- Coastal wetlands
- Coastal hazards
- Public access
- Marine debris
- Cumulative and secondary impacts
- Special area management planning
- Ocean/Great Lakes resources
- Energy and government facility siting and activities
- Aquaculture

Under the 309 grant program, states that improve their programs to meet the goals in one or more of the enhancement areas are eligible for additional federal funding.

As required by the program, CRM conducted a reassessment of the nine enhancement areas in both the Lake Erie and Delaware Estuary Coastal Zones. This provided CRM with an opportunity to reevaluate its management direction and past efforts in the priority enhancement areas.

Following the guidance set forth by NOAA, this report is a combined assessment and strategy. The assessment provides an overview of the 309 efforts since 2011, followed by an evaluation and update of the enhancement areas in accordance with the questions provided in the guidance. A copy of the 2011 Assessment and Strategy is available, for reference, at the Pennsylvania Department of Environmental Protection website, www.dep.state.pa.us , Keyword "Coastal Zone." A copy of the draft and final 2016 – 2021 Assessment and Strategy will also be made available on the website.

Prior to drafting our current Assessment and Strategy, CRM reached out to local stakeholders in both coastal zones to receive feedback on priorities and potential program changes. More details, including the list of local stakeholders engaged and a brief summary of feedback, is provided at the end of the document in the section entitled Summary of Stakeholder Engagement and Public Comment. Notification of the draft 2016 – 2021 Assessment and Strategy and ability to provide public comment on the document will be advertised in the *Pennsylvania Bulletin* and on CRM's website. CRM will provide a minimum 30-day public comment period on the draft document. A summary of public comments and program responses will be provided in the final document.

Summary of Recent Section 309 Achievements

NOAA gave final approval to CRM's 2011-2016 Assessment and Strategy on April 11, 2011. CRM developed three strategies for the 2011-2016 period: 1) Lake Erie Coastal Zone Boundary Expansion, 2) Development of AIS–Species Specific Rapid Response Plans and a Monitoring and Surveillance System for the Coastal Watersheds, 3) Building Marine Spatial Planning for Lake Erie Coastal Resources.

The Lake Erie Coastal Zone Boundary Expansion efforts continue. A considerable amount of outreach was conducted to solicit input from local government and local stakeholders. Input received has been somewhat divergent. Many stakeholders feel an expansion to the full watershed boundary is fundamentally necessary while some municipalities have expressed concerns and have asked not to be included. DEP continues to analyze the various expansion options. While the preferred geographic alternative has not yet been determined, CRM anticipates submitting a formal program change request related to LECZ boundary expansion prior to September 30, 2016.

Lake Erie Coastal Zone Boundary Expansion

- Community and municipal outreach
- Boundary expansion options and mapping

There has been considerable progress in building capacity for aquatic invasive species during this current strategy period. Pennsylvania Sea Grant, working with CRM, has played an important role in coordinating AIS efforts between the various agencies, commissions, and NGOs. These efforts are conducted through their active participation in the Pennsylvania Invasive Species Council as well as networked efforts outside of the council. Intergovernmental coordination efforts related to AIS, which is included in our Ocean Resources policy area, have been enhanced through these efforts. A very comprehensive monitoring and surveillance system has been initiated in Pennsylvania, using the iMapInvasives database. This database includes both terrestrial and aquatic species, which is important in addressing invasive wetland plant species. The Lead Partner Organization for this effort is the Pennsylvania Department of Conservation and Natural Resources who works closely with the Western Pennsylvania Conservancy to operate the system. The bulk of the funding for the PA iMapInvasives Project has been provided by the Great Lakes Restoration Initiative. CRM has provided funding for outreach and education on the use of the database as well as key invasive species identification. This outreach has focused on field staff for various agency, commission, conservation district, and NGO staff. The Pennsylvania Fish and Boat Commission (PFBC) also maintains a database of select priority species that are purely aquatic. One of the key accomplishments of PSG was the development and printing of a Pennsylvania specific AIS Field Guide for field biologists and water conservation officers. This guide improves identification skills and helps support more accurate reporting and population of the iMapsInvasives database. The Pennsylvania AIS Field Guide is available on the PSG website at http://www.paseagrant.org/projects/pennsylvanias-field-guide-to-aquatic-invasive-species/. One

AIS Rapid Response and Monitoring

- Approved Pennsylvania AIS Rapid Response Plan
- Pennsylvania Field Guide to AIS
- Multi-agency field staff training

of the gaps in AIS management is field staff's time to enter data into the database and to take full advantage of the database's broad functionality.

In September 2014, the Pennsylvania Invasive Species Council voted to approve the Pennsylvania Rapid Response Plan (http://www.paseagrant.org/wp-content/uploads/2012/09/PA-Rapid-Response-Plan-7_21_2014_Designed.pdf). A key priority identified is the need for formal training on the rapid response plan within each agency so that the rapid response process is better understood, and so that agency personnel, especially field staff, know the steps to follow for reporting AIS. Another future step for rapid response planning is to develop a memorandum of understanding or other agreements on departmental procedures to outline how each agency will be involved in responses. CRM and PSG will continue to pursue these goals.

During the 2011 – 2016 Strategy period CRM also began to accumulate data and map the diverse resources of Lake Erie. The goal is to consolidate information and make it more readily accessible to project planners and reviewers, as well as potentially serve as the baseline for any state or regional Marine Spatial Planning efforts. The effort has also identified areas where additional information and data is needed. The program intends to have a permitting assistance document and associated mapping of resources available in late 2016. It is anticipated that as additional information becomes available the documents will continue to be updated. Moving into the future, funding for updating these maps and documents will be sought from sources other than Section 309. Erie County's local government and specifically the Erie County Department of Planning have begun to investigate the possibility of a designated National Marine Sanctuary within Pennsylvania's portion of Lake Erie. The concept is in the very early stages, seeking public opinions and working with federal officials to acquire more details. The Marine Spatial Planning capacity building CRM has done could help to inform any type of Marine Sanctuary effort that may move forward.

Building Marine Spatial Planning for Lake Erie

- Data gathering and consolidation
- Shipwreck and substrate investigation
- GIS and data sharing

Current Enhancement Area Analysis Summary

Each of the nine enhancement areas was analyzed for their priority as coastal issues for Pennsylvania and for their potential for CRM program changes. Prior to drafting this Section 309 Assessment and Strategy document, CRM engaged key stakeholders to solicit comments on what our priorities should be and where specific CRM program changes could enhance management of the resources. This was a change compared to prior Section 309 enhancement cycles, when the document was drafted prior to seeking input, and stakeholders were then invited to provide comment. The new procedure of seeking stakeholder engagement prior to drafting the document proved successful, and the communication informed not only the drafting of this Section 309 document but the broader program priorities as well.

Consistent with the NOAA guidance, CRM limited itself to 3 "high priority" enhancement area designations; Coastal Hazards, Public Access, and Cumulative and Secondary Impacts. A more in-depth, Phase II assessment was conducted for each of these enhancement areas.

Wetlands
During the last assessment CRM considered Wetlands to be a high priority. It was considered a medium priority during this assessment. Significant changes in Pennsylvania's wetland mitigation policies are expected to occur during the next assessment period and CRM will be involved in representing the unique wetland resources in the coastal areas. As these new policies are implemented, experience gained may indicate the need for CRM program changes. However, CRM feels that migration to the new mitigation and compensation policies can be accomplished using existing resources. Both proposed strategies, the expansion of the Delaware Estuary Coastal Zone and building capacity to better facilitate climate adaptation and resiliency, will enhance CRM's ability to manage wetlands even though a specific wetland strategy is not being proposed.

Coastal Hazards
Coastal Hazards were considered a medium priority in the last assessment, it was elevated to a high priority during this assessment. Pennsylvania's CRM program has a long history of providing expertise and mitigating damage from shoreline and bluff erosion along the Lake Erie coast. In the Delaware Estuary, flooding throughout the coastal plain has been a long standing problem and priority among local partners. Recent climate trends and forecasts indicate an increased frequency of heavy precipitation events and larger more powerful storm systems, which will exacerbate flooding problems. Sea level rise will add additional threats. CRM's assessment found that the program needed to focus more on climate adaptation issues and help build internal and local capacity for climate adaptation and resiliency planning. The proposed strategy is presented at the end of this document.

Public Access
Public Access was considered a high priority last assessment and was considered a high priority again during this assessment. Waterfront redevelopment remains very active in the Delaware Estuary Coastal Zone and CRM continues to support local efforts that seek to re-connect the citizens with the estuary. Connecting growing trail systems and residential neighborhoods to new access sites encounter challenging obstacles associated with working waterfronts, post-industrial brownfields, and active infrastructure. CRM feels it is important to take advantage of the current momentum and developed a strategy to expand the Delaware Estuary Coastal Zone boundary to better facilitate making these challenging connections. The boundary expansion strategy is presented at the end of this document.

Marine Debris
Marine debris was considered a low priority during the last assessment, it was elevated to a medium priority during this assessment. Recognizing our coastal zones can be a source for plastic marine debris and a growing concern over secondary microplastics in the aquatic environment were factors in elevating the priority. A strategy for a program change was not developed, but CRM will seek opportunities to support efforts that address marine debris.

Cumulative and Secondary Impacts
Cumulative and Secondary Impacts were considered a high priority during the last assessment and remained a high priority during this assessment. Stormwater impacts and habitat fragmentation associated with heavy development in the urbanized Delaware Estuary remains a challenge. Phosphorus loadings to Lake Erie and the desire to avoid habitat fragmentation remain a priority in the Lake Erie Coastal Zone. Recent harmful algal blooms have highlighted the need for additional nutrient control efforts in the watershed. Climate change may exacerbate the problems and present increased threats from these existing cumulative and secondary impact concerns. CRM has developed a strategy to build capacity to address climate adaptation and resiliency that will help in planning to mitigate increased adverse cumulative and secondary impacts.

Special Area Management Planning
This enhancement area was considered a medium priority last assessment and a low priority this assessment. There are specific geographic areas that warrant future consideration for developing Special Area Management Plans, but at this time CRM felt priorities could be addressed without the need for a specific plan.

Ocean/Great Lakes Resources
Ocean/Great Lakes Resources were considered a high priority during the last assessment and strategies were developed and implemented to help enhance management of these resources. The strategies developed for the 2011 Section 309 Strategy and Assessment included consolidating data and mapping the resources of Lake Erie and developing aquatic invasive species monitoring and tracking systems and rapid response plans. During this assessment period, Ocean/Great Lakes Resources were considered a medium priority. The strategies developed for this Section 309 Assessment and Strategy will indirectly enhance management of these resources.

Energy and Government Facility Siting
During the last assessment period CRM considered Energy and Government Facility Siting to be a high priority. This was largely driven by wind energy interest and potential leasing of the lakebed in Lake Erie. While recognizing the importance of this enhancement area, the program considered it to be a medium priority for developing program changes under the current Assessment and Strategy. Energy facility siting is a significant priority state-wide and within each coastal zone. The Marcellus and Utica shale formations, and the ability to use fracking to access the resources, have generated an energy boom throughout the Commonwealth. New and transformed energy related port facilities have been built along the tidal estuary, and this activity will likely continue. Conventional oil and gas wells are located in the Lake Erie watershed, and non-conventional wells may someday be developed. While the interest in wind energy has slowed, the winds remain favorable and wind energy may still be in the Erie region’s future.

Aquaculture
Aquaculture was considered a low priority during the last assessment and is being considered a low assessment during this reporting period. Commercial aquaculture has not yet developed in either coastal zone. The critically important recreational fisheries in the Lake Erie Coastal Zone are supplemented by aquaculture, both public and private hatcheries. CRM recognizes the importance of these operations, but does not feel a program change is necessary. CRM can continue to support local partners under existing programs and policies.

Wetlands

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

Note: For the purposes of the Wetlands Assessment, wetlands are "those areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." [33 CFR 328.3(b)]. See also pg. 17 of the CZMA Performance Measurement Guidance for a more in-depth discussion of what should be considered a wetland.

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

Resource Characterization:

1. *Using provided reports from NOAA's Land Cover Atlas, please indicate the extent, status, and trends of wetlands in the state's coastal counties. You can provide additional or alternative information or use graphs or other visuals to help illustrate or replace the table entirely if better data are available.*

DECZ:

Coastal Wetlands Status and Trends in DECZ Coastal Counties (Delaware, Philadelphia, Bucks)		
Current state of wetlands in 2010 (acres)	33.37 sq. mi.	
Percent net change in total wetlands (% gained or lost)	from 1996-2010	from 2006-2010
	-1.65%	-0.33%
Percent net change in freshwater (palustrine wetlands) (% gained or lost)	from 1996-2010	from 2006-2010
	Delaware: -2.71% Philadelphia: -0.30% Bucks: -1.56%	Delaware: -2.42% Philadelphia: -1.51% Bucks: -1.04%
Percent net change in saltwater (estuarine) wetlands (% gained or lost)	from 1996-2010	from 2006-2010
	Delaware: -10.00% Philadelphia: -5.49% Bucks: -2.08%	Delaware: 0.92% Philadelphia: 0.00% Bucks: 1.74%

DECZ:

How Wetlands Are Changing in DECZ Coastal Counties (Delaware, Philadelphia, Bucks)		
Land Cover Type	**Area of Wetlands Transformed to Another Type of Land Cover between 1996-2010 (Sq. Miles)**	**Area of Wetlands Transformed to Another Type of Land Cover between 2006-2010 (Sq. Miles)**
Development	0.59	0.14
Agriculture	0.04	0
Barren Land	0.01	0
Water	0.07	0.04

LECZ:

Coastal Wetlands Status and Trends in LECZ Coastal Counties (Erie)		
Current state of wetlands in 2010 (acres)	78.7 sq. mi.	
Percent net change in total wetlands (% gained or lost)	from 1996-2010	from 2006-2010
	-0.49%	-0.12%
Percent net change in freshwater (palustrine wetlands) (% gained or lost)	from 1996-2010	from 2006-2010
	-0.49%	-0.35%
Percent net change in saltwater (estuarine) wetlands (% gained or lost)	from 1996-2010	from 2006-2010
	N/A	N/A

How Wetlands Are Changing in LECZ Coastal Counties (Erie County)		
Land Cover Type	**Area of Wetlands Transformed to Another Type of Land Cover between 1996-2010 (Sq. Miles)**	**Area of Wetlands Transformed to Another Type of Land Cover between 2006-2010 (Sq. Miles)**
Development	0.37	0.17
Agriculture	0.09	0.02
Barren Land	0.05	0.03
Water	0.07	0.04

The data in the above tables is by coastal county. Using NOAA LAND Cover Atlas data (2010), CRM looked at wetland acreage for just the coastal zone itself within each county.

Total Wetland Acres by Coastal Zone for Each County Using 2010 NOAA Land Cover Atlas Data	**# of acres**
Bucks County Total Acres	**43,434.12**
Estuarine Emergent Wetland	265.984
Estuarine Scrub/Shrub Wetland	2.223946
Palustrine Emergent Wetland	685.6427
Palustrine Forested Wetland	3,063.709
Palustrine Scrub/Shrub Wetland	183.4756
Wetland Total Bucks Co.	**4,201.035**
Delaware County Total Acres	**12,662.26**
Estuarine Emergent Wetland	191.4818
Palustrine Emergent Wetland	560.8793
Palustrine Forested Wetland	227.7321
Palustrine Scrub/Shrub Wetland	65.82882
Wetland Total Delaware Co.	**1,045.922**
Philadelphia County Total Acres	**18,483.22**
Estuarine Emergent Wetland	98.29843
Estuarine Scrub/Shrub Wetland	0.222395
Palustrine Emergent Wetland	268.4303
Palustrine Forested Wetland	233.5144
Palustrine Scrub/Shrub Wetland	121.4275
Wetland Total Philadelphia Co.	**721.893**
Erie County Total Acres	**40,606.59**
Palustrine Emergent Wetland	837.983
Palustrine Forested Wetland	4,070.712
Palustrine Scrub/Shrub Wetland	512.1749
Wetland Total Erie Co.	**5,420.87**

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

Update to Delaware Estuary Coastal Zone National Wetland Inventory Mapping:
Wetlands of Pennsylvania's Delaware Estuary Coastal Zone and Vicinity: Characterization and Landscape-level Functional Assessment
The Partnership for the Delaware Estuary (PDE) has taken a lead role in assessing ambient wetland condition in tidal wetlands, originally through the Delaware Estuary Wetland Workgroup and later through the Mid-Atlantic Coastal Wetland Assessment (MACWA). Their efforts have been primarily built on methodologies for tidal wetlands developed by Delaware DNR. CRM has provided technical and financial support to PDE's efforts. During the original condition assessment for Pennsylvania's tidal wetlands, it became apparent that tidal wetland data on existing NWI needed an update to provide more accuracy. The effort to update tidal polygon data led to this broader characterization and functional assessment report that includes a more accurate tidal base layer as well as additional data for the entire coastal zone. This report does not analyze trends data.
The updated NWI data will be made available on the US Fish and Wildlife Service NWI Mapper http://www.fws.gov/wetlands/Data/Mapper.html. The additional attributes associated with NWI+ data can be found via the NWI+ Web Mapper at http://www.aswm.org/wetland-science/wetlands-one-stop-mapping/5043-nwiweb-mapper. The final report is cited as follows:

> Tiner, R.W., E. Olson, D. Cross, and J. Herman. 2015. *Wetlands of Pennsylvania's Delaware Estuary Coastal Zone and Vicinity: Characterization and Landscape-level Functional Assessment*. Prepared for the Pennsylvania Department of Environmental Protection, Coastal Zone Management Program, Harrisburg, PA. U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. 44 pp. plus appendices.

Update to Lake Erie Watershed National Wetland Inventory Mapping:
Wetlands of Pennsylvania's Lake Erie Watershed: Status, Characterization, Landscape-level Functional Assessment, and Potential Restoration Sites
During a CRM 2009 effort to perform ambient wetland condition assessment within the Lake Erie watershed it became apparent that the existing NWI for certain areas of the watershed were less accurate than other areas. For certain quads the original NWI used high-altitude black and white, leaf-on aerial photography. CRM determined watershed planning and management efforts would be better served if more accurate NWI data was available and contracted with the U.S. Fish and Wildlife Service to provide a more accurate inventory for the Lake Erie watershed. CRM provided more accurate, more recent aerial photography to be used in identifying and characterizing the wetlands. In addition to status, the U.S. Fish and Wildlife effort included Landscape-level functional assessment and an effort to identify potential restoration sites. The NWI+ data layers can be viewed via interactive mapper at http://www.aswm.org/wetland-science/wetlands-one-stopmapping/5043-nwi-web-mapper. The final report generated from this effort is cited as follows:

Tiner, R. W., B. Diggs, I. Mans, and J. Herman, 2014. *Wetlands of Pennsylvania's Lake Erie Watershed: Status, Characterization, Landscape-level Functional Assessment, and Potential Restoration Sites.* Prepared for the Pennsylvania Department of Environmental Protection, Coastal Zone Management Program, Harrisburg, PA. U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. 54 pp. plus appendices. http://www.fws.gov/northeast/ecologicalservices/pdf/wetlands/Lake%20Erie%20Watershed%20Report_June_17_2014%20LowRes.pdf

Partnership for the Delaware Estuary Program *Climate Change and the Delaware Estuary* report http://archive.delawareonline.com/assets/pdf/BL161173722.PDF
This report was finalized during the late stages of last assessment period (June 2010). This report includes a case study specific to tidal wetlands and includes vulnerability assessment, adaptation options, and recommendations. This study could serve as a good foundation for a more specific analysis on a more refined geographic scope such as an individual county or parcel. In studies related to climate change, limited MACWA data that CRM has helped to support indicate that Pennsylvania tidal wetlands within the John Heinz National Wildlife Refuge are showing minor short-term accretion (1.6 cm/yr ± 1.5 cm/yr) and an associated elevation change of 1.4 cm/yr ± 1.0 cm/yr. (*Quirk, T. 2014. Site Specific Intensive Monitoring of Representative Wetlands in Barnegat Bay, New Jersey and the Delaware Estuary. Final Report 2011-2012. Prepared for EPA Region 2. The Academy of Natural Sciences of Drexel University, Philadelphia, PA*).

Management Characterization:

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

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

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

Pennsylvania State Programmatic General Permit #4
In order to reduce redundancy, Pennsylvania DEP coordinates state Chapter 105 permitting and federal Section 404 Clean Water Act/Section 10 Rivers and Harbors Act Army Corps of Engineers permitting activities through a State Programmatic General Permit. Pennsylvania State Programmatic General Permit #4 became effective July 1, 2011 and is effective for a period of five years. Note that according to the conditions specified in PSPGP#4, the Army Corps of Engineers will conduct independent permit reviews in the tidal waters of the estuary and within Lake Erie.

Growing Wetland Mitigation Banking Trends
Pennsylvania's regulatory wetland replacement siting criteria had historically favored replacement as near to the impacted area as possible. Prior to 2002, federal policies also favored replacement "…in areas adjacent or contiguous to the discharge area." Experience has shown that relatively small permittee responsible mitigation near the impacted site is difficult to successfully complete. Recognizing this, the 2008 joint ACOE/EPA mitigation rule included a preference hierarchy for mitigation that indicates mitigation banking is the number one preference for resource replacement and focused more on management from a watershed basis. Consistent with the joint rule, and consistent with the best available science, Pennsylvania is moving toward a stronger wetland mitigation banking system. The mitigation banking system provides advantages for both the success of the resource replacement and the time and monetary efficiencies for permittees. The increased activities associated with Marcellus and Utica Shale development has also been a driver supporting movement toward more wetland mitigation banking in Pennsylvania. At this time the Pennsylvania Department of Transportation has approved wetland mitigation banking and one private banking company has an approved wetland mitigation bank in the upper Susquehanna River watershed service area. There are other wetland mitigation banks currently being reviewed or planned. There are currently no approved wetland mitigation banks in either coastal watershed. The relationship between specific coastal zone siting criteria contained in Chapter 105 wetland regulations and wetland mitigation service areas will be examined in more detail during the next assessment period.

Pennsylvania Aquatic Resource Compensatory Mitigation
Pennsylvania is in the process of making significant changes to policies and procedures for compensating for unavoidable impacts to aquatic resources. A new in-lieu fee program is being developed, called the Pennsylvania Integrated Ecological Services, Capacity Enhancement and Support Program (PIESCES). When approved, this will replace the existing Pennsylvania Wetland Replacement Fund. The new in-lieu fee program will consider more stream impacts and mitigation in addition to the traditional wetland compensatory mitigation. The new program will be consistent with the 2008 joint ACOE/EPA mitigation rule and coordinated for use in Pennsylvania with the ACOE.

In addition, four technical guidance documents have been published for public comment (*Pennsylvania Bulletin*, March 8, 2014: http://www.pabulletin.com/secure/data/vol44/44-10/486.html) that relate to mitigation for impacts to aquatic resources including wetlands. The four draft technical guidance documents are:

1. PA Function Based Aquatic Resource Compensation Protocol
2. Lacustrine Condition Level 2 Rapid Assessment Protocol
3. Riverine Condition Level 2 Rapid Assessment Protocol
4. Wetland Condition Level 2 Rapid Assessment Protocol

Note that large riverine systems are assessed as lacustrine systems. The tidal resources of the Delaware Estuary represent a small but very unique subset of Pennsylvania's aquatic resources. CRM will continue to work within DEP to ensure coastal resources are considered in pending changes to policy and technical guidance documents.

The changes Pennsylvania DEP has proposed and continue to develop will better meet the requirements of the 2008 EPA and ACOE joint mitigation rules. The new technical guidance focuses more on functional assessment of both the impacted area and the proposed mitigation. The goal is to have a more standardized process based on the latest science.

Permitting fees
Commonwealth permitting fees for most Dam Safety and Waterways Encroachment permits had not increased since 1991. During this assessment period DEP promulgated regulatory changes to increase both permitting fees and Submerged Lands Licensing Agreement (SLLA) fees. The final rulemaking was published in the *Pennsylvania Bulletin* on February 16, 2013 (http://www.pabulletin.com/secure/data/vol43/43-7/index.html). CRM did not a play a role in these changes. It should be noted that submerged lands in the tidal waters of the Delaware Estuary and the submerged lands in Lake Erie are subject to Submerged Lands Licensing Agreements and annual fees.

Enhancement Area Prioritization:

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

High	
Medium	X
Low	

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

In an effort to keep our "high" priorities limited to only three enhancement areas, "Wetlands" was not selected as a high priority. Wetland related issues will be captured in the enhancement areas that were selected as "high" priorities and in the strategies presented in this document.

CRM continues to recognize the significant role wetlands play in our program policy areas and in multiple Section 309 enhancement areas.

Total stakeholder engagement indicated that the "Wetlands" enhancement area received the most responses for "high" priority (63%). It is important to note that out of the 11 respondents from the LECZ only 27% indicated wetlands as a high priority enhancement area. Coastal Hazards (flooding) or Cumulative and Secondary Impact responses (nutrients) are directly related to prioritizing wetlands without actually selecting the "Wetlands" enhancement area as the high priority.

CRM feels that wetlands can continue to be a high priority for the program without developing a program change specifically for wetlands. Thus, "Wetlands" was not selected as a "high" priority enhancement area and an in-depth assessment was not conducted. The two strategies being proposed, minor boundary expansion in the DECZ and building capacity to address climate change, touch on wetlands and will enhance our capacity to manage wetlands. Wetlands can help mitigate hazards related to flooding and coastal storms, and serve important functions related to community and ecological resiliency to climate change. However, wetlands are also threatened by climate change.

Coastal Hazards

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

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

PHASE I (HIGH-LEVEL) ASSESSMENT:

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

Resource Characterization:

While Pennsylvania's two coastal areas share many problems and opportunities consistent with all coastal communities, they are also unique and divergent in many ways. The assessment for coastal hazards largely analyzes the Delaware Estuary and Lake Erie Coastal Zones independently.

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

DECZ:

Population in the Coastal Floodplain – Delaware Estuary			
	2000	**2010**	**Percent Change from 2000-2010**
No. of people in coastal floodplain	319,938	325,228	1.65 %
No. of people in coastal counties	2,666,146	2,710,234	1.65 %
Percentage of people in coastal counties in coastal floodplain	12.0 %	12.0 %	-----

LECZ:

Population in the Coastal Floodplain – Lake Erie			
	2000	**2010**	**Percent Change from 2000-2010**
No. of people in coastal floodplain	5,168	8,566	+65.8 %
No. of people in coastal counties	280,843	280,566	-0.10 %
Percentage of people in coastal counties in coastal floodplain	1.8 %	3.0 %	----------

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

Pennsylvania's Atlantic coast was not included in NOAA's State of the Coast "Vulnerability Index" referenced above. Pennsylvania was also not included in the National Assessment of Coastal Vulnerability to Sea-Level Rise (Thieler, E.R., and Hammar-Klose, E.S., 1999. *National Assessment of Coastal Vulnerability to Future Sea-Level Rise: Preliminary Results for the U.S. Atlantic Coast*. U.S. Geological Survey, Open-File Report 99-593, 1 sheet - available online at: http://pubs.usgs.gov/of/of99-593/). Personal communication with one author indicated Pennsylvania's portion of the estuary may be included in future efforts.

A good reference for analysis and discussion of shoreline erosion and protection in Pennsylvania's Delaware Estuary, including implications of climate change, was done by Chris Linn of the Delaware Valley Regional Planning Commission: [Chris Linn. 2010. "Pennsylvania." In James G. Titus and Daniel Hudgens (editors). *The Likelihood of Shore Protection along the Atlantic Coast of the United States. Volume 1: Mid-Atlantic.* Report to the U.S. Environmental Protection Agency. Washington, D.C.] The document, including mapping, can be found here: http://risingsea.net/ERL/PA.html

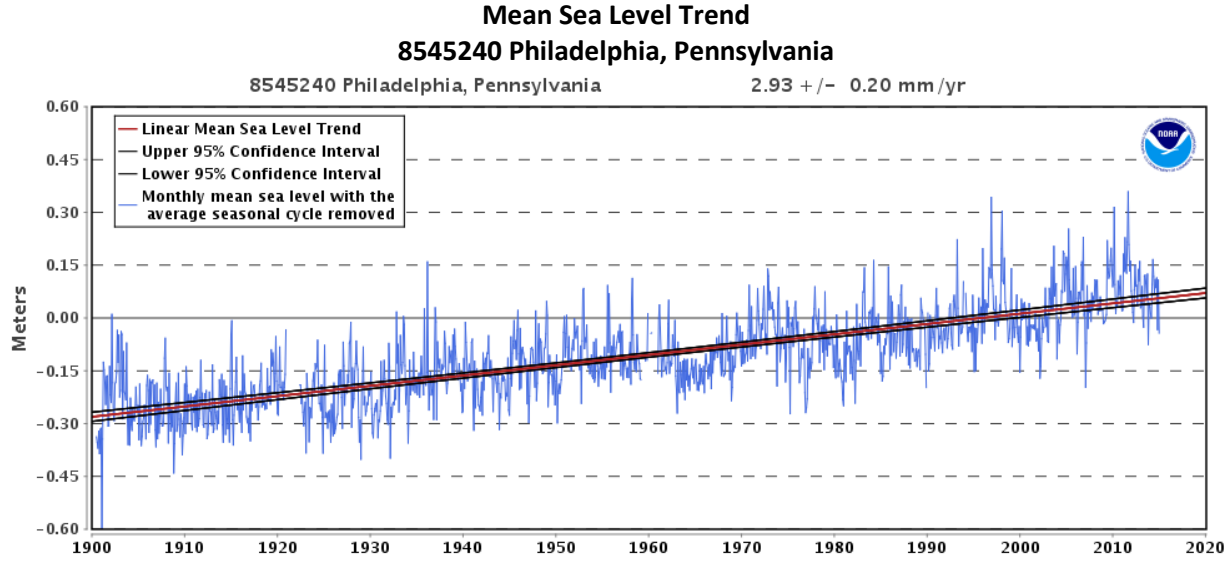
Pennsylvania's Delaware Estuary Shoreline is well armored and has been subject to significant fill and modification during the past few centuries. The above report concludes that about 60% of the tidal Delaware River shoreline is likely or certain to be protected if future climate impacts present threats. The report goes on to state that of the 10.5 square miles of dry land within approximately 3 feet above the tides, 6.1 square miles is likely or almost certain to be protected.

The report offers a first step at analyzing the potential for planning or policy changes that could encourage or allow for inland migration of tidal wetlands. The 40% of Pennsylvania's coastline that is considered unlikely to be protected or abuts non-tidal wetlands, offers locations that warrant further analysis and consideration for tidal wetland encroachment.

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

Pennsylvania was not included in the *Coastal Vulnerability Index* cited above so the data was not available for filling out the table provided in the guidance. Pennsylvania's Delaware Estuary is included in an interactive Sea Level Rise Viewer available at NOAA's DigitalCoast (http://coast.noaa.gov/digitalcoast/tools/slr). This viewer does not categorize vulnerability, but does offer a sliding scale of sea level rise that visually shows inundation. It is a CRM goal to have our tidal shorelines included in future national efforts assessing vulnerability to sea level rise, and Philadelphia is included in the National Climate Assessment report mentioned later in this section.

Regional sea-level rise trends are available through an interactive map available from NOAA at http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml. The mean sea-level rise presented from this source indicates a linear trend of 2.93 mm/year. This is based on data collected from 1900 to 2013. It is equivalent to 0.96 feet in 100 years. The graph below is from this source.



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

DECZ:

Type of Hazard	General Level of Risk (H, M, L)
Flooding (riverine, stormwater)	H
Coastal storms (including storm surge)	M
Geological hazards (e.g., tsunamis, earthquakes)	L
Shoreline erosion	L (most is armored and protection assumed)
Sea level rise	M
Land subsidence	L
Saltwater intrusion	M

LECZ:

Type of Hazard	General Level of Risk (H, M, L)
Flooding (riverine, stormwater)	H
Coastal storms (including storm surge)	H (shoreline and bluff erosion)
Geological hazards (e.g., tsunamis, earthquakes)	L
Shoreline erosion	H
Great Lake level change	H
Land subsidence	N/A
Saltwater intrusion	N/A
Other – Invasive species*	H*

* The Erie County Hazard Mitigation Plan considered this a low priority but it was evaluated based on forestry and agricultural production. CRM considers the general level of risk to be high due to ecological threats and the associated recreational and economic impacts.

5. *If available, briefly list and summarize the results of any additional data or reports on the level of risk and vulnerability to coastal hazards within your state since the last assessment. The state's multi-hazard mitigation plan or climate change risk assessment or plan may be a good resource to help respond to this question.*

National, statewide, and regional reports and data

Federal Emergency Management Agency Region III Coastal Analysis and Mapping
The Federal Emergency Management Agency (FEMA) has begun a coastal analysis and mapping project that will be used to update Digital Flood Insurance Rate Maps. Bucks, Philadelphia, and Delaware Counties are included in the spatial areas subject to storm surge propagating up the Delaware River. An overview of the coastal analysis and mapping project can be found here: http://www.r3coastal.com/. FEMA is also conducting a Great Lakes Flood Study that includes Erie County

(https://www.rampp-team.com/documents/pennsylvania/watershed/Erie/GreatLakes_factsheet.pdf).

FEMA is currently conducting coastal studies in Delaware, Philadelphia, and Erie counties. Information specific to Pennsylvania's individual county coastal analysis and mapping studies, including fact sheets on methodologies, current status, and projected completion dates, can be found here: https://www.rampp-team.com/pa.htm.

National Climate Assessment Report

This report summarizes the current and future impacts of climate change on the United States and can be explored on a regional basis. The report was produced by a team of more than 300 experts guided by a 60-member Federal Advisory Committee. The report can be found on the U.S. Global Change Research Program website at: http://nca2014.globalchange.gov/. Specifically referring to the northeast, the report states that the key message regarding climate risk to people is that "(h)eat waves, coastal flooding, and river flooding will pose a growing challenge to the region's environmental, social, and economic systems. This will increase the vulnerability of the region's residents, especially its most disadvantaged populations." The report indicates that in the northeast region there has been a 71% increase in "heavy" precipitation events between 1958 and 2012 ("heavy" = the heaviest 1% of events).

Pennsylvania Climate Impacts Assessment Update (2013)

This 2013 report is an update to the 2009 document *Pennsylvania Climate Impacts Assessment* and *Economic Impacts of Projected Climate Change in Pennsylvania*. The documents were prepared by Penn State University specifically for Pennsylvania DEP to fulfill obligations directed in the Pennsylvania Climate Change Act, Act 70 of 2008. The initial efforts focused on summarily quantifying greenhouse gas emissions and trends and did not deal specifically with the management of climate change impacts, related coastal hazards, or strategies for adaptation. The Pennsylvania Climate Change Advisory Committee has moved toward increasing emphasis on adaptation and resiliency. The report, subsequent updates, and related information are available on DEP's Climate Change Advisory Committee's webpage: http://www.portal.state.pa.us/portal/server.pt/community/climate_change_advisory_committee/21894.

Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations (December, 2014)

This report was the culmination of a multi-year effort that included significant public input. Work groups from private and public sectors were formed to evaluate individual sectors. The purpose of the Climate Adaptation Planning Report is to identify practical implementation strategies for the built environment and natural resources. This is the first statewide effort in addressing the need for climate change adaptation planning in Pennsylvania. One outcome of the proposed strategy presented in this document is for CRM to play a more significant role in representing the unique coastal areas in these statewide efforts. The Climate Adaptation Planning Report will be incorporated into the next version of the Pennsylvania Climate

Change Action Plan. The Pennsylvania Climate Adaptation Planning Report can be found here: http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-10796.

Chesapeake Bay Watershed Agreement – Climate Resiliency
Just over half of Pennsylvania lies within the Chesapeake Bay Watershed. The protection and restoration of the Chesapeake Bay is managed through a multi-state, multi-agency partnership with the Chesapeake Bay Program. A new Chesapeake Bay Watershed Agreement was signed on June 16, 2014. Pennsylvania is a signatory of the agreement and the agreement includes a climate resiliency goal for the entire watershed. Efforts related to the Chesapeake Bay watershed effort may be relevant in informing Pennsylvania's efforts on the Delaware Bay and Lake Erie watersheds. A draft Management Strategy for Climate Resiliency was published for comment on March 16, 2015. Goals and outcomes from the Chesapeake Bay Program for the Chesapeake watershed are:

GOAL: Increase the resiliency of the Chesapeake Bay Watershed, including its living resources, habitats, public infrastructure and communities, to withstand adverse impacts from changing environmental and climate conditions.

Monitoring and Assessment Outcome: Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs and projects.

Adaptation Outcome: Continually pursue, design and construct restoration and protection projects to enhance the resiliency of bay and aquatic ecosystems from the impacts of coastal erosion, coastal flooding, more intense and more frequent storms and sea level rise.

Pennsylvania 2013 Standard State All-Hazard Mitigation Plan
The updated 2013 Standard State All-Hazard Mitigation Plan was adopted by resolution on October 21, 2013. The update was coordinated by PEMA and included representatives from 39 different state agencies (including DEP), county and city governments, and one business (CRM did not have a role). While assessing statewide hazards and establishing a state-level mitigation plan, the Standard State All-Hazard Mitigation Plan also provides guidance for local hazard planning initiatives, including a standardized list of hazards, and serves as a model plan format for county and local hazard mitigation plans.

DECZ reports and data

Bucks County Hazard Mitigation Plan
The Bucks County Hazard Mitigation Plan was last updated as a draft in 2011 and is available on Bucks County's website: http://www.buckscounty.org/docs/government-documents/buckscountyhazmitplan2011.pdf?sfvrsn=2. It is considered a living document that could be updated when appropriate, but consistent with the Disaster Mitigation Act of 2000 should be updated again in 2016. Vulnerability assessment was conducted for 18 identified natural and man-made hazards.

Flooding/flash-flooding and hurricanes, tropical storms, and Nor'easters were coastal hazards ranked as "High Risk." Sea-level rise was not mentioned in the Hazard Mitigation Plan.

Bucks County Interactive Floodplain Viewer
Bucks County offers a visual tool for assessing flood risk at individual locations: https://gisweb.co.bucks.pa.us/apps/floodplainviewer/

Delaware County Hazard Mitigation Plan
The Delaware County Hazard Mitigation Plan was last updated in 2011. Copies of the plan are available at the Delaware County Planning Department offices and were provided to CRM. The three highest ranked risk hazards were: 1) flood, 2) winter storm, and 3) hazardous materials. Hurricanes/tropical storms/nor'easters were considered moderate hazards.
The plan mentions the long-range potential for flooding along the Delaware River and its tidal tributaries from seal level rise, but goes on to explain sea level rise will not be directly addressed in the Hazard Mitigation Plan "at this time." The plan mentions a CRM funded effort done by the Delaware Valley Regional Planning Commission in 2004: *Sea Level Rise Impacts in the Delaware Estuary of Pennsylvania, June 2004.* Any new comprehensive hazard mitigation planning would benefit from an updated analysis with more current data.

Philadelphia Natural Hazard Mitigation Plan
Philadelphia's Natural Hazard Mitigation Plan was updated in 2012 and is available on the City of Philadelphia's webpage: http://oem.readyphiladelphia.org/HazardMitigation. The plan states that from 1861-2011, 29 tropical cyclones have had centers of circulation pass through or within 65 statute miles of Philadelphia. Flooding, which may occur with or without tropical cyclone impacts, had a slightly higher hazard ranking than actual tropical cyclones (due to increased probability). The Philadelphia Natural Hazard Mitigation Plan uses NOAA's SLOSH model to analyze storm surge impacts for Category 1, Category 2, and Category 3 hurricanes (using current sea levels). The plan identifies critical infrastructure that would be impacted for each category storm. The plan does not specifically address sea level rise.

Partnership for the Delaware Estuary (PDE) – *Climate Change and the Delaware Estuary*
The *Climate Change and the Delaware Estuary* publication was supported by EPA's Climate Ready Estuaries Program and focused on three key resources: shellfish, wetlands, and drinking water. The document was published in June 2010 and is available on the PDE website: http://delawareestuary.org/science_programs_climate_change.asp

The City of Chester Vision 2020 Climate Adaptation Planning Elements (June 25, 2014)
This document was prepared by the Chester Hazards and Climate Task Force and was ultimately approved by Chester City Council. The task force included numerous individuals from local government and businesses. The effort was led by Pennsylvania Sea Grant, the Delaware Valley Regional Planning Commission, the City of Chester, and the Delaware County Planning Department. The plan represents a significant step toward local planning for climate change adaptation and will help inform future efforts within the estuary. CRM will

rely heavily on the expertise gained by the participants involved in this climate adaptation effort as we implement our proposed Section 309 climate adaptation and resiliency capacity building strategy discussed at the end of this document. The plan can be found here: http://easternpaseagrant.org/chester/documents/ClimateAdaptationElementsFinal26-June-14.pdf.

LECZ reports and data

Erie County Hazard Mitigation Plan

Erie County updated their comprehensive Hazard Mitigation Plan in 2012. All 38 municipalities within the county participated in the update as well as PA DCNR, PA Lake Erie Watershed Association, and the PA Coastal Resources Management Program. The 2012 Erie County HMP ranked winter storms, flooding, and environmental hazards (hazardous materials release) as the three top high-risk categories. The coastal related hazards coastal erosion, invasive species, and landslide were ranked in the low-risk category.

Climate Ready Great Lakes

This regional collaboration project consists of three free training modules related to climate change and climate adaptation in the Great Lakes. The three modules are: 1) What am I adapting to? 2) What is an adaptation plan? 3)What tools are available to help me? The training modules are available here: http://www.regions.noaa.gov/great-lakes/index.php/resources/climate-ready-great-lakes/.

Bluff Recession Control Point Monitoring

CRM maintains 136 control points along the Lake Erie bluff shoreline to measure and calculate bluff recession. Measurements from fixed monuments to the bluff crest at specific bearings are taken every four years. The last cycle was completed in 2010 and 2011(western county 2010, eastern county 2011). Measurements for this cycle are currently in progress. Following are the results from 30+ years of monitoring as of 2011:

Erie County average = 0.61 feet per year

Township	Average Recession Rate (ft/yr)
Springfield	0.99
Girard	0.87
Fairview	0.52
Millcreek	0.31
Erie	0.47
Lawrence Park	0.32
Harborcreek	0.44
North East	0.48

The above table lists municipalities from west to east along the shoreline. Note the substantially higher erosion rates in the western municipalities.

Management Characterization:

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

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these that address:			
Elimination of development/redevelopment in high-hazard areas	Y	Y	Y
Management of development/redevelopment in other hazard areas	Y	Y	N
Climate change impacts, including sea level rise or Great Lake level change	N	N	N
Hazards planning programs or initiatives that address:			
Hazard mitigation	Y	Y	Y – County HMP updates
Climate change impacts, including sea level rise or Great Lake level change	Y (minimal)	Y (minimal)	Y, at the state level
Hazards mapping or modeling programs or initiatives for:			
Sea level rise or Great Lake level change	N	N	N
Other hazards (LECZ - bluff recession)	Y	Y	N

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

The Delaware Estuary Coastal Zone does not have specific definitions for "high-hazard" areas. Special Flood Hazard Areas (SPFH), as defined by the National Flood Insurance Program, would apply to both coastal zones:

Special Flood Hazard Areas (SFHA): The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood

insurance applies. The base flood is the 100-year flood event (1% annual chance). (FEMA)

The following definition is provided in the Bluff Recession and Setback Act and applies to bluffs along the Lake Erie coast:

Bluff Recession Hazard Area (BRHA): An area or zone where the rate of progressive bluff recession creates a substantial threat to the safety or stability of nearby existing or future structures or utility facilities. The term shall not include any area where the horizontal distance, measured perpendicular to the shoreline, between the shoreline and the bluff toe is in excess of 250 feet and such area shall not be subject to any Environmental Quality Board regulations or municipal bluff setback ordinance. (Bluff Recession and Setback Act, Act 48 of 1980)

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

Amendment to the Bluff Recession and Setback Act of 1980

CRM is responsible for implementing the Bluff Recession and Setback Act (Act 48 of 1980) (BRSA) which restricts new development and limits improvements to existing development within formally designated Bluff Recession Hazard Areas (BRHAs). The designation of the BRHA's is a public, regulatory process guided by CRM-led scientific studies of the average long-term bluff recession rates. Those long-term average recession rates are determined by a combination of on-the-ground monitoring and GIS analysis of recent and historical aerial photography. Future long term averages will likely include LiDAR as well as on-the-ground monitoring and historical aerial photography. Long term recession rates for the entire county are approximately 0.6 feet per year, but individual municipalities and specific bluff reaches may erode quicker or slower than the county average. The formal adoption of the BRHA's are by reference to the CRM studies within the Title 25, Chapter 85 Bluff Recession and Setback regulations (companion regulations to the BRSA). In July of 2012, the Pennsylvania General Assembly passed, and Governor Tom Corbett signed, Act 72 of 2012 — an amendment to the BRSA that redefined BRHA's to permanently exclude any areas where the toe of bluff was greater than 250 feet from the shoreline of Lake Erie.

Enhancement Area Prioritization:

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

High	X
Medium	
Low	

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

Flooding, exacerbated by a heavily urbanized environment, has long been a concern to local stakeholders in the DECZ, and has been expressed in prior Section 309 Assessment and Strategy comments. Climate change predictions and recent trends seem to indicate that increased heavy rain events will become more common, and thus increase flooding threats. CRM has supported some climate change efforts, but an increased focus seems warranted. In the LECZ, the Pennsylvania CRM program has the responsibility for managing the Bluff Recession and Setback Act and is involved in hazards associated with harmful algal blooms, shoreline erosion, and invasive species. Pennsylvania's coastal areas offer important, unique areas of the Commonwealth and CRM has the ability to focus on these unique areas and needs.

During the stakeholder engagement process 57% of the 35 total respondents chose Coastal Hazards as a high priority. This was third highest of the nine enhancement areas, overall Wetlands was number one and Public Access was number two. In the Delaware Estuary Coastal Zone, Coastal Hazards were considered a high priority by 68% of 19 respondents and in the Lake Erie Coastal Zone it was considered a high priority by 45% of local respondents. Upon closer examination reasons for considering Wetlands a high priority sometimes focused on mitigation of flooding concerns related to Coastal Hazards.

Coastal Hazards – In-Depth Assessment

Since CRM considered Coastal Hazards to be a High Priority enhancement area, more in-depth assessment was warranted.

In-Depth Resource Characterization:

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

1a. **Flooding In-depth**: *Using data from NOAA's State of the Coast "Population in the Floodplain" viewer and summarized by coastal county through NOAA's Coastal County Snapshots for Flood Exposure, indicate how many people at potentially elevated risk were*

located within the state's coastal floodplain as of 2010. These data only reflect two types of vulnerable populations. You can provide additional or alternative information or use graphs or other visuals to help illustrate or replace the table entirely if better data are available.

Statewide:

2010 Populations in Pennsylvania Coastal Counties at Potentially Elevated Risk to Coastal Flooding				
	Under 5 and Over 65 years old		In Poverty	
	# of people	% Under 5/Over 65	# of people	% in Poverty
Inside Floodplain	13,869	18.0%	10,459	13.6%
Outside Floodplain	442,743	19.5%	459,392	20.2%

* - Data based on NOAA supplied spreadsheets from original data source American Community Survey 5-year estimates.

1b. **Flooding In-depth:** *(for all states besides territories): Using summary data provided for critical facilities, derived from FEMA's HAZUS and displayed by coastal county through NOAA's Coastal County Snapshots for Flood Exposure, indicate how many different establishments (businesses or employers) and critical facilities are located in the FEMA floodplain. You can provide more information or use graphs or other visuals to help illustrate or replace the table entirely if better information is available.*

Bucks County was not included in the Coastal Counties Flood Exposure Snapshots. Data provided in this table comes from a summary spreadsheet provided by NOAA. Limited information was available. Coastal Snapshots, including "Flood Exposure" for Philadelphia, Delaware, and Erie Counties can be found here: http://www.coast.noaa.gov/snapshots/

Critical Facilities in the FEMA Floodplain[44]						
	Schools	Police Stations	Fire Stations	Emergency Centers	Medical Facilities	Communication Towers
Bucks County Inside Floodplain	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Philadelphia County Inside Floodplain	5	Not Available	Not Available	Not Available	Not Available	Not Available
Delaware County Inside Floodplain	2	1	2	Not Available	Not Available	Not Available
Erie County Inside Floodplain	2	Not Available	4	Not Available	Not Available	Not Available

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

DECZ:

	Type of Hazard	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Hazard 1	Flooding	Throughout coastal zone, exacerbated by increased heavy precipitation events evidenced in recent trends and forecast with climate change. Riverine/stream, coastal, and urban flooding.
Hazard 2	Coastal storms	Throughout coastal zone.
Hazard 3	Salinity intrusion	Threatens water intakes in Philadelphia, managed partially by reservoir strategy through Delaware River Basin Commission.

LECZ:

	Type of Hazard	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Hazard 1	Coastal storms / Flooding	Both coastal and inland flooding caused by storm events, exacerbated by Great Lakes water levels.
Hazard 2	Shoreline and bluff erosion	Bluff and shoreline areas, exacerbated by Great lakes water levels and storm events.
Hazard 3	Invasive species*	Open waters of Lake Erie and watershed. Determined to be a low priority in County Hazard Mitigation Plan, but potential recreational economic impact is substantial.

* - Not a coastal hazard listed by CZMA, but listed in Erie County Hazard Mitigation Plan.

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

DECZ:

Flooding has long been a high concern in the DECZ. Each current county hazard mitigation plan in the DECZ considers flooding to be a highly ranked risk hazard. Sixty-eight percent of stakeholders from the DECZ considered Coastal Hazards to be a high priority with both stormwater/riverine and sea level rise/storm surge flooding identified as the hazards of concern. Recent climate trends indicate increased heavy precipitation events and increased threat from flooding. Climate change predictions indicate the flooding threat to continue to grow, both from increased heavy precipitation events and generally stronger coastal storms.

According to the Delaware River Basin Commission approximately 15 million people (approximately five percent of the nation's population) rely on the waters of the Delaware River Basin for drinking, agricultural, and industrial use. During times of drought, saltwater intrusion could threaten Philadelphia Water Department drinking water intakes on the tidal Delaware River. Sea level rise and climate change may grow these threats and increase the competition for the Delaware watershed water resources.

LECZ:

Flooding was listed as a high risk category in the Erie County Hazard Mitigation Plan. Since 1994 the county has documented at least 64 flood or flash flood events, more than 100 windstorm events (≥50 kt.), and more than 150 winter storms. Each of these storm types are a frequent, annual occurrence within the Lake Erie Coastal Zone. Shortened lake ice-seasons and decreased total ice coverage as a result of climate change could extend the lake-effect snow season and increase the severity of individual lake-effect snow events. More frequent and more intense storms could increase shoreline erosion rates, bluff erosion, property losses, and wind and flooding related structural damage.

Higher Great Lakes water levels can exacerbate coastal flooding from storms and increase bluff instability and erosion. CRM implements the Commonwealth's Bluff Recession and Setback Act and has a 35-year history of providing local support, technical support, and research. At this time Lake Erie water levels are near their long term averages. Official seasonal water level forecast for the Great Lakes are issued jointly by the U.S. Army Corps of Engineers - Detroit District and Environment Canada's Great Lakes-St. Lawrence Regulation Office (http://www.lre.usace.army.mil/Missions/GreatLakesInformation/GreatLakesWaterLevels/WaterLevelForecast.aspx).
Current predictions indicate that the lake level will rise slightly in the short term, and remain close to the long term averages for the six-month forecast period. Generally, the current consensus is that climate change will lead to lower lake levels in the future. Regardless of the level, it can be assumed that Lake Erie water levels will continue to fluctuate and bluff erosion management benefits from accurate lake level predictions. Shoreline and bluff erosion will remain a focus for the coastal program. Coastal Hazards was selected as a high priority by forty-five percent of LECZ stakeholders, if a specific hazard was identified it was bluff erosion.

The Erie County Hazard Mitigation Plan considered "invasive species" to be a low category hazard. However, the hazard assessment considered forestry and agricultural impacts and did not include the potential open lake impacts and the potentially significant economic impacts to the recreation and tourism industry.

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

Emerging Issue	Information Needed
DECZ – Sea level rise, salt water intrusion	Additional flow and salinity gauge data from river.
LECZ – Harmful Algal Blooms	Better forecasting and testing. More information on prevention.

In-Depth Management Characterization:

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

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

Management Category	Employed by State/Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Change Since the Last Assessment (Y or N)
Statutes, Regulations, and Policies:			
Shorefront setbacks/no build areas	Y	Y	Y
Rolling easements	N	N	N
Repair/rebuilding restrictions	Y	Y	Y
Hard shoreline protection structure restrictions	N*	N	N
Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)	Y	Y	N
Repair/replacement of shore protection structure restrictions	N*	N	N
Inlet management	N	N	N
Protection of important natural resources for hazard mitigation benefits (e.g., dunes, wetlands, barrier islands, coral reefs) (other than setbacks/no build areas)	Y	N	N
Repetitive flood loss policies (e.g., relocation, buyouts)	N	N	N
Freeboard requirements	N	N	N
Real estate sales disclosure requirements	N	N	N

Management Category	Employed by State/Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Change Since the Last Assessment (Y or N)
Restrictions on publicly funded infrastructure	N	N	N
Infrastructure protection (e.g., considering hazards in siting and design)	Y	Y	N
Management Planning Programs or Initiatives:			
Hazard mitigation plans	Y	Y	Y
Sea level rise/Great Lake level change or climate change adaptation plans	N	N	N
Statewide requirement for local post-disaster recovery planning	Y	N	N
Sediment management plans	Y	Y	N
Beach nourishment plans	Y	N	N
Special Area Management Plans (that address hazards issues)	Y	Y	N
Managed retreat plans	N	N	N
Research, Mapping, and Education Programs or Initiatives:			
General hazards mapping or modeling	Y	Y	N
Sea level rise mapping or modeling	N	N	N
Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks)	Y	N	N
Hazards education and outreach	Y	Y	N

* - Construction and repair of shore protection structures reviewed through normal water obstruction and encroachment permitting processes.

2. *Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's management efforts in addressing coastal hazards since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state's management efforts?*

   The intention of the Bluff Recession and Setback Act (BRSA) is to manage development in way that limits the risks to structures and property within the designated hazard areas, not to manage or prevent bluff recession itself from occurring. Although human activities can exacerbate bluff recession, it is a natural process that is inevitable over time. The most recent bluff recession related property damage assessment was conducted in 1987 and covered only a time span of two years of elevated lake levels. No comparison to property damage trends prior to the passage of the BRSA were conducted. If possible, a study to analyze trends in bluff recession-related property damage prior to the passage of the BRSA and progressively through its 35 years of implementation would be beneficial. No such study has been conducted.

Identification of Priorities:

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

Management Priority 1: Resiliency and adaptation planning that considers a changing climate.

Description: Resiliency and climate adaptation has not been a high priority for the Pennsylvania Coastal Resource Management Program. The program needs to build its internal capacity to better assist and facilitate local measures to strengthen resiliency and adaptation efforts. Traditional significant hazards, such as flooding in the urbanized flat landscape of the coastal plain, appear to be problems that will be exacerbated by climate change. In addition to building internal capacity, there is a need to promote local buy-in and better network with other agencies and partners.

Management Priority 2: Bluff and shoreline erosion of the Lake Erie shoreline.

Description: Bluff and shoreline erosion along the Lake Erie coast remain a significant concern for Pennsylvania's coastal program. Littoral sediment dynamics specifically for Pennsylvania's coast, including dynamics associated with Conneaut Harbor in Ohio, would help in addressing bluff erosion and the design of shoreline protection structures. The potential impacts of climate change on Great Lakes water levels and bluff and shoreline erosion also warrants additional consideration.

Management Priority 3: Ecosystem transformations associated with climate change.

Description: Ecosystem transformations due to climate change can have significant impacts in both coastal areas. While difficult to predict with certainty, planning, preparing, and building resiliency seems warranted. The Lake Erie ecology supports an important part of the local economy, primarily through the recreational sector. A collapse of the recreational fishery, or worsening concerns associated with harmful algal blooms, could cause significant economic damage. Pennsylvania's Delaware Estuary is a part of a larger system that has had significant cumulative impacts beginning with the original settling of the colonies. In Pennsylvania, tidal wetlands resources were severely degraded, losing over 95% of precolonial acreage. Sea level rise threatens the scarce acreage that remains. Opportunities for inland migration of tidal wetlands are limited, and with the redeveloping waterfronts, a planning effort that specifically considers the impacts and opportunities related to tidal wetlands seems warranted and timely.

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

DECZ and LECZ Combined

Priority Needs	Need? (Y or N)	Brief Explanation of Need/Gap
Research	Y	LECZ: Better understanding of littoral drift, especially as it pertains to Conneaut Harbor and the potential for mitigative measures that would address the high bluff erosion rates downdrift in Pennsylvania. DECZ: 1) Continued gathering of data on sediment accumulation rates in tidal wetlands. 2) Beneficial use of dredged material for shoreline, wetland, and subaqueous climate mitigation projects within the estuary.
Mapping/GIS/modeling	Y	DECZ: Mapping /modeling that would specifically address opportunities for landward migration of tidal wetlands that would be consistent with local land uses.
Data and information management	Y	National efforts on vulnerability assessment due to sea-level rise have failed to include Pennsylvania, need to bring attention to this shortcoming.
Training/Capacity building	Y	Better understanding climate impacts, including sea-level rise, for both internal CRM staff and local officials and stakeholders.
Decision-support tools	N	-
Communication and outreach	Y	Communication and outreach with municipal officials to better align CRM resources with local needs.

Enhancement Area Strategy Development:

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

Yes __X__
No _____

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

NOAA's Office for Coastal Management has set making coastal communities more resilient a high priority goal. CRM recognizes a need to internally enhance the program's capacity to facilitate local actions to address coastal hazards in a way that considers the short term and long term impacts of climate change. Hazards associated with climate change can impact human

health and safety, natural resources, and the economy. Pennsylvania CRM would like to examine each of these in greater detail and explore where our program can fill a niche to better facilitate implementation of recommended mitigation actions identified at the local level. CRM feels the program can strengthen local efforts related to planning, adapting, and mitigating coastal hazards.

Flooding, including flooding associated with tropical cyclone storm systems, has been a concern expressed by local authorities in the Delaware Estuary Coastal Zone for many years, including past Section 309 comments and current input. Coastal hazards in general were a stakeholder concern expressed again during the current process. Increased frequency of high precipitation events, potentially stronger storms, and sea-level rise are climate related factors that could contribute to even more significant hazards associated with flooding. Efforts to address flooding may also have positive ecological impacts to watersheds. Stream restoration projects are listed as mitigative measures for flooding in county hazard mitigation plans.

Public Access

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*
Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

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

DECZ:

Delaware Estuary Coastal Zone Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
Beach access sites (swimming)	0	No change	CRM GIS DB
Shoreline (other than beach) access sites	55 sites	↑ **Net Gain = 7 sites** **Gain of 8 sites:** Lardner's Point Park (267.8 m) Washington Ave Pier/Pier 53 (320.84 m) Washington Avenue Green (42.56 Navy Yard Dry Dock Park Race Street Pier/Pier 11 Morrisville Riverfront Preserve Grays Ferry Crescent Jack's Marina/Southport Mitigation **Loss of 1 existing site:** Maple Beach Levee Trail – *may be temporary	CRM GIS DB

Delaware Estuary Coastal Zone Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
Recreational boat (power or nonmotorized) access sites	16 free public access sites (10 ramps & 6 canoe/kayak access); 15 fee charged public access sites (8 marinas & 7 ramps); 26 club/private access sites (22 marinas & 4 ramps)	↓ Gain of 1 fee charged public access ramp: Quaker-Penn Ramp Loss of 1 fee charged marina to state-owned wetland creation and public access site: 3 Seasons / Jack's marina Loss of 1 free public canoe/kayak access site due to weather conditions: Old fishing dock at JHNWR	CRM GIS DB
Number of designated scenic vistas or overlook points	0	No change	N/A
Number of fishing access points (i.e. piers, jetties)	15	No change	CRM GIS DB
Coastal trails/ boardwalks	9 trail systems; 36 trail segments; 37.5 miles (old GIS DB); 58.6 miles (new GIS DB)	↑ Gain of 7.6 miles of trails, including: - 1.9 miles to the Schuylkill River Trail - 5.2 miles to the Delaware Riverfront Trail/East Coast Greenway - 0.5 miles to trails in the area of Southport Mitigation on Neshaminy Creek	CRM GIS DB
Number of acres parkland/open space	5,965 acres & 73 sites (old GIS DB); 6,304 acres & 102 sites (new GIS DB)	↑ Gain of 64 acres & 8 sites: Morrisville Riverfront Preserve Washington Ave Green Park Washington Ave Pier Race Street Pier	CRM GIS DB

Delaware Estuary Coastal Zone Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
	9.7% of total DECZ area (64,733 ac) is publically accessible; 0.4 sites per mile of shoreline;	Grays Ferry Crescent Lardner's Point Park Navy Yard League Island Park Jack's Marina/Southport	
Other (please specify)	5.3 new miles of accessible tidal shoreline	↑ Gains from 8 parks and 9 trails	CRM GIS DB
	26% of tidal DECZ shoreline is accessible	There are 55 access sites and 47 miles of accessible tidal shoreline.	CRM GIS DB

LECZ:

Lake Erie Coastal Zone Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
Beach access sites	10 public swimming beaches	No change	CRM GIS DB
Shoreline (other than beach) access sites	40	↑ Gain of 3 sites: State Game Lands 314 Addition (Coxon property) Larry Toth Memorial Pier Shorewood Addition/Artise property	CRM GIS DB, Erie County GIS DB
Recreational boat (power or nonmotorized) access sites	9 public canoe launches; 20 public powerboat sites; 17 private powerboat sites	↑ Gain of 1 transient floating dock	CRM GIS DB

Lake Erie Coastal Zone Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
Number of designated scenic vistas or overlook points	None designated	No change	N/A
Number of fishing access points (i.e. piers, jetties)	42 (new GIS DB)	↑ Gain of 1 fishing pier: Larry Toth Memorial Pier	CRM GIS DB
Coastal trails/ boardwalks	8 trail systems 36 miles	↑ Gain of 3 trail segments to total 0.8 miles: Frontier Park paths (Paving of interior park trails) Bayfront Public Access - Liberty Park (New walkway on north side of park) Bayfront Public Access - Former GAF site path (1,100' of public walkway at former GAF site)	CRM GIS DB
Number of acres parkland/open space	6,154 acres & 58 sites 15% of total LECZ area (40,989 ac) is publically accessible; 0.9 sites per mile of shoreline;	↑ Gain of 209 acres & 5 sites: - 3 additions to State Game Lands #314 - 1 addition to existing park - 1 access site	CRM GIS DB
Other (please specify)	0.3 new miles of accessible shoreline	Gains from public access sites	CRM GIS DB
	48% of Lake Erie shoreline is accessible	There are 40 access sites and 37 miles of accessible shoreline.	CRM GIS DB

CRM GIS DB = Coastal Resource Management GIS Database.

2. *Briefly characterize the demand for coastal public access and the process for periodically assessing demand. Include a statement on the projected population increase for your coastal counties. There are several additional sources of statewide information that may help inform this response, such as the Statewide Comprehensive Outdoor Recreation Plan, the National Survey on Fishing, Hunting, and Wildlife Associated Recreation, and your state's tourism office.*

According to *NOAA's Coastal Population Report,* the population within the state's coastal shoreline counties is projected to stay the same between 2010 and 2020. According to *Philadelphia 2035* (2011), the recently released comprehensive plan for Philadelphia, the city population is expected to gain 40,000 new residents between 2010 to 2020. According to *Destination Erie: A Regional Vision, Existing Conditions and Trends Report* (2013) the county population is projected to increase from 2000-2040 by about 9,000 people from its current population at a 3% growth rate. Most of this growth is expected to occur in shoreline townships west and south of Erie City.

The *Pennsylvania State Comprehensive Outdoor Recreation Plan* (SCORP), to be published in 2015, employed 2,240 completed resident surveys by region and city, including Philadelphia. Southeast region responses were aggregated over a large area outside of the coastal zone areas of Bucks and Delaware counties and should be interpreted with care. Northwest region responses were combined to include all of Erie County, in addition to Crawford, Mercer, and Venango Counties.

Residents of Philadelphia and Southeast Pennsylvania feel strong about public access, with highest needs focused on improved access to the water, creation of new trails and paths, and maintenance of existing facilities, in addition to a strong demand for open space in Delaware and Bucks counties.

As compared to the remainder of the state, residents of Erie County are generally satisfied with the current availability of public access opportunities. This may be due to the opportunities offered by Lake Erie and Presque Isle State Park. Attention should be devoted to protecting existing access areas from development, maintaining their current condition, and pursuing their enhancement.

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

DECZ:

Additional sources of information included the *Tidal Delaware River Recreation Survey* (2010), *Bucks County Open Space and Greenways Plan* (2011), *Delaware Direct Watershed River Conservation Plan* (2011), *Delaware River Watershed Conservation Plan for the Delaware River* (2014), and *Delaware County Open Space, Recreation and Greenway Plan* (ongoing).

According to SCORP survey results, Philadelphia residents expressed the greatest need for increased Water access points (64%), in addition to other water-based facilities such as motorized and non-motorized boating, lake/stream swimming, and water trails. The same

respondents agreed most strongly, compared to any other region in the state, that local waterways were not accessible to boating and fishing. The *Tidal Delaware River Recreational Survey* found that awareness of the river was the primary reason for not boating on the river, in addition to safety concerns. Needs include increase and maintenance of access points, safe and secure parking areas, equipment storage, and trash receptacles. Public access to the water in Delaware County is especially lacking with only two public boat launches to the Delaware River. Public outreach for recently published Rivers Conservation Plans has repeatedly highlighted a need for more open access to the waterfront, including the ability to "touch the river." 32% of Bucks County residents felt that there was a need for more trails and recreational access along rivers and streams, with 37% stating canoe/kayak launch sites were a needed amenity in county parks. The need for a better awareness of existing public access opportunities was also expressed by residents in Bucks County.

Networked trails were also in high demand according to SCORP surveys where about 70% of Philadelphia residents felt funding should be prioritized for construction of pedestrian, cycling paths, greenways and trails. They agreed that these trails should connect neighborhoods with schools, shopping areas, parks, and open spaces. In Delaware County, trails were overwhelmingly popular where residents felt that planning for open space should focus on trail development and maintenance of existing facilities. Public outreach in both Delaware and Bucks Counties highlighted a need to connect trails to existing regional trails and systems, where a large percentage of Bucks residents listed establishing connections between existing trails as a top priority.

The southeast region identified acquisition and protection of open space as undeveloped, conserved land as the highest funding priority in the SCORP, while Philadelphia residents felt strongly, but with a lower emphasis. This demand was highlighted in 1997 when Bucks County voters approved a $59 million bond referendum to fund a 10-year open space program, which was supplemented in 2007 by a second open space bond that dedicates $7 million of $44 million specifically to Delaware River open space acquisition and improvements. A needs assessment conducted recently in Delaware County found that 65% of respondents would be willing to use tax dollars for parks, open space, and recreation. However, the majority of resident interest in open space appears to focus on trails and maintenance. Approximately 57% of residents felt that planning for open space should focus on new acquisitions.

While not an eligible activity for Coastal Management Program funding, maintenance of existing access sites, trails, and open space was a strong, pervasive need. This was listed as the number one funding priority in both Philadelphia and Southeast, with 90% of residents listing this in the SCORP surveys. Safety and security was expressed throughout plans and reports, especially at parking locations along river access sites. According to the SCORP, needs least in demand by Philadelphia residents were hunting and fishing areas.

According to the PA Fish and Boat Commission, Bucks ranks #2 rank of 67 counties in Pennsylvania for number of boat registrations with 14,431 in 2013. Delaware and Philadelphia counties rank #25 and #26 place with 4,534 and 4,223. The number of annual registrations in the three Southeast PA coastal counties has decreased every year from 26,810 in 2004 to 23,188 in 2013.

LECZ:

The SCORP found that residents in Northwest Pennsylvania were relatively satisfied with their current access opportunities. Public in this region utilized outdoor recreation more than any other region in the state, including participation in fishing and walking on streets, sidewalks, or trails. They were also the most satisfied with their outdoor recreation facilities, boating, swimming, water trails, and certain types of fishing areas. Residents agreed very strongly that maintaining outdoor recreational areas are more important than adding new opportunities. Related to this, they identified maintenance of existing areas as the highest funding priority, as compared to a low priority for acquiring land for recreational development and building more greenways and trails.

The "Destination Erie: A Regional Vision" planning initiative conducted extensive public outreach on economic, social, and environmental needs in Erie County in 2013 and 2014. Over 2,000 people were surveyed and asked to rank the top 12 land use priorities for future development, ranging from lower taxes to access to local shopping. Walkable neighborhoods ranked third, protect sensitive environments ranked fourth, and access to recreation ranked almost last at 11th place. Comments from the public from these surveys focused on an interest in new public access and in promotion of existing sites.

In May 2012, GoErie.com conducted a public opinion survey within Erie County. 65% of 777 respondents felt that the benefits of protecting wildlife habitat and public access through conservancy purchases outweigh the loss of tax revenue and other benefits of keeping the land private. 24% felt that they did not and 10% were not sure.

A 2003 survey conducted by the Lake Erie Regional Conservancy (LERC) for the *Pennsylvania Lake Erie Watershed Conservation Plan* (2008) found that residents in the watershed were very satisfied with the region's recreational opportunities. At least 85% of respondents were satisfied with birdwatching, hiking, biking, boating, swimming, and fishing opportunities, with a very small percentage (4%-10%) not satisfied with these opportunities. Improvements to recreational resources were diverse and conflicting, with camping and bicycling as the most popular recommendations by 7% and 5% of respondents. The survey found that Presque Isle is by far the most popular location for all recreational activities for fishing, swimming, boating, hiking, and bicycling. The 2008 Lake Erie Rivers Conservation Plan also examined the public's perception of existing access sites throughout the County. In general, sites within the LECZ were regarded as an important resource or in need of conservation action.

The *Sportfishing in America* reports published by the American Sportfishing Association identified 119,742 Great Lakes anglers in Pennsylvania 2011, which is a notable increase from 85,000 in 2006. According to the PA Fish and Boat Commission, Erie County takes the #7 rank of 67 counties in Pennsylvania for number of boat registrations with 10,911 in 2013. This number has slightly decreased since 2004 and leveled-off from 2008-2013.

Management Characterization:

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

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

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

Statutes, regulations, policies, or case law interpreting these

DECZ – Philadelphia City zoning changes

Recent local zoning ordinances in Philadelphia have and will continue to encourage new public access. In 2009, the city established the Delaware River Conservation District that creates special use rules for development in the new overlay district along the North Delaware River. This includes a 50 foot buffer island from the bulk head line or the top of the bank. A similar buffer was adopted three years later to cover the entire city and restricts new permanent structures or impervious surfaces closer than 50 foot to the water, unless the activity is related to a port, marina, or other water-dependent use. These buffers will provide an opportunity for negotiations of use license agreements for trails, promote new greenway, park, and open space development, in addition to planning for future sea level rise. In June 2013, Philadelphia also adopted the Central Delaware Waterfront zoning overlay. This district requires active uses on ground floor frontages, structures greater than 5,000 square feet must keep 40% of the parcel open area, and limits building height to 100' with allowances if public amenities, such as a waterfront trail, are provided. These changes were driven by Philadelphia City planning efforts, not CZM- or 309-driven, including implementation of *A Civic Vision for the Central Delaware* (2007).

Operation/maintenance of existing facilities

PFBC Infrastructure Plan

The Pennsylvania Fish and Boat Commission (PFBC) has adopted a multi-year infrastructure plan as part of their new 2014-2017 Strategic Plan. The effort will include a return on investment analysis of marinas managed by PFBC and prioritization of managed access areas. PFBC will use this to implement repairs on an established cycle. These changes are not 309- or CZM-driven. This effort is anticipated to address some frequently expressed public concerns over maintenance of public access facilities owned by the Commission.

Acquisition/enhancement programs

DECZ Riverfront & Access Enhancement

Regional public access efforts established in the previous assessment period were heavily implemented in the last five years on the Delaware and Schuylkill River waterfronts. The *Master Plan for the Central Delaware* was adopted by the Philadelphia Planning Commission in 2012, which will implement the Civic Vision and Action Plan completed five year earlier. The Delaware River Waterfront Corporation will guide the transformation of a six mile section of riverfront by reconnecting neighborhoods to new and existing public spaces along the waterfront. This city's new comprehensive plan, *Philadelphia 2035*, supports the Central Delaware effort, in addition to continued access improvements under the earlier *North Delaware Riverfront Plan* (2001) being implemented by the Delaware River City Corporation (DRCC), the *Tidal Schuylkill River Trail Master Plan* (2003), and continuous development of the East Coast Greenway. CRM has provided continued pass-through grant support to planning and construction activities along riverfront trails in Philadelphia, Delaware, and Bucks Counties.

Bucks County Open Space & Greenways

The Bucks County Open Space and Greenways Plan was published in 2011 and provides an updated framework to support the County's Open Space Program, funded through 1997 and 2007 bond referendums, and the *Bucks County Waterfront Revitalization Plan* (2005). Specific access development in Bucks County includes the 522-acre Biles Island along the Delaware River in Falls Township, which is currently owned by Waste Management with an option for township purchase. A master plan was developed and approved in 2011, although implementation is pending, including potential phase 1 public access area within the northern portion of the island. This area also offers considerable potential for tidal wetland creation and restoration projects.

Delaware County Planning

Delaware County is in the process of developing their updated comprehensive plan, entitled *Delaware County 2035.* The open space, recreation, and greenway component is still being developed and will be a major factor in shaping much needed Delaware riverfront access and connectivity in the county.

The *Delaware River Conservation Plan for the Delaware River Corridor and Naamans, Marcus Hook, and Stoney Creek Watershed* (2014) was recently published by the Delaware County

Planning Department. The plan sets several relevant objectives, including development of passive open space, pocket parks and gardens, participation in the Delaware River water trail, and development of new riverfront viewing areas and boat launch facilities.

CRM is poised to play a significant role in implementing these new access objectives through involvement in the Delaware County Coastal Zone Task Force and pass through grants.

Erie County Greenways Plan and Grant Program
The Erie County Greenways Plan was published in 2009 and is part of the larger northwest Pennsylvania greenways planning effort and examines the methods by which a greenway network can be developed for Erie County.

The new Erie County Greenways Grant Program funds acquisition, development, and repair of greenways, recreational trails, open space, natural areas, and community conservation projects using Marcellus Legacy Fund allocations. Erie County awarded $243,000 through the program in 2013 and $185,000 in 2014. The program has funded several new public access areas and trails in the LECZ. This was not a 309- or CZM-driven effort, but the program anticipates leveraging coastal zone grants with this new funding source.

Destination Erie Regional Plan
Planning for this new regional strategic effort in Erie County started in 2012 and will be finalized in 2015. Funded by a US Department of Housing and Urban Development grant, it considers economic, social, and environmental aspects. Recently released draft recommendations include holding an open space referendum to purchase and protect open space and developing community trail networks to link existing parks and the region's trail network.

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

Public Access Guide	Printed	Online	Mobile App
State or territory has? (Y or N)	• East Coast Greenway Pennsylvania/Delaware Guide • Tidal Delaware River Water Trail Map & Guide	• PFBC Access Guides • Tidal Delaware Water Trail • Greater Philadelphia's Regional Trail Network • Schuylkill River Trail • Schuylkill Banks Map • Explore PA Trails	• PA State Parks & Forests Guide

Public Access Guide	Printed	Online	Mobile App
Web address (if applicable)	• www.greenway.org/pdf/pade_guide2013.pdf • www.tidaltrail.org	• http://fishandboat.com/gis.htm • http://www.tidaltrail.org/trail-map/ • http://connectthecircuit.org/ • http://www.schuylkillrivertrail.com/ • http://www.schuylkillbanks.org/node/8 • http://www.explorepatrails.com	• http://www.dcnr.state.pa.us/stayconnected/mobile-app/
Date of last update	• 2013 • Unknown	All online maps are continually updated	• Oct 16, 2014
Frequency of update	• Unknown	All online maps are continually updated	• As needed

There is currently no comprehensive state or coastal zone-wide public access guide. Pertinent regional and topical guides are listed in the table.

According to the most recent SCORP, only 25% of residents stated they find mobile mobile/smart phone applications important when seeking outdoor recreation information. These applications ranked lowest as compared to 10 other sources, including visitor centers, newspaper articles, and travel guides. Only 1.3% of residents said they use these applications the most.

Enhancement Area Prioritization:

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

High	X
Medium	
Low	

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

Public access was identified by stakeholders as the second highest priority of the nine enhancement areas. 60% of the 35 key stakeholders surveyed identified access as one of the high priority enhancement areas. Since the program's development, CRM has played an important role in creating and enhancing public access in both coastal zones and it remains a priority for the next five years.

The Delaware Estuary waterfront in particular is under transformation, and CRM seeks to keep momentum where it exists and build greater support in underserved areas. In addition to CRM's stakeholder engagement survey, other surveys such as the one conducted for the Pennsylvania State Outdoor Recreation Plan and other regional surveys cited in this assessment confirm that citizens in the DECZ still consider new open space and access to the water to be a high priority. The selection of Public Access as a "high" priority is well justified.

Public Access In-Depth Assessment

CRM considered Public Access to be a "High Priority" and developed an in-depth assessment to further examine the enhancement area.

In-Depth Resource Characterization:

Purpose: To determine key problems and opportunities to improve the CMP's ability to increase and enhance public access opportunities to coastal areas.

1. *Use the table below to provide additional data on public access availability within the coastal zone not reported in the Phase I assessment.*

DECZ:

DECZ Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
Access sites that are ADA compliant	26 trail segments 54% of trail mileage	↑ +7.6 miles (all new trail segments)	CRM GIS database

LECZ:

LECZ Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)**	**Cite data source**
Access sites that are ADA compliant	Data being developed	unknown	N/A

2. *What are the three most significant existing or emerging threats or stressors to creating or maintaining public access within the coastal zone? Indicate the geographic scope of the stressor, i.e., is it prevalent throughout the coastal zone or are specific areas most*

threatened? Stressors can be private development (including conversion of public facilities to private); non-water-dependent commercial or industrial uses of the waterfront; increased demand; erosion; sea level rise or Great Lakes level change; natural disasters; national security; encroachment on public land; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.

DECZ	Stressor/Threat	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Stressor 1	Real Estate costs and potential legacy contamination of riverfront properties	Throughout DECZ
Stressor 2	Barriers that isolate public from riverfront or prohibit contiguous connections	Throughout DECZ but especially in specific industrial areas of Philadelphia and Delaware Counties.
Stressor 3	Potential impacts of climate change in low-lying areas	Throughout DECZ

LECZ	Stressor/Threat	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Stressor 1	Shoreline erosion	Accessible Lake Erie shoreline, especially north side of Presque Isle and SGL #314.
Stressor 2	Barriers to accessing the water	All Lake Erie shoreline
Stressor 3	Beach closures	Presque Isle and Freeport Beaches

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

DECZ:

Location and limited availability allow riverfront properties in the Southeast to command high prices, despite the recent slow-down in the real estate market. These prices often preclude outright public ownership and purchase of these parcels, but may allow for alternative methods of securing access to the water. A 16-acre riverfront property in South Philadelphia was recently purchased for $13 million by a private developer, which will include a 100 foot wide land conveyance to the Natural Lands Trust for trail development (of which 50 foot of this buffer cannot be developed under the new Philadelphia riverfront zoning). Another unique deal in

North Philadelphia, the Dietz and Watson land swap, involved purchase of a private property and portion of publically owned land adjacent to a boat ramp access site for $12 million by Philadelphia Industrial Development Corp (PIDC). 22 acres of this 40 acre property was then sold to Dietz and Watson for $6 million to allow for expansion of this facility and included an easement to the existing ramp. As part of the deal, PIDC transferred a nine-acre vacant industrial riverfront parcel in Philadelphia City to be developed into a trail, which will provide a desperately needed access site in Bridesburg.

In 2005, vacant land made up about 12% of the DECZ, much of which constitutes former industrial parcels along the Delaware and Schuylkill Rivers. According to the Delaware River City Corporation, the North Delaware encompasses over 700 acres of vacant and under-utilized land. These sites represent a valuable opportunity for conversion to new public access sites, but also bring a history of soil and water contamination. Costs associated with testing and cleanup, in addition to liability issues, are a major impediment to converting these properties to new parks and trails. However, it can be done as evidenced by a success story on the Lower Schuylkill. Philadelphia Industrial Development Corporation is currently working to remediate brownfields north and south of Bartram's Garden for industrial reuse and will incorporate a riverfront trail to create Bartram's Mile.

Residents of the DECZ and their neighborhoods have been physically isolated from the river by historical developments along the river, including active and vacant industrial sites, private parcels, highways, and rail lines. Many, if not all, reports focused on public access in the Southeast detail this waterfront isolation, including *Accessing the Tidal Delaware*, DVRPC (2012), *North Delaware Riverfront Plan* (2001), and both recently published Rivers Conservation Plans for the Delaware Direct Drainage. SCORP surveys found that Philadelphia residents felt local waterways for fishing and boating opportunities are inaccessible more than any region residents in the state. Opening these physical barriers requires significant planning, coordination, and financial investments. Efforts along the Central Delaware River have recently focused on creating connector streets and trail to tie neighborhoods to the waterfront, including development of the Columbia Avenue, Race Street, and Spring Garden Connectors. These projects include improved streetscaping, lighting, tree plantings, and signage.

Safety concerns are a recurring and, whether real or perceived, deterrent to public access in the DECZ. According to the SCORP surveys, Philadelphia residents felt that public recreation areas near their homes are not safe more so than any other region in the state. *Safety in Philadelphia Parks and Recreation Centers* (2013) report was published in response to an elevated number of safety incidents that occurred at City parks in 2011. Relevant community concerns expressed during public meetings included lighting and signage needs, more surveillance needed, and maintenance issues impacting safety, such as sidewalks needing repair. The *Tidal Delaware River Recreation Survey* (2010) found that boaters would increase their activity on the river if there were more secure parking areas and safer access points. On the tidal Delaware, there are clear and recognized safety issues, including large commercial boats and their wakes, changing tides and currents, floating debris, piers, and bridge abutments.

Climate change and sea level rise add an additional potential stressor to waterfront public access sites. The level of effort to protect waterfront access sites and their amenities may not be as

significant as protecting critical infrastructure. Natural amenities such as tidal wetlands that help protect the sites while also supporting bird watching and other passive uses may disappear. Vulnerability and potential resiliency specifically related to public access sites and their uses should be better assessed.

LECZ:

Existing public access areas along Lake Erie, including the very popular Presque Isle State Park, are threatened by shoreline erosion. CRM has been measuring recession using a network of fixed control points along the lakeshore for over thirty years. Twenty-seven of these points are located on public access sites and have an average erosion rate of about one foot per year, compared to a half-foot per year rate on non-accessible properties. Erie Bluffs State Park in Springfield and Girard Townships has one of the highest recession rates where one control point measured 71 feet of land lost from 1986 to 2014 or over 3 feet per year. West of Erie Bluffs, State Game Lands #314 also experiences high rates of erosion, which average about 1.7 feet per year. This can be attributed to effects from Ohio's neighboring Conneaut Harbor breakwaters that trap and remove sediment that would normally be transported east to Pennsylvania through natural littoral drift. Presque Isle is the most visited access area in the LECZ and is especially susceptible to erosion. Structural stabilization and annual sand replenishment is currently implemented at a high cost to stabilize the peninsula and allow for continued use of its beaches, trails, and lagoons. Climate change is anticipated to result in reduced lake levels, which may actually reduce direct wave erosion and lessen this stressor.

While the entire stretch of Lake Erie shoreline in Pennsylvania is publically accessible between the high and low water mark, getting to that narrow strip can be difficult. Contiguous privately owned land creates a barrier to accessing that water. Even where public access exists, the bluffs create a natural obstacle. State Game Lands #314 borders over two miles of the shoreline, but does not provide any significant direct access down the steep bluffs to the water. The new Erie Bluffs State Park poses a similar situation with 1.4 miles of only visual shoreline access. In the City of Erie, Bayfront Highway presents a manmade physical barrier that presents obstacles to better access to Presque Isle Bay.

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

Emerging Issue	Information Needed
Climate change and extreme weather events	Reliable SLR/lake level change, flooding, extreme weather models to predict affected areas. Strategies to address impacts of climate change, for example, realistic municipal zoning approaches to converting flood-prone areas to greenways or open space.

In-Depth Management Characterization:

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

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

Management Category	**Employed by State/Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Comprehensive access management planning	N statewide. Mostly regional and local efforts.	Y	N
GIS mapping/database of access sites	Y	N	N – maintenance of existing GIS database
Public access technical assistance, education, and outreach (including access point and interpretive signage, etc.)	Y	Y	N

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

No significant management category changes.

3. *Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's management efforts in providing public access since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state's management efforts?*

The 2014-2018 SCORP provides a review of Pennsylvania's stewardship of recreational access areas. The state has been successful in many areas, including the number and variety of parks, forests, gamelands, and creation of new water trails. Overall areas for improvement include maintenance of existing facilities and creation of more trails. Final recommendations of the plan

include: promotion of healthy living through outdoor connections, creation of opportunities for community prosperity through tourism and economic development, sustaining natural resources and public investments, enhancing close-to-home local parks and outdoor recreation, and ensuring long-term funding stability.

In 2014, the Penn State Center for Survey Research completed a statewide survey of 606 Pennsylvania residents to assess public support for state funding towards resource and land preservation. Over 97% of residents agreed that state funds should be continued to be used for preservation of open space and farmland, parks and trails, and protection of rivers and streams. This majority increased from 92% when the same survey was conducted only two years ago. Over 80% of residents would support an actual increase in funds to support these causes.

Identification of Priorities:

1. *Considering changes in public access and public access management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve the effectiveness of its management effort to better respond to the most significant public access stressors. (Approximately 1-3 sentences per management priority.)*

Management Priority 1: Continue to support new waterfront acquisition while beginning to focus more intently on connections from the waterfront to populated residential areas and the challenging connections between the existing and new sites.

Description: The continued momentum for waterfront revitalization along the Delaware Estuary offers timely opportunities for CRM to continue supporting the growing public access. CRM, working with local partners, should focus more on identifying the underserved areas and areas where challenges exist due to local conditions or a relative lack of financial support. This includes seeking better ways to overcome the obstacles of getting the public connected to the waterfront sites and making the challenging connections between the sites. CRM can use pass through grants to support on-going and new efforts to plan, develop, and coordinate local, regional, and national trail segments.

Management Priority 2: Maintain existing public access by minimizing shoreline erosion and associated bluff erosion in the LECZ.

Description: Improvement is needed in understanding nearshore littoral transport and its effects on public access. The CMP should coordinate with the federal government and other partners to develop a study or studies that will assist in better understanding impacts to and management of shoreline public access sites. Bluff recession should continue to be monitored.

Management Priority 3: Improve availability of public access mapping

Description: A comprehensive listing of access areas in the coastal zones should be made available to the public online and/or a printed publication. CRM should work with local organizations that already serve as a source for visitor information or directly make this information available through the program website.

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

Priority Needs	**Need?** (Y or N)	**Brief Explanation of Need/Gap**
Research	Y	Littoral study(s) in the LECZ.
Mapping/GIS	Y	No comprehensive public access guide/online interactive map. National sea level rise map viewers are often failing to include Pennsylvania's shoreline.
Data and information management	Y	Sea level rise data specific to all of Pennsylvania's tidal shorelines.
Training/Capacity building	Y	Building resilience/adaptation and looking for opportunities regarding climate change at public access sites.
Decision-support tools	N	
Communication and outreach	Y	No comprehensive public access guide/online interactive map.
Other (Specify)	Y	Brownfield type assistance for uses other than industrial or commercial development, such as public open space or ecological restoration.

Enhancement Area Strategy Development:

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

   Yes __X___
   No _____

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

Public access has been and continues to be a priority for the CRM program. In the LECZ, 64% of key stakeholders considered public access to be a high priority enhancement area. In the DECZ, 63% of key stakeholders considered public access to be a high priority enhancement area. Waterfront transformation and revitalization is very active in the DECZ with a great deal of grass roots and political support. CRM needs to continue to support the momentum that has developed but many challenges remain. Balancing public space, commercial, industrial, and port facility uses along the waterfront remains a challenge. Former industrial uses and their legacy contaminants can complicate planning and introduce significant costs in assessment before specific planning can even begin. Historic and well developed waterfront transportation infrastructure such as rail lines and highways provide additional challenges. Once new waterfront public access sites are developed, getting local resident to the sites and connecting the

sites to each other, becomes critical – many of the barriers to these goals appear quite challenging.

The two strategies that CRM is proposing will each present opportunities to enhance the program's ability to better manage and support both new and existing public access.

Marine Debris

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

Resource Characterization:

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

DECZ:

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

* - "Dumping" was previously considered a "Low" significance source in the DECZ. The change to "Medium" reflects a change in understanding of the source, not a change in status or trends regarding the source.

LECZ:

Source of Marine Debris	Existing Status and Trends of Marine Debris in Coastal Zone		
	Significance of Source (H, M, L, unknwn)	**Type of Impact** (aesthetic, resource damage, user conflicts, other)	**Change Since Last Assessment** (↑, ↓, ↔, unknown)
Land-based			
Beach/shore litter	**M**	Mostly aesthetic	↔
Dumping	**L**	Minimal impact	↔
Storm drains and runoff	**M**	Mostly aesthetic, some resource damage	↔
Fishing (e.g., fishing line, gear)	**L**	Mostly aesthetic, some resource damage	↔
Other – abandoned dredge pipes from historic dredging	**L**	Aesthetic, user conflicts (safety)	↔
Ocean or Great Lake-based			
Fishing (e.g., derelict fishing gear)	**L**	Minimal	↔
Derelict vessels	**L**	Minimal	↔
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	**L**	Minimal	
Hurricane/Storm	**L**	Minimal	↔
Tsunami	-	-	-
Other (please specify)	-	-	-

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

The sources of marine debris in the Delaware Estuary have generally not changed since the last assessment period, or for several assessment periods. Plastic litter, entering by wind or stormwater or a combination of the two, remains the largest source of marine debris in the Delaware Estuary. While the primary source and type of debris remains the same, the concern over the potential impacts has grown since the last assessment. Secondary microplastics, which are generated from the breakdown of larger plastic pieces, persist in the environment and are being found in animal tissues throughout the world. (Primary microplastics are discussed in the Cumulative and Secondary Impacts section). The global issue of the impacts of microplastics, including secondary microplastics, is under increasingly intense investigation and it is anticipated that more will be understood by the next strategy and assessment period.

Numerous voluntary cleanups are conducted throughout the year, and these efforts have been strong during this assessment period. The best data for what is being found and removed is collected by the Ocean Conservancy via International Coastal Cleanup events conducted in the fall. Keep Pennsylvania Beautiful, CRM remains a supporter of these events in both coastal zones. In the DECZ the volume of debris collected during volunteer cleanups often overshadows the need for proper documentation of what is being collected. While the need to collect data is recognized, volunteer enthusiasm to complete the job at hand and the overwhelming volume out-competes the need for better documentation. Keep Pennsylvania Beautiful serves as the statewide coordinator for Pennsylvania's participation in the International Coastal Cleanup. Results for the state-wide International Coastal Cleanup effort are reported to the Ocean Conservancy who releases a report the following spring that summarizes the global effort, including Pennsylvania's combined results. The Spring 2014 report, summarizing 2013 efforts, indicated that Pennsylvania ranked 6th in the nation in total number of volunteers and removed 459,076 pounds of trash and debris from Pennsylvania's waterways and coastal regions (12.8% of all the trash collected nation-wide).

Like the DECZ, there has been little change to the sources of marine debris in the LECZ since the last assessment. The first International Coastal Cleanup organized by CRM in the Lake Erie area was conducted in 2003 and the effort remains very strong and well supported throughout the area. CRM remains a strong supporter and organizer. Cigarette butts remain the most common item collected during the annual event. In 2013 volunteers in Erie County collected and documented 16,276 butts.

Illegal Dump Surveys

Keep Pennsylvania Beautiful has systematically conducted illegal dump surveys in each of Pennsylvania's 67 counties (http://www.keeppabeautiful.org/IllegalDumpSurveys.aspx). In addition to location, these surveys provide good data on what and how much is being dumped. Erie County was conducted during the original round in 2005. Bucks (2011), Philadelphia (2012), and Delaware (2012) Counties were surveyed during this assessment period. The survey results indicate that illegal dumping is a significant problem in the DECZ. In Bucks County, there were 123 illegal dump sites in total, the vast majority of these are located in the heavily populated coastal municipalities. In Delaware County only 26 sites were identified, but again the heavily populated coastal municipalities bear the brunt of sites. In Philadelphia a few sites were identified along the tidal Delaware and Schuylkill, but the sites tended to be more inland than along the coast. The degree to which the illegal dumping directly impacts the estuary itself is somewhat unknown, but it does directly impact non-tidal wetlands in a fairly significant manner.

Management Characterization:

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

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

Pennsylvania does not have any marine debris specific statutes, regulations, policies, or case law. The foundation for Pennsylvania's marine debris regulatory efforts rest in waste management, recycling, combined sewer overflow, and stormwater NPDES permitting.

Philadelphia Combined Sewer Overflow Long-Term Control Plan
This was considered a draft under EPA and DEP review during the last assessment period. The EPA and DEP have approved the document and subsequent implementation documents through regulatory and non-regulatory agreements. This plan is also discussed in the Cumulative and Secondary Impacts section of this document. Most significant to marine debris is the related update to Section 6 of the *Updated Nine Minimum Controls Report* (June 2013, approved January, 2015). Section 6 is entitled "Control of the discharge of Solids and Floatables in CSOs" and specifically addresses how structural and non-structural technologies will be used to address the problems identified in the CSO Long Term Control Plan Update. Section 7, "Pollution Prevention Programs," also addresses some non-structural approaches toward lessening impacts of marine debris. More information can be found here: http://www.phillywatersheds.org/what_were_doing/documents_and_data/cso_long_term_control_plan.

Floatables Control using Debris Skimming Vessels
CRM helped support the original purchase of a 39-foot skimming vessel acquired by the Philadelphia Water Department in 2006, the R.E. Roy. The vessel is operated 5 days per week approximately 8 months per year. Debris removal has ranged from 11.0 tons/yr. to 44.2 tons/yr. In 2014 the Philadelphia Water Department began recycling #1 and #2 bottles collected by the skimming vessel. During this first year of recycling effort, 1,024 lbs. were collected.

The Philadelphia Water Department also continues to operate a pontoon skimming vessel in the tidal Delaware and Schuylkill waters, where debris is removed by dip nets. While this directly improves the aesthetics of the waterfront, it also serves as a very visible public awareness tool regarding litter and especially floating plastic litter. Philadelphia's Combined Sewer Overflow Long-Term Control Plan includes use of this vessel.

City of Erie Sewer Department

The new litter trap constructed at the mouth of Mill Creek and discussed during the last assessment period continues to operate. Originally it was planned that the materials would be quantified as part of an outreach effort, but the presence of syringes highlighted the dangers involved and the outreach effort and detailed accounting was cancelled. Approximately 56 tons per year is removed, this includes all trash and natural items such as sticks and logs. There is also a litter trap located on Cascade Creek, another urban stream that empties into Presque Isle Bay.

Voluntary Cleanups

For Pennsylvania, marine debris removal programs often focus on voluntary cleanups and the education opportunities and stewardship that develop through the cleanups. It is important to note that generally long-term stewardship is far more important than the benefits of actual removal of debris. The grass roots support for voluntary cleanups remains strong in both coastal zones. This is not a comprehensive list, but a few example efforts are presented here:

International Coastal Cleanup (ICC)

CRM had historically worked with the non-profit group Pennsylvania Cleanways on helping to coordinate the state-wide International Coastal Cleanup (ICC). During this assessment period Pennsylvania Cleanways merged with Keep Pennsylvania Beautiful and continues to coordinate under the name Keep Pennsylvania Beautiful.

In the LECZ the local ICC Steering Committee remains strong and the cleanup is well supported by partners, supporters, and volunteers. CRM first organized the steering committee in 2003 and remains active in coordinating the annual effort. The 2014 LECZ ICC included 1662 local volunteers at 27 individual sites. There is no local steering committee for the DECZ and Keep Pennsylvania Beautiful has filled the role of coordinating in the DECZ in conjunction with their statewide responsibilities. In the DECZ the 2014 ICC included 528 adult volunteers at 31 individual events. Note that some of these events are outside of the coastal zone but within the local coastal watershed. CRM periodically provides financial assistance to support ICC events in the DECZ.

The Schuylkill Scrub

The Schuylkill Scrub was originally founded in 2010 and has grown considerably. The event is now coordinated by the Schuylkill Action Network with assistance from Keep Pennsylvania Beautiful. This is a spring event, March 1 through May 31, that occurs throughout the watershed. For more information visit: www.SchuylkillScrub.org.

Philly Spring Cleanup
During the last assessment period Philadelphia initiated a city-wide litter cleanup prioritization strongly encouraged by Mayor Nutter. These efforts continued to gain momentum during this assessment period. April, 2015 will mark the 8th anniversary of the Philly Spring Cleanup. http://www.philadelphiastreets.com/philly-spring-cleanup

Annual Presque Isle Spring Cleanup
April 11, 2015 will mark the 59th annual Presque Isle Spring Cleanup, a strongly supported public event that helps prepare the park for the coming season.

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

The approval of Philadelphia's CSO Long-Term Control Plan is the most significant change regarding the management of marine debris in Pennsylvania's coastal zones. Continued implementation, monitoring, and adaptive management will occur during the next assessment period. DEP has played a significant role in developing Philadelphia's Long-Term Control Plan, it was not a 309- or CZM-driven change. There has been considerable momentum in lessening street litter throughout the DECZ which undoubtedly leads to less floatable debris. CRM periodically supports these efforts in a way to encourage community stewardship and keep the momentum moving. While progress has been made, the impacts remain significant. This is a global challenge and a meaningful solution to floatable debris remains elusive. More information on the impacts of plastics, specifically secondary microplastics, is anticipated during the next assessment period.

Enhancement Area Prioritization:

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

High	
Medium	X
Low	

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

Of the 35 key stakeholders surveyed, 14% considered Marine Debris to be a "high priority." This was evenly distributed between the LECZ and DECZ, none of the 5 state-wide respondents considered it a "high priority."

CRM considers it a medium priority primarily due to the heavy volumes of floatable debris that enters the Delaware Estuary from our heavily urbanized coastal zone. Voluntary cleanups only collect a tiny percentage of the debris that enters and happens to get trapped along the tidal shorelines. Cleanup veterans are left wondering where does the rest go. Along Lake Erie, any walk on a secluded beach will reveal the omnipresence of floatable debris. It's a pervasive problem that crosses state and national borders. Much of the debris found along Pennsylvania's shoreline probably originates in another state. As a case in point to the connectivity of the lakes, on October 22, 2014 CRM staff found a collapsible cooler on the banks of Lake Erie near the mouth of Eightmile Creek. Using information found in the bag it was returned to the owner and the program learned the cooler had fallen off a docked freighter in Sarnia, Ontario. Making the enhancement area a "high" priority would probably not generate much additional improvement, but the overall concern for the issue justifies at least a "medium" priority.

Cumulative and Secondary Impacts (CSI)

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states.)*
Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. *Using National Ocean Economics Program Data on population and housing, please indicate the change in population and housing units in the state's coastal counties between 2012 and 2007. You may wish to add additional trend comparisons to look at longer time horizons as well (data available back to 1970), but at a minimum, please show change over the most recent five year period (2012-2007) to approximate current assessment period.*

DECZ:

Trends in DECZ Coastal Population and Housing Units (Delaware, Philadelphia, Bucks)				
Year	**Population**		**Housing**	
	Total (# of people)	% Change (compared to 2002)	Total (# of housing units)	% Change (compared to 2002)
2007	2,625,177	4.21%	1,121,812	1.29%
2012	2,735,758		1,136,236	

LECZ:

Trends in LECZ Coastal Population and Housing Units (Erie)				
Year	**Population**		**Housing**	
	Total (# of people)	% Change (compared to 2002)	Total (# of housing units)	% Change (compared to 2002)
2007	279,092	0.56%	117,950	1.22%
2012	280,646		119,390	

2. *Using provided reports from NOAA's Land Cover Atlas please indicate the status and trends for various land uses in the state's coastal counties between 2006 and 2011. You may use other information and include graphs and figures, as appropriate, to help illustrate the information.*

DECZ:

Distribution of Land Cover Types in DECZ Coastal Counties (Delaware, Philadelphia, Bucks)		
Land Cover Type	**Land Area Coverage in 2010 (Acres)**	**Gain/Loss Since 2006 (Acres)**
Developed, High Intensity	111,462	3,085
Developed, Low Intensity	88,090	973
Developed, Open Space	69,210	102
Grassland	4,326	-90
Scrub/Shrub	29,318	19
Barren Land	2,630	-1,158
Open Water	18,285	13
Agriculture	106,483	-1549
Forested	160,346	-1344
Woody Wetland	18,426	-45
Emergent Wetland	2,931	-26

LECZ:

Distribution of Land Cover Types in LECZ Coastal Counties (Erie)		
Land Cover Type	**Land Area Coverage in 2010 (Acres)**	**Gain/Loss Since 2006 (Acres)**
Developed, High Intensity	14,643	915
Developed, Low Intensity	34,003	646
Developed, Open Space	10,835	525
Grassland	5,056	51
Scrub/Shrub	16,045	294
Barren Land	1,690	-352
Open Water	70,989	122
Agriculture	183,040	-1,069
Forested	196,416	-1,062
Woody Wetland	44,589	-243
Emergent Wetland	5,779	173

3. *Using provided reports from NOAA's Land Cover Atlas, please indicate the status and trends for developed areas in the state's coastal counties between 2006 and 2011 in the two tables below. You may use other information and include graphs and figures, as appropriate, to help illustrate the information.*

DECZ:

Development Status and Trends for DECZ Coastal Counties (Delaware, Philadelphia, Bucks)			
	2006	**2010**	**Percent Net Change**
Percent land area developed	43.27%	43.95%	0.68%
Percent impervious surface area	17.79%	18.20%	0.41%

How Land Use Is Changing in DECZ Coastal Counties (Delaware, Philadelphia, Bucks)	
Land Cover Type	**Areas Lost to Development Between 2006-2010** (Acres)
Barren Land	1,242
Emergent Wetland	6
Woody Wetland	70
Open Water	64
Agriculture	1,600
Scrub/Shrub	256
Grassland	166
Forested	877

LECZ:

Development Status and Trends for LECZ Coastal Counties (Erie)			
	2006	**2010**	**Percent Net Change**
Percent land area developed	9.84%	10.20%	0.36%
Percent impervious surface area	3.37%	3.51%	0.14%

How Land Use Is Changing in LECZ Coastal Counties (Erie)	
Land Cover Type	**Areas Lost to Development Between 2006-2010** (Acres)
Barren Land	486
Emergent Wetland	38
Woody Wetland	70
Open Water	13
Agriculture	947
Scrub/Shrub	83
Grassland	64
Forested	442

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

DECZ Shoreline Types	
Surveyed Shoreline Type	**Percent of Shoreline**
Armored	53.6%
Beaches	10.6%
Flats	10.5%
Rocky	14.6%
Vegetated	36.1%
Calculated using 2014 ESI database. Total percent exceeds 100% since shorelines can be classified in two or three categories. For example, a section of shoreline classified as landward vegetated, seaward as beaches, and seaward #2 as flats, would be counted in all three categories.	
DECZ and LECZ Combined Shoreline Types	
Surveyed Shoreline Type	**Percent of Shoreline**
Armored	36%
Beaches	6%
Flats	0%
Rocky	49%
Vegetated	10%
ESI data was not available for Lake Erie, so overall state values from the State of the Coast were used.	

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

Refer to PA DEP stream assessment results presented individually for each coastal zone under question 2 of the In-Depth Resource Characterization section that follows.

Management Characterization:

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

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

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

Statutes, regulations, policies, or case law interpreting these:

Chapter 102 Erosion and Sediment Control Regulation Revisions
Revised regulations were implemented in November 2010 and include mandatory 150 feet riparian buffers on high quality or exceptional value waters, which was later amended in Act 162 described below. Voluntary 100 feet forested buffers can be established or converted. Other major changes include tightening of permit requirements, updating E&S control requirements, and including antidegradation implementation provisions. These updated regulations are anticipated to provide greater protection for addressing sediment pollution related to construction and new development, especially in the Southeast. Revisions were integrated in new amendments to the expiring NPDES Construction Stormwater PAG-02 Statewide permit in 2012. This was not a 309- or CZM-driven change.

Act 162 of 2014
This act amends buffer requirements in the existing Pennsylvania Clean Streams Law for NPDES permit applicants for stormwater discharges associated with construction activities. Permits for activities within 150 feet of certain high quality or exceptional value waters can now choose to implement BMPs in certain cases or follow prior requirements to use or install a

riparian buffer. Permits for activities within 100' of special protection water require offsetting if the BMP option is selected. The offset riparian buffer must be as close as feasible to the actual disturbance, be at a 1:1 ratio, and include other BMPs to manage stormwater. The act will provide applicants with greater flexibility in permit requirements, especially dealing in developed constrained areas such as Southeast PA. This change was not a 309- or CZM-driven change.

Revised Combined Sewer Overflow (CSO) Policy
DEP revised its existing CSO policy in February 2010 to cover follow-up actions, including compliance monitoring and actions, permit reviews, inspections, and enforcement. These revisions should continue to minimize water quality impacts of these combined systems, which are present in both coastal zones. There are currently 164 combined sewer outfalls in Philadelphia, which are monitored, modeled, and connected to a public notification system called CSOcast. The City is addressing these in their Green City, Clean Waters program, which is summarized below. As of 2011, the Delaware County Regional Water Control Authority identified 28 outfalls in the Chester City area that drain to the Delaware River, Chester and Ridley Creeks. According to DEP's CSO database, there are no registered CSO facilities in Bucks County. The Erie system currently has five CSOs and continues to work to eliminate these points. All facilities continue to address these issues through their approved Long Term Control Plans. This was not a 309- or CZM-driven change.

Chapter 93 Amendments
Updated and revised water quality criteria for conventional pollutants and toxic substances were approved in 2013. These updated criteria are based on updated studies, research, and national recommendations and are part of the required triennial review under the Clean Water Act. This was not a 309- or CZM-driven change.

Pennsylvania Natural Diversity Inventory (PNDI) Coordination Policy
This new policy was published in May 2013 and provides policy and procedures for permit applicants to meet legal requirements for the protection of threatened and endangered species. These detailed procedures should result in timely coordination, in addition to improved avoidance and minimization of impacts to species with special protections during construction or any other activities requiring a DEP permit. This was not a 309- or CZM-driven change.

Act 41 of 2013
This act allows for continued use of on-lot septic systems, providing those systems comply with Clean Streams Law requirements. There are three high quality watersheds in the LECZ (Crooked Creek, Godfrey Run, and Twelvemile Creek) and none in the DECZ. There are no exceptional value watersheds in either coastal zone. This was not a 309- or CZM-driven change.

<u>Guidance documents:</u>

Erosion and Sediment Pollution Control Program Manual Revisions
Revisions to the existing program manual were finalized in March 2012. The manual includes specific guidance, performance requirements, and design criteria to support the implementation

of the Department's water quality regulatory requirements for erosion and sediment control. The Manual has been designed to be more user-friendly and to complement the Pennsylvania Stormwater BMP Manual. It follows an overall approach that supports the managing of stormwater for erosion and sediment control during earth disturbance activities that are compatible with, and can be integrated into, structural and non-structural post construction stormwater management practices. This was not a 309- or CZM-driven change.

Chapter 105 Proposed Technical Guidance Documents
These proposed technical guidance documents establish the basis for evaluating the condition and assessment of water resources and determining appropriate mitigation and criteria for success. The proposed guidance was published in the *Pennsylvania Bulletin* in March, 2014. These documents and the resulting proposed in-lieu-fees program are discussed in greater detail under the Management Characterization portion of the Wetlands section of this document. This change was not a 309- or CZM-driven change.

Management plans:

Philadelphia City Green City, Clean Waters
This 25-year plan implements the City's Combined Sewer Overflow (CSO) Long Term Control Plan, which was amended in 2011 and implemented through a PA DEP Consent Order and Agreement in 2011, and an EPA Partnership Agreement and Administrative Order for Compliance on Consent in 2012. The $2.4 billion program will reduce stormwater and untreated sewage that enters into rivers and streams after heavy precipitation events that overwhelm the City's combined sewer system. Since the last assessment, Philadelphia has begun to implement the plan mainly through green infrastructure approaches to manage and minimize stormwater. By the beginning of 2014, the Philadelphia Water Department had designed or completed 191 stormwater tree trenches, 61 rain gardens, 72 storage trenches, and 34 porous paving projects. Stormwater is being addressed on non-residential private property by providing billing reductions when owners implement a BMP on site, in addition to public education and outreach. The Greenworks Philadelphia plan is currently being implemented by the Mayor's Office of Sustainability and sets 15 sustainability targets for 2015, including management of stormwater to meet federal standards. As of the 2014 progress report, 323 acres have been greened out of a total final target of 450 acres. This was not a 309- or CZM-driven change.

New Rivers Conservation Plans
Two new plans were published in the DECZ, including Philadelphia's Delaware Direct Watershed in 2011 and Delaware County's Delaware River Corridor and Naamans, Marcus Hook, and Stoney Creek Watershed in 2014. These locally developed integrative plans address a variety of resources in the DECZ and will encourage investments in planning, implementation, and development. This was not a 309- or CZM-driven change.

Trout and Godfrey Run Watershed Implementation Plan
This plan was completed and approved in 2009 and seeks to address nutrient, sediment, and bacterial loadings to the lake. Water quality improvement practices suggested include

agricultural BMPs, improved septic system management, riparian buffer restoration, and stream bank restoration and stabilization. This was not a 309- or CZM-driven change.

Erie County Act 167 County-Wide Stormwater Management Plan
In August 2010, Erie published their countywide SWM plan which provides a comprehensive program to assist in the planning and management of stormwater for participating municipalities. Implementation of this plan will manage stormwater runoff created by new development activities, maintain groundwater recharge, and prevent degradation of water quality. By summer 2014, all Erie County municipalities have adopted stormwater management ordinances that are compliant with the countywide plan. This was not a 309- or CZM-driven change.

2012 Great Lakes Water Quality Agreement Amendments
The Great Lakes Water Quality Agreement is a binational agreement to cooperate on the protection of water quality and ecological resources of the Great Lakes. It was originally signed in 1972 and prior to this update was last updated in 1987. The overall purpose of the agreement is to "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes."

The Great Lakes Water Quality Agreement of 2012 was officially ratified by the governments of Canada and the United States on February 12, 2013. The new provisions address aquatic invasive species, habitat degradation and effects of climate change, and continue work on threats such as harmful algae, toxics, and vessel discharges. The agreement includes amendments relative phosphorous loadings in Lake Erie (Annex 4) and new management structures to accomplish agreement goals (Annex 2). Pennsylvania CRM, through the DEP Office of Great Lakes, serves on a subcommittee developing new phosphorous targets for Lake Erie. CRM, working with the DEP Office of Great Lakes, is also involved in creating a new binational strategy and subsequent domestic action plan for nutrient reductions in Lake Erie. Management agreements, such as the existing LaMP, will see notable changes and progress during the next assessment period. Information regarding the existing Lakewide Management Plan (LaMP) for Lake Erie can be found at: http://epa.gov/greatlakes/lakeerie/index.html. The full text of the Great Lakes Water Quality Agreement with 2012 amendments can be found at: http://epa.gov/greatlakes/glwqa/20120907-Canada-USA_GLWQA_FINAL.pdf.

Presque Isle Bay Area of Concern/Presque Isle Bay Watershed Plan
In 2013, Presque Isle Bay was removed from the Areas of Concern list after its designation back in 1991. Delisting resulted from lack of toxicity of sediments, upgrades to Erie City's wastewater system that reduced sewer overflows and stormwater runoff, and reduced industrial activities along the Bayfront.

Enhancement Area Prioritization:

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

High	X
Medium	
Low	

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

Flooding concerns in the Delaware Estuary coastal plain have been a local concern and priority for many years. Stream impairments in the DECZ due to stormwater runoff are significant, and habitat fragmentation in the DECZ is ubiquitous. Tidal wetlands, significantly degraded by cumulative and secondary impacts over the past 300+ years, now face the additional impacts of sea level rise. In the LECZ nutrient runoff continues to be of concern and recent harmful algal blooms have increased both awareness and prioritization. In the LECZ, opportunities to develop in a wiser way that considers landscape level habitat connectivity are still available. Preservation is cheaper than restoration and minimizing habitat fragmentation should be a priority for planning and development within the Lake Erie watershed. CRM recognized the importance of habitat connectivity when selecting habitat connectivity projects as a Section 312 Performance Metric to be tracked in both coastal zones.

Only 26% of key stakeholders listed Cumulative and Secondary Impacts as a high priority enhancement area. However, upon closer examination, those stakeholders selecting the "Wetlands," "Coastal Hazards," and "Ocean and Great Lakes Resources" enhancement areas often included several comments related to cumulative and secondary impacts. The Cumulative and Secondary Impacts Enhancement area in strongly connected to these other enhancement areas and to some specific concerns identified by stakeholders. More information on stakeholder engagement is provided at the end of the document.

Cumulative and Secondary Impacts In-Depth Assessment

Since CRM considered Cumulative and Secondary Impacts to be a "High Priority," an In-Depth Assessment was written.

In-Depth Resource Characterization:

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

DECZ:

1. *What are the three most significant existing or emerging cumulative and secondary stressors or threats within the coastal zone? Indicate the geographic scope of the stressor, i.e., is it prevalent throughout the coastal zone or are there specific areas that are most threatened? Stressors can be coastal development and impervious surfaces; polluted runoff; agriculture activities; forestry activities; shoreline modification; or other (please specify). Coastal resources and uses can be habitat (wetland or shoreline, etc.); water quality; public access; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.*

Delaware Estuary Coastal Zone			
	Stressor/Threat	**Coastal Resource(s)/Use(s) Most Threatened**	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Stressor 1	Urban runoff related siltation and flow variability	Aquatic habitat	Entire DECZ
Stressor 2	Legacy industrial contamination	Delaware River	Tidal portions of Delaware River
Stressor 3	Coastal development	Wetlands and forested land	Bucks and Delaware Counties

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

Results of DEP stream assessments within the coastal zone are shown below aggregated by impaired use, source, and cause:

DECZ	
Assessed streams	192 miles
Impaired streams	187 miles
Impaired use:	**Percent of assessed streams:***
Fish consumption	57.9%
Aquatic life	40.7%
Recreational	7.5%
Major sources of impairment:	**Percent of assessed streams:***
Urban runoff/Storm sewers	73.5%
Unknown	64.1%
Habitat modification	16.2%
Municipal point source	12.3%
Agriculture	5.9%
Major causes of impairment:	**Percent of assessed streams:***
PCB	57.8%
Siltation	29.8%
Other habitat alterations	29.6%

DECZ	
Water/Flow variability	26.9%
Nutrients	8.4%
Pathogens	7.5%
* Aggregated percentages may exceed 100% as reaches can be impaired for multiple uses, sources, and causes.	

97% of assessed streams in the DECZ have been found to be impaired, mainly for fish consumption and aquatic life uses under DEP's surface water quality monitoring and assessment program. Over 70% of this degradation is attributable to runoff from impervious surfaces and storm sewers, which impacts natural stream flow variability and siltation. Changes in natural hydrologic regimes, including bank erosion, incised channels, and minimized baseflow results in an unstable environment and limited habitat for macroinvertebrates, fishes, and other aquatic organisms. Increased erosion and siltation causes aggradation of sediments in excess of what streams can transport. Increased siltation results in smothering of streambed habitat for aquatic organisms. Climate change is anticipated to increase runoff and erosion in urban areas as storms increase in intensity and frequency. Short, heavy precipitation events will allow for less time for infiltration and increased stormwater amounts. Stream flows are expected to also become even more variable than existing flashy streams with increased floods and droughts anticipated with future climate change.

The majority of unknown sources of impairment are connected to Polychlorinated biphenyls (PCB) contamination resulting from legacy industrial operations. These man-made compounds were used extensively in electrical equipment prior to their ban in the late 1970s and are also created as a by-product in some manufacturing processes. In 2003, a Total Maximum Daily Load (TMDL) was developed for the tidal Delaware River for PCBs. Models found that nonpoint source runoff, point sources, and the mainstem Delaware River were principal sources of PCBs, as they bind to organic compounds. PCBs, in addition to other legacy contaminants, will continue to be a persistent water quality and human health issue in the DECZ. However, efforts underway since 2000 to clean up PCBs continue to make headway, including Pollution Minimization Plans (PMPs) required by the Delaware River Basin Commission. All 30 industrial and municipal PCB dischargers in PA's TMDL area have initiated PMPs and continue to decrease their loadings. Nonpoint source and PCBs attached to sediments in the river persist with re-suspension of sediments.

Coastal development is a significant threat to wetland and forested land and has contributed to significant habitat fragmentation. NOAA's C-CAP data was extracted by the DECZ coastal zone boundary and analyzed by county, as shown in the table below.

Summary of Natural Land Conversion in the Delaware Estuary Coastal Zone, Using NOAA C-CAP Data.			
	Delaware County Coastal Zone	Philadelphia Coastal Zone	Bucks County Coastal Zone
Natural land lost to development 2006-2010	13.8 acres (of 12,664 total acres)	13.6 acres (of 18,481 total acres)	149 acres (of 43,434 total acres)
Predominant land converted	• 60% deciduous forest • 24% palustrine forested wetland • 10% estuarine emergent wetland	• 34% deciduous forest • 21% unconsolidated shore • 16% grassland • 15% palustrine forested wetland	• 53% deciduous forest • 22% scrub/shrub • 14% palustrine forested wetland

Within the span of five years, 149 acres of natural land was developed within Bucks County and converted to low (40%), medium (29%), and high-intensity development (17%), in addition to developed open space (15%). In all DECZ coastal zone areas, deciduous forest experienced the most loss, followed by scrub/shrub, and palustrine wetlands. Areas of forest loss were generally spread evenly throughout the coastal zone. A brief analysis of selected sites using aerial photography found most loss was attributable to new residential, commercial, warehouse, and industrial structures, new and expanded parking lots, construction of water detention basins, in addition to construction of the new soccer stadium in Delaware County. Overall, development continues at a steady pace despite minimal population growth. Loss of unconsolidated shore in Philadelphia was due to changing water levels in artificial inland holding ponds. Small losses of natural areas from the build-up landscape of Southeast Pennsylvania should be minimized as these areas only make up 20% of the DECZ, as compared to 60% of the zone being developed. Impervious surfaces from these new developed areas increase stormwater runoff, as compared to natural areas, further aggravating siltation and flow variability discussed in Stressor #1.

LECZ:

1. *What are the three most significant existing or emerging cumulative and secondary stressors or threats within the coastal zone? Indicate the geographic scope of the stressor, i.e., is it prevalent throughout the coastal zone or are there specific areas that are most threatened? Stressors can be coastal development and impervious surfaces; polluted runoff; agriculture activities; forestry activities; shoreline modification; or other (please specify). Coastal resources and uses can be habitat (wetland or shoreline, etc.); water quality; public access; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.*

Lake Erie Coastal Zone			
	Stressor/Threat	Coastal Resource(s)/Use(s) Most Threatened	Geographic Scope (throughout coastal zone or specific areas most threatened)
Stressor 1	Phosphorus loadings/Harmful algal blooms (HABs)	Lake Erie drinking water supplies, livestock, recreational use, and aquatic organisms	Presque Isle Bay, Lake Erie, and small agricultural ponds
Stressor 2	Urban runoff	Water quality and aquatic habitat	Presque Isle Bay and its tributaries, Lake Erie and its tributaries to a lesser degree
Stressor 3	Malfunctioning septic and sewage systems	Water quality and Recreational access, including swimming and fishing	Lake Erie and its watersheds

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

Results of DEP stream assessments within the coastal zone are shown below aggregated by impaired use, source, and cause. As compared to the DECZ, streams are significantly higher quality.

LECZ	
Assessed streams	131 miles
Impaired streams	22 miles
Impaired use:	**Percent of assessed streams:***
Fish consumption	16.4%
Major sources of impairment:	**Percent of assessed streams:***
Siltation	17.5%
Nutrients	1.9%
Other habitat alterations	1.7%
Water/Flow variability	1.7%
Major causes of impairment:	**Percent of assessed streams:***
Agriculture	7.8%
Urban runoff/Storm sewers	6.2%
Small residential runoff	2.7%
Land development	2.5%
Municipal point source	1.8%
* Aggregated percentages may exceed 100% as reaches can be impaired for multiple uses, sources, and causes.	

Harmful algal blooms (HABs) are a re-emerging issue in the Lake Erie basin beginning in the late 1990s in the western basin and have been increasing in frequency and distribution in the central and eastern basin, including Presque Isle Bay. HABs are mainly attributed to warm waters and phosphorus loading, particularly soluble reactive phosphorus found in sewage and fertilizers. Non-point sources via tributaries that enter the Lake are believed to contribute the largest portion of loadings, especially during periods of stormwater runoff. This is a concern for the LECZ as 10% of streams were assessed to be impaired by either agriculture or residential runoff. HABs pose a risk to human health through drinking water contamination and recreational contact, including its associated economic revenue generated from tourism. HABs in small farm ponds have resulted in numerous livestock and dog illnesses and deaths. They can also impact fish communities by decreasing levels of dissolved oxygen and degrade near shore and wetland habitats. Climate change is anticipated to exacerbate HABs as water temperatures continue to increase, ice cover decreases, and stormwater runoff that delivers the majority of the phosphorus to the lake will increase with more severe and frequent storm events.

Urban runoff negatively impacts streams in the LECZ including portions of tributaries to Presque Isle Bay, the Walnut Creek Watershed, and many other unnamed tributaries. Untreated urban runoff in the LECZ can be attributed to large, contiguous impervious areas with little stormwater management infrastructure. As populations in the LECZ grew through the 1900's, these impervious areas created an environment where the volume of water entering streams after a significant rainfall caused stream bank and ravine erosion, stream scour and streambed down cutting, and sediment laden water to enter Lake Erie. Currently, urban runoff increases sedimentation in Presque Isle Bay and the near shore coastal zone, it reduces aquatic habitat through high volume flows, increases water treatment costs for public water treatment plants, increases beach closings of beaches along Presque Isle State Park, and has been the source of impairment for many LECZ stream reaches.

There are 179 active water discharges within the state's Lake Erie watershed registered in Pennsylvania's Environment Facility Application Compliance Tracking System, not including residential septic systems. 22 of these discharges are municipal sewage treatment systems, 154 are industrial, and 13 are commercial discharges. Malfunctioning systems contribute bacteria and other pathogens, nutrients, improperly disposed household chemicals, pharmaceuticals, and other contaminants. Most notable is the impact on the state's 10 permitted beaches along the lake, which include 9 beaches on Presque Isle and Freeport Beach in North East Township. According to the National Resources Defense Council, 14% of samples taken at these monitored beaches exceeded the Beach Action Value in 2013 with Freeport Beach experiencing the highest exceedance rate of 34%. Trends since 2009 show a slight increase of samples exceeding the national standard. The CMP has provided grant assistance to the Erie County Department of Health to research and develop a beach monitoring and notification program. 2006 data from the Erie County Department of Health found poor correlations between bacterial levels and amount of rainfall in Trout Run and small streams in urbanized areas of Erie and Millcreek Township. These elevated levels during dry periods suggest local or point sources of contamination, rather than stormwater sources. The 2008 Lake Erie Rivers Conservation Plan recommends increased attention to treatment plant compliance inspections and the research on the cumulative impact of permitted discharges on water quality.

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

DECZ and LECZ:

Emerging Issue	Information Needed
Pharmaceuticals, Hormones, and other wastewater contaminants	What is being removed by sewage treatment systems and what is being discharged into the environment; Research on human health threats and impacts on aquatic organisms
Microplastics	Attachment of persistent pollutants onto plastic particles; Impacts on aquatic organisms: Amounts passing through sewage treatment systems
Reliable climate change predictions and impacts on current stressors	Reliable SLR/lake level change, flooding, extreme weather models to predict affected areas; Strategies to address impacts of climate change

In-Depth Management Characterization:

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

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

Management Category	**Employed by State or Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Methodologies for determining CSI impacts	Y	N	Y
CSI research, assessment, monitoring	Y	Y	Y
CSI GIS mapping/database	Y	N	N
CSI technical assistance, education and outreach	Y	Y	Y
Other (please specify)			

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

Methodologies for determining CSI impacts

Water Quality Assessment Methodology
In 2013, PA DEP finalized their updated assessment protocols used for the state's water quality management programs as required under section 303(d) of the Federal Clean water Act. Several new field sampling protocols were added or revised. This was not a 309- or CZM-driven change. This update should provide more accurate evaluation of impaired streams.

CSI research, assessment, monitoring

Technical Report for the Delaware Estuary and Basin
This report was published in 2012 by the Partnership for the Delaware Estuary and assesses the status and trends of indicators used to gauge environmental conditions. This was not a 309- or CZM-driven change. PDE's established 50 key indicators are an extremely valuable approach to evaluating and prioritizing the status of the Bay, including nutrients, metals, PCBs, pharmaceuticals and personal care products,

Updated PCB and pH Water Quality Criteria by Delaware River Basin Commission
In 2013, DRBC adopted updated water quality criterion of 16 picograms/liter for polychlorinated biphenyls (PCBs) and 6.5 to 8.5 criteria range for pH in the Delaware Estuary and Bay. With DRBC's adoption of revised PCB criterion, it is anticipated that the U.S. EPA will establish new TMDLs. These updated values are more uniform and based upon the most current methodology and scientific data available. The updated PCB criterion will ensure protection of human health from the contaminant's carcinogenic effects. This was not a 309- or CZM-driven change.

Presque Isle Bay Watershed Plan and Lake Erie Watershed Integrated Water Resources Management Plan
Pennsylvania Sea Grant has completed several studies and a geospatial-based model for the Presque Isle Bay Watershed Restoration, Protection, and Monitoring Plan. Relevant studies consider sediment and water quality conditions in tributaries, in addition to invertebrate and fish communities. These efforts are currently being expanded to the entire Pennsylvania Lake Erie watershed. This will allow for identification of monitoring, restoration, and protection actions and needs. This was not a 309-driven change.

CSI technical assistance, education and outreach

PA VinES Program
The Pennsylvania VinES Program, Vested in Environmental Sustainability, is a newly developed program with a mission to foster and promote concepts of sustainability and environmental consciousness through education, outreach, and self-assessment to reduce conflicts between viticulture and water quality in the Lake Erie basin. Major goals of the program include increasing watershed health, improving education and outreach opportunities for the Viticulture and Grape Growing industry, increasing partnerships and collaboration for all industry sectors, and increasing environmentally sustainable production and processing practices for all industry sectors to reduce water quality impacts to the Lake Erie basin.

PENNVEST Nonpoint Source Funding Program
In 2010 DEP partnered with the Pennsylvania Infrastructure Investment Authority (PENNVEST) to develop a funding program for "shovel ready" green infrastructure development projects. This new loan and grant program will address and help minimize nonpoint source pollution specifically related to urban runoff and brownfields. This was not a 309-driven change.

State implementation of Clean Water Act Section 303(d) Vision and Goals
DEP is working to implement the first of EPA's six new goals, Engagement, and is reaching out to county and local government officials, watershed groups, and other stakeholders in watersheds throughout the state. This was not a 309-driven change.

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

Technical Report for the Delaware Estuary and Basin
This report was published in 2012 by the Partnership for the Delaware Estuary and describes status and trends of indicators used to gauge environmental conditions. While the entire river basin is considered, it does provide an accurate assessment of the resource. Forests, wetlands, and other natural areas are slightly below average and are on the decline. Water pollution, especially nutrients, continue to remain high compared to other estuaries, but are continually improving since historic lows during the industrial revolution. Major issues continue to remain with nonpoint source and legacy pollutants, which still need to be addressed. Wetlands as an indicator are assessed slightly below average and are on the decline due to increasing development pressures, in addition to issues with sea level rise.

River and watershed conservation plans were a significant priority for both DEP and DCNR during the past 15 years. Those plans concluded with specific recommended actions for the geographic area of concern. Tracking which recommended actions have been implemented, including on-the-ground projects that implement Best Management Practices

(BMPs), has for the most part not been conducted. This is a gap, mentioned by some key stakeholders, that remains for watershed managers and management groups.

Identification of Priorities:

1. *Considering changes in cumulative and secondary impact threats and management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve the effectiveness of its management effort to better assess, consider, and control the most significant threats from cumulative and secondary impacts of coastal growth and development. (Approximately 1-3 sentences per management priority.)*

   Management Priority 1: Expand DECZ

   Description: Expansion of the coastal zone will allow CRM to better address water impairments from further upstream.

   Management Priority 2: Examine climate change impacts on cumulative and secondary impacts and seek adaptation and resiliency measures that can be planned for and implemented.

   Description: Green infrastructure and contiguous/connected habitat can help mitigate the negative impacts of cumulative and secondary impacts. Climate changes occurring and predicted to occur will exacerbate traditional cumulative and secondary impacts. Addressing cumulative and secondary impacts will help to mitigate hazards and provide resiliency associated with climate change.

   Management Priority 3: Assess role of Coastal Nonpoint Pollution Control Program in the CRM program.

   Description: Given lack of dedicated CNPP funding, determine priority of nonpoint source plan goals within the framework of the existing CRM program. Potentially pursue better integration of CNPP program with CRM, including improved coordination with state 319 program, review and revision of management measures, and five-year plan update.

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

Priority Needs	**Need?** (Y or N)	**Brief Explanation of Need/Gap**
Research	N	
Mapping/GIS	Y	Better mapping and tracking of implementation projects that support recommendations generated in watershed management plans.
Data and information management	N	
Training/Capacity building	N	
Decision-support tools	N	
Communication and outreach	Y	More communication and outreach needed
Other (Specify)	Y	Begin or increase implementation efforts where studies have been completed.

Enhancement Area Strategy Development:

1. *Will the CMP develop one or more strategies for this enhancement area?*
   Yes __X__
   No _____

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

   Cumulative and secondary impacts have had substantial impacts on the water resources of the Delaware Estuary and Lake Erie and are connected to concerns with other enhancement areas such as Coastal Hazards, Wetlands, and Ocean and Great Lakes Resources. Climate change exacerbates problems associated cumulative and secondary impacts. Many stakeholder concerns can be traced back to cumulative and secondary impacts. The Cumulative and Secondary Impacts enhancement area will be partially addressed by both strategies being proposed by CRM.

Special Area Management Planning

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

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states and territories.) Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

Resource Characterization:

1. *In the table below, identify geographic areas in the coastal zone subject to use conflicts that may be able to be addressed through a special area management plan (SAMP). This can include areas that are already covered by a SAMP but where new issues or conflicts have emerged that are not addressed through the current SAMP.*

   This table contains unique geographic areas where Special Area Management Planning was considered. Ultimately CRM decided several of the objectives suggested as part of a SAMP can be addressed through strategies which target specific enhancement areas.

Geographic Area	Opportunities for New or Updated Special Area Management Plans
	Major conflicts/issues
Delaware County Delaware Estuary Shoreline	The Delaware County waterfront is mostly a working waterfront providing an economic foundation for the area. There is also a goal of providing meaningful access and reconnecting local residents to their shoreline. As county and municipal planners and officials seek to connect to and participate with local and regional greenway trails, they are faced with unique challenges and hurdles. Providing green connections around active facilities and back to the waterfront where appropriate and dealing with post-industrial

Geographic Area	Opportunities for New or Updated Special Area Management Plans
	contamination for access and/or ecological restoration projects is specifically an obstacle/challenge mentioned by local stakeholders. Many unknowns are present when dealing with potentially contaminated properties and most brownfield efforts focus specifically on economic redevelopment. It is difficult to receive funding for access and ecological restoration projects when the costs cannot be accurately estimated without considerable expense in site assessment, including sampling and analysis. Better support and coordination for potential projects involving green infrastructure, public access, and ecological restoration that involve potential contamination issues is a need in other parts of the DECZ as well.
Lake Erie Bluffs and Shoreline	Development of a Lake Erie Bluffs and Shoreline SAMP was part of the 1997 309 Assessment and Strategy. That effort included funding studies that focused on bluff erosion issues and shoreline protection structures. An updated SAMP for the Lake Erie Bluffs and Shoreline could build upon prior efforts and better define specific policies and technical guidance. A SAMP for the western municipalities, where bluff recession is the greatest and potentially exacerbated by Conneaut Harbor Seawalls, may also be a specific geographic area that could benefit from a new or updated SAMP.
Lake Erie Watershed Agricultural Based BMPs	Hypoxia and Harmful Algal Blooms continue to impact Lake Erie and agricultural run-off is one factor impacting these lake responses. A SAMP addressing nutrients, herbicides, pesticides, and coliforms in a specific geographic area with majority agricultural use could be considered.

Management Characterization:

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

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

* = Lake Erie Bluff and Shorelines

The addition of a Special Area Management Plan Process to CRM's program plan was approved through Routine Program Change VIII on August 13, 1998. The SAMP process can be found in Chapter 3, page 42, of CRM's Program Guidance Document. Development of the process for identifying and implementing a SAMP was funded through Pennsylvania's February 1997 Section 309 strategy.

The 1997 Section 309 strategy also included development of a Lake Erie Bluffs and Shoreline SAMP. Technical studies which specifically addressed potential conflicts in this area were conducted and the coastal hazards and public access enhancement areas were strengthened.

The 2006 Section 309 strategy included integrating coastal Special Area Management Planning processes with the statewide Critical Area Resource Plans processes. Working with the Delaware River Basin Commission and the Montgomery County Planning Commission, CRM helped to produce a SAMP for the Upper Wissahickon Creek watershed. The final report was published in June 2008 and concluded with recommendations for specific implementation steps. This was developed using Section 309 funds and was supplemented by Section 306 funds (2005-PS.06 and 2006-PS.07).

Enhancement Area Prioritization:

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

High	
Medium	
Low	X

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

CRM has decided to make SAMPs a low priority and not pursue a strategy specific to developing a new SAMP. The stakeholder comments received highlight specific geographic areas and concerns that could be addressed through the development of a SAMP. Ultimately, CRM felt that many of the concerns mentioned could be addressed through strategies that address related enhancement areas or through Section 306 funding. Some concerns will be at least partially addressed by the strategies presented in this Section 309 Assessment and Strategy. The potential SAMPs listed in the Resource Characterization table above will be reconsidered during the next Section 309 assessment. The comments will also be used to inform larger CRM program priorities.

Six out of thirty-five stakeholders considered SAMPs to be of high priority. Three of the high priority responses involved planning for redevelopment along the DECZ waterfront with a focus on mixed land use. In addition to the general concept of mixed land use, the specific challenges and obstacles of balancing current waterfront industrial uses and past industrial uses with sustainable zoning and planning that includes more public open space and green infrastructure. Brownfields redevelopment for public open space, ecological restoration, or green infrastructure

presents difficult challenges in both planning and implementation. How to better address potential contamination issues when planning or implementing public access and ecological restoration projects is a continuing management gap that deserves further consideration.

A fourth SAMP suggestion was to complete a database of existing watershed plans and the steps that have (and have not) been taken to implement them. This comment also appeared outside of Special Area Management Planning enhancement area. A lack of implementation of recommendations developed in watershed plans, as well as a lack of tracking of implementation steps and projects that were completed, was a gap identified by multiple stakeholders. While a SAMP could be developed for a specific geographical area, this comment also applies to the entire area of both coastal zones (as well as a state-wide concern).

The fifth high priority SAMP comment involved forming a task group of natural resource and agriculture representatives to develop comprehensive best management practices for the viticulture industry in the Lake Erie Watershed. While more prevalent in the eastern portion of the Lake Erie Coastal Zone, grape culture is present throughout the watershed. CRM felt it would be difficult to define a specific geographic area within the watershed without excluding some grape facilities and this project could be better implemented on a watershed wide basis. A watershed based initiative, Vested in Environmental Sustainability (VinES), has started with some preliminary meetings. CRM supports the current effort and can help fund the effort in the future using Section 306 funding. Additional information on VinES is included in the Cumulative and Secondary Impacts section.

The sixth high priority SAMP comment addressed the conservation of water in the Lake Erie watershed and ensuring use only within the basin. While not a program priority, CRM recognizes the importance of water conservation. The primary responsibility for water conservation efforts lies within DEP's Bureau of Safe Drinking Water, Division of Planning and Conservation. CRM has helped to support some efforts related to water conservation, and helps to fund the Office of Great Lakes in DEP's Northwest regional office. The DEP Office of Great Lakes is well suited to address water conservation and the enforcement of existing Great Lakes Water Quality agreements that generally prohibit water withdrawal for uses outside the Great Lakes watershed. CRM, working with the Office of Great Lakes, will explore ways to more efficiently network and utilize the resources of the Bureau of Safe Drinking Water, Division of Planning and Conservation regarding water conservation efforts within the watershed, but a SAMP will not be a part of the current strategy.

Ocean and Great Lakes Resources

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

PHASE I (HIGH-LEVEL) ASSESSMENT: *(Must be completed by all states and territories.) Purpose: To quickly determine whether the enhancement area is a high priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

Resource Characterization:

1. *Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW), indicate the status of the ocean and Great Lakes economy as of 2011, as well as the change since 2005, in the tables below*

Data from *Economics: National Ocean Watch*, DECZ and LECZ Combined:

Status of Ocean and Great Lakes Economy for Coastal Counties (2011)				
	Establishments (# of Establishments)	**Employment** (# of Jobs)	**Wages** (Millions of Dollars)	**GDP** (Millions of Dollars)
Living Resources	139	852	21.92	71.29
Marine Construction	ND	ND	ND	ND
Marine Transportation	202	8808	428.51	799.35
Offshore Mineral Extraction	ND	ND	ND	ND
Tourism & Recreation	1991	32020	691.03	1548.46
All Ocean Sectors	2395	42987	1224.17	2617.66

ND = No data available. The number is not "0" but the data is suppressed for legal reasons.

Data from *Economics: National Ocean Watch*, DECZ and LECZ Combined:

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2011/2010)				
	Establishments (% change)	**Employment** (% change)	**Wages** (% change)	**GDP** (% change)
Living Resources	-11.5	-29.1	-28.4	-20.8
*Marine Construction	0.0*	6.0*	22.6*	5.5*
Marine Transportation	14.8	-.05	15.0	41.4
*Offshore Mineral Extraction	-10.3*	-25.1*	98.9*	107.6*
Tourism & Recreation	13.8	14.64	27.1	23.2
All Ocean Sectors	11.4	10.0	21.6	32.5

(*****) – Indicates 2010 data was used for the comparison. All other values are 2011 data. Marine Construction and Offshore Mineral Extraction data for 2011 were suppressed for legal considerations.

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

DECZ:

Significant Changes to Ocean Resources and Uses in the Delaware Estuary Coastal Zone	
Resource/Use	**Change in the Threat to the Resource or Use Conflict Since Last Assessment** (↑, ↓, -, unkwn)
Resource	
Benthic habitat (including coral reefs)	-
Living marine resources (fish, shellfish, marine mammals, birds, etc.)	↑, increased threat from invasive species
Sand/gravel	-
Cultural/historic	-
Other (please specify)	-
Use	
Transportation/navigation	↓

Significant Changes to Ocean Resources and Uses in the Delaware Estuary Coastal Zone	
Resource/Use	**Change in the Threat to the Resource or Use Conflict**
Offshore development	-
Energy production	-
Fishing (commercial and recreational)	-
Recreation/tourism	-
Sand/gravel extraction	-
Dredge disposal	-
Aquaculture	-
Other (please specify)	

LECZ:

Significant Changes to Great Lakes Resources and Uses in the Lake Erie Coastal Zone	
Resource/Use	**Change in the Threat to the Resource or Use Conflict Since Last Assessment** (↑, ↓, -, unkwn)
Resource	
Benthic habitat (including coral reefs)	↓, decreased interest in wind energy development
Living marine resources (fish, shellfish, marine mammals, birds, etc.)	↑, threats from new introductions of aquatic invasive species
Sand/gravel	-
Cultural/historic	-
Other (please specify)	-
Use	
Transportation/navigation	-
Offshore development	-
Energy production	-
Fishing (commercial and recreational)	-
Recreation/tourism	↑, HAB and beach closures
Sand/gravel extraction	-
Dredge disposal	-
Aquaculture	-
Other (please specify)	-

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

Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources												
Resource	**Major Reasons Contributing to Increased Resource Threat or Use Conflict** (Note All that Apply with "X")											
	Land-based development	Offshore development	Polluted runoff	Invasive species	Fishing (Comm & Rec)	Aquaculture	Recreation	Marine Transportation	Dredging	Sand/Mineral Extraction	Ocean Acidification	Other - Shoreline erosion
DECZ Living resources	X			X								
LECZ Living Resources			X	X								
LECZ Recreation / Tourism			X									

The ecological impacts of impervious cover in the DECZ are documented in the Cumulative and Secondary Impacts section of this document. The presence of an establishing population of *Dreissena sp.* mussels in Conowingo Pond on the lower Susquehanna River in Pennsylvania increases the threats to the freshwater tidal Delaware Estuary. Recent discoveries of large populations of native freshwater mussels, including species thought to be extirpated, make the Zebra/Quagga mussel threat even more concerning. Also of note, the northern snakehead has become well established within the estuary during this past assessment period.

The Asian carp threat continues to build on Lake Erie, with the potential to significantly disrupt food webs and impact tourism.

Phosphorous loadings in Lake Erie threaten living resources with hypoxic dead zones. More recently, harmful algal blooms (HABs) have become more common in Lake Erie in general and within Pennsylvania's Presque Isle Bay specifically – threatening recreation and tourism.

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

Delaware River Main Channel Deepening Project

The long anticipated project to deepen the Delaware River Federal Navigation Channel from 40 to 45 feet from Philadelphia to the mouth of Delaware Bay has been moving forward this assessment period. Construction began with a reach in Delaware in 2010 and moved into Pennsylvania in 2011, where dredging continues. It is anticipated that the main channel

deepening project will be completed in 2017. The Philadelphia Regional Port Authority is serving as the local sponsor for this Army Corps of Engineers project. The project aims to keep the regional ports competitive by accommodating larger ships. Dredge material is being placed into five existing federal confined upland dredge disposal facilities. ACOE documents indicate that 50 years of dredge material capacity exist at the existing federal facilities. Reports, environmental assessments, fact sheets and additional information can be found on the ACOE webpage: http://www.nap.usace.army.mil/Missions/Factsheets/FactSheetArticleView/tabid/4694/Article/490804/delaware-river-main-channel-deepening.aspx. For more information on the Philadelphia Regional Port Authority visit: http://www.philaport.com/. An interesting and informative video on the ports of Philadelphia can be found at https://www.youtube.com/watch?v=k1b-aOOlKp0&feature=youtu.be

Management Characterization:

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

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

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

Statewide:

Pennsylvania Aquatic Invasive Species Rapid Response Plan
Pennsylvania CRM included the addition of an Ocean Resources Policy Area in our Program Guidance Document through Routine Program Change Number 10 (2003). This was a 309- driven change and included CRM's efforts to address and better manage "aquatic nuisance species." CRM has continued to support efforts to prevent the introduction of new species and the spread of existing species in to or out of the coastal zones. CRM seeks to accomplish these goals by working with our networked partners and has supported the development of management plans and interagency coordination through previous 309 efforts. In September 2014 the Pennsylvania Invasive Species Council approved the Rapid Response Plan and Procedures for Responding to Aquatic Invasive Species in Pennsylvania. CRM, working with Pennsylvania Sea Grant, contributed to the development of this plan through 309 efforts. The plan can be found on the Pennsylvania Sea Grant website: http://www.paseagrant.org/wp-content/uploads/2012/09/PA-Rapid-Response-Plan-7_21_2014_Designed.pdf.

iMapInvasives Database
An important step in the management of invasive species in Pennsylvania is the development of the Pennsylvania iMapInvasives database and homepage: (http://www.naturalheritage.state.pa.us/paimap.aspx). This GIS based tool will not only help track invasive species and identify new introductions, it serves as a training and information clearinghouse for agency staff, private citizens, and land managers throughout the state. The database is part of the Pennsylvania Natural Heritage Program. New York, Florida, Maine, Oregon, and Vermont also have iMapInvasive homepages.

DECZ:

Comprehensive Conservation Management Plan for the Delaware Estuary
The Partnership for the Delaware Estuary (PDE) manages the coordination of the Comprehensive Conservation Management Plan through the Estuary Implementation Committee. Updates to the plan were approved in 2014: http://delawareestuary.org/plan. PDE also developed a 5-year strategic plan (2013-2018) to help fulfill the goals of the plan. During this assessment period, the Partnership for the Delaware Estuary began discussing with partners, including CRM, more significant updates to the Comprehensive Conservation and Management Plan for the Delaware Estuary. It is anticipated that the plan will be significantly updated during the next assessment period – with a current completion goal of 2018.

Delaware Estuary Regional Sediment Management Plan
In 2009 a Delaware River Basin/Estuary Sediment Management Workgroup (RSMW) was formed. The RSMW consists of numerous Federal, State, Regional, NGO, and commercial entities. On August 13, 2013 the RSMW published the Final Delaware Estuary Regional Sediment Management Plan. This plan, along with the white pages attached as appendices, provides an extremely comprehensive summary of sediment quantity and dynamics, sediment quality, dredging and dredged material management, and restoration and beneficial use of

material. The broad stakeholder participation and publication of this document is a significant step in sustainable management of dredged material that benefits both the environment and economy. The plan includes specific problem statements and recommended actions. Pennsylvania CRM did not directly participate in the RSMW, DEP staff from southeast regional office did participate. CRM has supported and may continue to support efforts directly related to the action items identified in the plan. CRM participated in calls and discussions relative to beneficial use of dredge material and developing a regional approach to contaminant standards for similar uses. Contaminant standards for aquatic uses of dredged material is a technically complicated issue and ultimately may remain a site-specific determination.

Mid-Atlantic Regional Council on the Ocean (Mid-Atlantic Regional Planning Body)
In 2010, a Presidential Executive Order established a National Ocean Policy (NOP) to guide the protection, maintenance, and restoration of America's oceans and coasts. The NOP requires federal agencies to coordinate regional ocean planning with states, tribes, and stakeholders. The NOP also calls for the creation of Regional Planning Bodies (RPB's) to coordinate and implement regional ocean planning by states and regional entities, and engage stakeholders and technical experts at every key step. Accordingly, DEP, via the CRM program, agreed to be involved as a voluntary, regional partner state in order to account for our vital interests including the Port of Philadelphia, water quality, natural resources/habitat/living resources in the Delaware Estuary region.

LECZ:

2012 Great Lakes Water Quality Agreement Amendments
The Great Lakes Water Quality Agreement is a binational agreement to cooperate on the protection of water quality and ecological resources of the Great Lakes. The Great Lakes Water Quality Agreement of 2012 was ratified by the governments of Canada and the United States on February 12, 2013. More information on the Great Lakes Water Quality Agreement is found in the Cumulative and Secondary impacts section.

Exploration of National Marine Sanctuary in Erie County
Local officials have begun to explore the concept of a National Marine Sanctuary in Pennsylvania's portion of Lake Erie, an area sometimes referred to as the Erie quadrangle. Local government official have had discussions with NOAA officials and have hosted local public information sessions. At this time the effort is still in an exploratory phase.

Pennsylvania Lake Erie Harmful Algal Bloom Task Force
Harmful algal blooms (HABs) are caused by a cyanobacteria, or blue-green algae. While detected in Ohio previously, Pennsylvania first detected a bloom of the toxic algae in Presque Isle Bay in 2013. Presque Isle State Park forms the northern, lakeward border of Presque Isle Bay, and recreational restrictions and health advisories became an immediate concern. The response was to form a diverse local task force, the Pennsylvania Lake Erie Harmful Algal Bloom Task Force to develop a monitoring and response strategy including program design and techniques for algae monitoring. DEP and CRM has taken a lead role working with the task force. The monitoring strategy was implemented in 2014 and will grow in 2015 to include real

time data collection from a new buoy in Presque Isle Bay that includes an algae sensor. The existing monitoring buoy on the lakeward side of Presque Isle will be upgraded to include an algae sensor.

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

DECZ:

Comprehensive Ocean Management Plan	State Plan	Regional Plan
Completed plan (Y/N) (If yes, specify year completed)	N	Y Comprehensive Conservation and Management Plan for the Delaware Estuary, 1996
Under development (Y/N)	N	Y
Web address (if available)	-	http://delawareestuary.org/plan
Area covered by plan	-	PA, NJ, and DE portions of Delaware Estuary

LECZ:

Comprehensive Great Lakes Management Plan	State Plan	Regional Plan
Completed plan (Y/N) (If yes, specify year completed)	N	Y Lake Erie Lakewide Management Plan
Under development (Y/N)	N	Y (continued development)
Web address (if available)	-	http://www.epa.gov/greatlakes/glwqa/
Area covered by plan	-	US and Canadian waters of Lake Erie

Enhancement Area Prioritization:

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

High	
Medium	X
Low	X

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

Ocean and Great Lakes Resources cover a broad area and are critical to the economies and quality of life of both coastal zones. Ocean and Great Lakes Resources will remain a high priority for the CRM program even though the enhancement area was selected as only a medium priority for a program change. Existing policies are adequate for supporting efforts related to threats to ocean and Great Lakes resources although more resources to implement policies seems warranted. Additional funding, through CRM or other sources, would benefit CRM and partners in better understanding and managing threats to resources associated with climate change, ecological transformations, nutrient enrichment, littoral drift, dredge management and disposal (including beneficial reuse), fisheries management, and others. The Ocean and Great Lakes Resources enhancement area interacts with all of the other enhancement areas, and CRM's proposed strategies will partially touch on issues associated with this enhancement area even if it is not specifically identified. By examining each program policy area for climate change implications, new threats to Ocean and Great Lakes Resources will be considered.

Only 26% of total stakeholder respondents indicated Ocean and Great Lakes Resources to be a "high" priority for program changes in the 309. Only 0.05% of DECZ respondents considered it a "high" priority, 45% of LECZ stakeholders considered it a high priority. Individual comments regarding Ocean and Great Lakes Resources included invasive species, micro plastics and micro beads, emerging contaminants, and nutrients. Cumulative and secondary impacts are a significant driver for threats related to Ocean and Great Lakes Resources, and these specific concerns are addressed in more detail in the Cumulative and Secondary Impacts section of this document.

Energy and Government Facility Siting

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

Resource Characterization:

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

Energy facility and energy-related activities have been significant during this reporting period, within Pennsylvania generally and specifically within each individual coastal zone. The booming energy economy within Pennsylvania will continue, potential impacts to the economy and environment are significant, and the issue will undoubtedly continue to receive significant attention.

DECZ:

Status and Trends in Energy Facilities and Activities in the Delaware Estuary Coastal Zone				
	Exists in CZ		**Proposed in CZ**	
Type of Energy Facility/Activity	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)
Energy Transport				
Pipelines	Y	- (existing were modified)	Y	↑
Electrical grid (transmission cables)	Y	-	N	-
Ports	Y	↑	N	-
Liquid natural gas (LNG)	N	-	N	↓
Other (please specify)				
Energy Facilities				
Oil and gas	Y	-	Y	↑
Coal	N	↓	N	-
Nuclear	N	-	N	-
Wind	N	-	N	-
Wave	N	-	N	-
Tidal	N	-	N	-
Current (ocean, lake, river)	N	-	N	-

Status and Trends in Energy Facilities and Activities in the Delaware Estuary Coastal Zone				
	Exists in CZ		Proposed in CZ	
Type of Energy Facility/Activity	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)
Hydropower	N	-	N	-
Ocean thermal energy conversion	N	-	N	-
Solar	Y	↑	Y	(small scale)
Biomass	N	-	N	-
Other (Biogas)	Y	↑	N	-

DECZ

Pennsylvania's Delaware Estuary Coastal Zone (DECZ) has been a keystone refining center for the northeast since the beginning of petroleum refining. Although the DECZ does not contain shale energy reserves, the shale energy boom in Pennsylvania has impacted the energy facilities present along the tidal Delaware and Schuylkill Rivers. Similar to other parts of the northeast, the DECZ has seen a partial transition away from conventional oil refining as well as an increased use of domestic crude over foreign crude for refining. The previously existing transportation infrastructure and port facilities have transitioned to accommodate the oil, gas, and gas liquids being produced from shales in other parts of the state and country. This transition has been vital to the economy of the DECZ, as jobs related to traditional refining may have been lost without the increased domestic supply for both energy and industrial uses.

Pipelines

Pipeline activities include the Mariner East 1 project which involved reversing flow from refined products heading west to natural gas liquids heading east to Marcus Hook. Mariner East 2 is a proposed pipeline that would be constructed immediately parallel to the existing Mariner East 1 pipeline and would dramatically increase the amount of natural gas liquids flowing to Marcus Hook. Thousands of miles of new gathering lines and pipelines will be built to accommodate Marcellus Shale gas and related products. Additional pipeline construction projects, which may be smaller local projects, are anticipated during the next assessment period.

Exelon's Eddystone Generating Station

Exelon's Eddystone Generating Station retired its two coal operated steam boiler-turbine generators in 2012. The generating station continues to produce energy using either natural gas or fuel oil, depending on market prices.

The Eddystone Rail Facility

The Eddystone Rail Facility is a new energy port facility operating on a former portion of the Eddystone Generating Station. The facility is designed to be a trans-shipment facility receiving crude oil by rail and transferring to barge for delivery to Philadelphia-area refineries. The facility began operating in Spring, 2014.

Marcus Hook – MarkWest Energy Partners L.P
Sunoco Logistics and MarkWest Energy Partners developed a processing plant for Marcellus gas and liquids on the site of a former Sunoco refinery. The Marcus Hook area, with infrastructure and related businesses in place, sees itself as an energy hub that can facilitate new industries that can take advantage of the wet gas and other petroleum based products.

Trainer – Conoco/Phillips to Delta Airlines/Monroe Energy
In 2012 Delta Airlines purchased the previous Conoco/Phillips 66 refinery in Trainer to begin refining jet fuels and other products. Once dominated by foreign crude, the refinery now uses more domestic supplies such as the Bakken shale from North Dakota.

Philadelphia Energy Solutions
This refinery is currently considered the largest refinery complex on the U.S. East Coast at 335,000 barrels per day, and the 10th largest refinery in the U.S. It is also the longest continuously operating refinery on the east coast. Philadelphia Energy Solutions was formed in 2012 to continue refining operations at the former Sunoco refinery.

Biogas
Philadelphia Water Department partnered to construct a 43 million kWh per year biogas cogeneration facility at its Northeast Water Control Plant.

Solar Energy
The Philadelphia Water Department installed a 60,000 square foot 250-kilowatt photovoltaic facility at the Southeast Water Pollution Control Plant.

LECZ:

Status and Trends in Energy Facilities and Activities in the Lake Erie Coastal Zone				
	Exists in CZ		**Proposed in CZ**	
Type of Energy Facility/Activity	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)
Energy Transport				
Pipelines	Y	-	N	-
Electrical grid (transmission cables)	Y	-	Y	↑
Ports	Y	-	N	-
Liquid natural gas (LNG)	N	-	N	-
Other (please specify)				
Energy Facilities				
Oil and gas	Y	unknown	?	Unknown
Coal	N	-	N	-
Nuclear	N	-	N	-
Wind	N	-	N?	-

Status and Trends in Energy Facilities and Activities in the Lake Erie Coastal Zone				
	Exists in CZ		Proposed in CZ	
Type of Energy Facility/Activity	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unkwn)
Wave	N	-	N	-
Tidal	N	-	N	-
Current (ocean, lake, river)	N	-	N	-
Hydropower	N	-	N	-
Ocean thermal energy conversion	N	-	N	-
Solar	N	-	N	-
Biomass	N	-	N	-
Other (please specify)				

LECZ:

Lake Erie Connector

The Lake Erie Connector is a proposed 73 mile electricity transmission cable running under the bed of Lake Erie from Ontario to Pennsylvania. The project developer, ITC Holdings Corps, is hoping to submit permit applications in 2015, begin construction in 2016, and be operational by 2019.

HERO BX Biodiesel

Lake Erie Biofuels changed its name to Hero BX in 2009. Hero BX has the capacity to produce about 50 million gallons annually and was by far Pennsylvania's largest producer. Despite an industry-wide decline in biofuels manufacturing, HERO BX continues to operate at its Erie, PA facility.

Gas wells

The Lake Erie Coastal Zone and Lake Erie watershed have numerous conventional gas wells. During this assessment period, unconventional wells (fracking) targeting the Utica Shale were considered within the coastal zone. The project is no longer moving forward, but it is possible that unconventional wells may be proposed within the coastal zone and/or watershed during the next assessment period.

Wind Energy

During this reporting period the momentum for developing wind energy in Lake Erie subsided substantially. Costs associated with long transmission seem to be one technical obstacle. Without grants/subsides these projects do not seem financially viable under current technology and conditions. In June, 2014 it was announced the Lake Erie Energy Development Corporation was not selected as one of the three Department of Energy "Advanced Technology Demonstration Projects" for a project located in eastern Ohio's portion of Lake Erie. This project continues to work on completing engineering and other studies, and could be very informative in Pennsylvania's Lake Erie wind energy future.

During this assessment period a commercial wind farm development was proposed in North East Township that would have been partially within the coastal zone. After much local debate, plans for the wind farm development were dropped, at least temporarily. Winds along the Lake Erie shoreline are favorable, and wind farm development remains a possibility for Lake Erie and the Lake Erie coastal areas.

Management Characterization:

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

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

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

None of the following management changes were 309 or CRM driven. CRM has embarked on mapping the resources of Lake Erie in an effort to supply a decision support tool for project planners and reviewers. In addition to mapping known resources, data gaps where additional research and information is needed have been identified. CRM, working with partners, is seeking ways to acquire data to fill the identified gaps. These efforts will continue into the next assessment period. If regional Marine Spatial Planning moves forward, the information gained could be used to support those efforts.

The Pennsylvania Energy Development Plan
The Pennsylvania Energy Development Authority released the most recent version of the Pennsylvania Energy Development Plan on October 16, 2014

(http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-102875/0120-BK-DEP4454%20combined.pd). This plan represents an update to the 2008 Energy Development Plan.

Gas and Hazardous Liquids Pipelines Act ("Act 127" of 2011)
This new law became effective February 20, 2012. The primary purpose of the law was to help cover a gap in regulatory oversight regarding the inspection of pipelines and pipeline facilities. PUC was given expanded authority to enforce federal pipeline safety laws related to non-public gas and hazardous liquids pipeline equipment and facilities including intrastate pipelines. For more information:
http://www.puc.state.pa.us/filing_resources/issues_laws_regulations/act_127_pipeline_act.aspx.

Impact Fee ("Act 13" of 2012)
Act 13 was signed into law on February 14, 2012. The act amended Title 58 statutes relating to oil and gas. Best known for imposing impact fees on unconventional gas wells, the act included several other amendments related to oil and gas development. For some of these issues case law is still being decided. The following paragraph comes directly from the act:

> Amending Title 58 (Oil and Gas) of the Pennsylvania Consolidated Statutes, providing for an unconventional gas well fee and for transfers from the Oil and Gas Lease Fund; providing for distribution of fees and transfers; establishing the Natural Gas Energy Development Program; consolidating the Oil and Gas Act with modifications and additions relating to definitions, well permits, permit objections, comments by municipalities and storage operators, well location restrictions, well site restoration, protection of water supplies, notification to public drinking water systems, containment for unconventional wells, transportation records regarding wastewater fluids, corrosion control requirements, gathering lines, well control emergency response, hydraulic fracturing chemical discharge requirements, bonding, air containment emissions, public nuisances, enforcement orders, well control emergency cost recovery, penalties, civil penalties, inspection and production of materials, witnesses, depositions and rights of entry, third party liability and inspection reports; providing for local ordinances relating to oil and gas operations and for responsibility for fee; making an appropriation; and making a related repeal.

Pennsylvania DEP Policy for Erosion and Sediment Control and Stormwater Management for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing, or Treatment Operations or Transmission Facilities
This new policy became effective December 12, 2012 and guides DEP implementation of Chapter 102 requirements associated with gas exploration, production, processing, treatment, and transmission.
(http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-92195/800-2100-008.pdf)

Addressing Spills and Releases at Oil & Gas Well Sites or Access Roads
This policy addresses actions to be taken by persons responsible for and/or responding to spills and releases at oil and gas well sites or access roads. It became effective September 21, 2013.
(http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-96766/800-5000-001.pdf)

Enhancement Area Prioritization:

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

High	
Medium	X
Low	

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

Pennsylvania has a long history with energy development and processing. The current energy boom provides significant economic opportunities for the entire Commonwealth, including our coastal zones. The energy boom also provides new environmental threats and challenges, including increased transportation of crude oil by rail, new energy and industrial products related to wet gas products, new pipelines, and the construction of thousands of unconventional wells with associated access roads and amenities. Energy facility siting will remain a high priority for the entire commonwealth. Regulatory oversight will continue to evolve and adjust along with the industry. There are many unknowns regarding future potential impacts to the coastal zones.

CRM has supported the energy transitions in the Delaware Estuary Coastal Zone by providing a dedicated biologist to conduct environmental reviews on water obstruction and encroachment permits. By having a dedicated reviewer, familiar with the unique resources and regulations of the tidal Delaware Estuary, critical project reviews are conducted in an efficient manner that expedites review and protects the resources.

CRM can continue to support Energy and Government Facility Siting where applicable through our normal operations and a program change does not seem necessary. CRM will continue to monitor developments, and will assist DEP in management of emerging issues when needs are identified.

During CRM's stakeholder engagement process, Energy and Government Facility Siting was selected as a high priority by just 14% of total respondents.

Aquaculture

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

Resource Characterization:

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

Type of Facility/Activity	Status and Trends of Aquaculture Facilities and Activities		
	# of Facilities	Approximate Economic Value*	Change Since Last Assessment (↑, ↓, ↔, unknown)
LECZ: Recreation and conservation support (steelhead, brown trout, walleye)	Two facilities: PFBC Fairview Hatchery Save Our Native Species (S.O.N.S) Hatchery - Presque Isle Bay	Economic value of recreational steelhead fishery equals $5.71 million in new value-added activity[1].	↔
DECZ: No current facilities	0	_	↔

**2004, Creel Analysis and economic impact of Pennsylvania's Lake Erie Tributary Fisheries in Erie County, Pennsylvania, with Special Emphasis on Landlocked Steelhead Trout, Pennsylvania Fish and Boat Commission.*

The Pennsylvania Fish and Boat Commission works closely with cooperative nurseries to fulfill and supplement their recreational fishing hatchery effort. The following cooperative nurseries are within the Lake Erie watershed, but located outside of the Lake Erie coastal zone:

Facility Name	Location
Albion	Fairview
3CU Mitchel	Girard
3CU Ro-Ze	Girard
3CU Mission	Girard
3CU Peck	Fairview
Kendra	Girard
Tom Ridge Environmental Center	Erie
Wesleyville	Wesleyville

The aquaculture industry within Pennsylvania remains relatively unchanged since the last assessment period although overall sales seem to be down slightly. The 2012/2013 Census of Agriculture (issued in September 2014) indicates that on a state-wide basis the total number of commercial facilities remains at 56. Both 2005 and 2013 data indicate a total of 56 commercial facilities. According to the data the total sales decreased from $8,951,000 in 2005 to $6,927,000 in 2013. Food fish (largely trout) accounted for 83% of total sales in 2005 and 82.5% of sales in 2013. These total sales numbers do not include approximately $9,200,000 of value associated with trout produced for conservation and recreational purposes. According to the 2011 Trout and Aquaculture Census, Pennsylvania ranks third in commercial trout production for food and third in trout production for recreation and conservation purposes. There has also been little change to the industry within each individual coastal zone.

LECZ

The Lake Erie coastal zone continues to focus on supporting the recreational sport fish industry. There has been no change to the number of facilities within the coastal zone since the last assessment period. There are four Pennsylvania Fish and Boat Commission facilities that support the Lake Erie recreational fishery. Only one of these, the Fairview State Fish hatchery, is located within the coastal zone. The Fairview State Fish Hatchery serves as the headquarters for the steelhead spawning as well as raises approximately 350,000 steelhead per year for stocking. The other three fish commission hatcheries that support the Lake Erie recreational fishery are the Linesville State Fish Hatchery, the Tionesta State Fish Hatchery, and the Corry State Fish Hatchery. Each of these hatcheries is located outside of the Lake Erie watershed.

The Lake Erie Brown Trout put-grow-take fishery that began with stockings in 2009 continues. With the help of cooperative nurseries, the PFBC maintains its goal of stocking 90,000 – 100,000 brown trout per year. The success of the fishery is being studied and evaluated and there are signs the fishery is increasing. Currently much of the brown trout catch is related to catches while anglers are targeting other species. It is expected that as success becomes more frequent anglers will begin to target this species directly.

DECZ

There are no existing aquaculture facilities in the Delaware Estuary coastal zone. The interest in using aquaculture to aid in freshwater mussel restoration continues. CRM has supported these efforts. Efforts at Cheyney University, discussed in the prior assessment, have been discontinued. Partners including the Partnership for the Delaware Estuary, the Academy of Natural Sciences, and the Philadelphia Water Department are currently working together to find a facility along the tidal Delaware or Schuylkill Rivers to house a mussel hatchery. These partners would work with the Fairmont Water Works to incorporate a networked educational and outreach component as part of this project. Robust populations persist in the main stem of the tidal Delaware, aquaculture restoration efforts would be focused on tributary streams.

The PFBC uses a hatchery located outside of the coastal zone, and outside of the Delaware Estuary watershed, to help supplement shad restoration on the Schuylkill River. A small effort to

spawn and rear American shad along the banks of the Schuylkill is being proposed by the Philadelphia Water Department. Working with PFBC, PDE, and others, they plan to spawn shad using a non-lethal method in tanks located at Fairmount Water Works. Fertilized eggs will be disseminated for grow-out as part of educational outreach efforts before being stocked back into the Schuylkill. A 2-year proof of concept trial run is scheduled to begin in 2015. If experience demonstrates potential success this offers a great opportunity for hands-on educational outreach that supports developing stewardship.

Management Characterization:

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

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

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

NPDES General Permit

The Pennsylvania Department of Agriculture continues to have the primary responsibility for the regulation and support of the aquaculture industry in Pennsylvania. This was established by the Aquaculture Development Act in 1998, Act 1998-94. This act included language that DEP was directed to develop an NPDES general permit for aquaculture facilities. This general permit, PAG-11, was issued in October 2012 and remains in current use. The general permit is consistent with Concentrated Aquatic Animal Production facilities described in the federal clean water act at 40 CFR Part 122. These changes were not CRM-driven changes. Facilities discharging to High Quality (HQ) or Exceptional Value (EV) waters are not eligible for this general permit. Future

regulatory efforts may try to balance Clean Water Act and Clean Streams Law requirements with the needs of the industry with regard to more efficient permitting requirements within HQ and EV waters. Pennsylvania commercial aquaculture facilities are relatively small, so overhead such as permitting and required water quality sampling can have a very significant impact on their operating budget and competitiveness. The impacts are disproportionately greater at smaller facilities than at larger facilities. This is a specific management concern that needs to be considered within Pennsylvania.

Biosecurity measures
In 2011, Infectious Pancreatic Necrosis, a highly contagious disease that especially impacts salmonids, was found in PFBC hatcheries and many of the cooperative nurseries that help support the Lake Erie recreational fishery. This resulted in over 100,000 fish being unavailable for stocking in Lake Erie tributaries. While the disease is not detrimental to humans, the PFBC works with the Great Lakes Fisheries Commission in an effort to keep IPN from impacting wild stocks within the lake. Partially as a result of the impacts from this loss, the PFBC has tightened its biosecurity measures for its facilities as well as the 161 cooperative facilities state-wide.
A new Biosecurity Plan was developed in 2012. The new biosecurity plan discourages nursery exchanges of fish and requires written permission from both the PFBC Cooperative Nursery Unit Leader and the PFBC Fish Health Unit Leader. PFBC was responsible for this management change, CRM had no direct involvement in the change. The new biosecurity measures will also have a positive impact on preventing the accidental spread of aquatic invasive species.

Crayfish restrictions
The rusty crayfish has received the most attention, and have been highly regulated since 2005 - live individuals cannot be possessed, sold, transported or cultured within Pennsylvania. However, five additional introduced species are known to exist within Pennsylvania. To address the continuing threat, the PFBC amended 58 Pa. Code Chapters 61, 63, 69, 71 and 73 to generally restrict the sale, possession, introduction, transportation and culture of all live native and nonnative crayfishes. Exceptions exist for testing and scientific purposes or restaurant consumption and local wild caught crayfish can still be used for bait under specific conditions. While the new rules did not specifically address propagation, the PFBC also removed crayfish from the list of species approved for open-system propagation that the Department of Agriculture could register for artificial propagation. This was done with existing authorities. Facilities can still be registered for propagation in closed systems. The new rules went into effect January 1, 2015.

Enhancement Area Prioritization:

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

High	
Medium	
Low	X

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

At this time commercial aquaculture opportunities remain limited within Pennsylvania's two coastal zones. The Coastal Resources Management program has supported recreational and ecological restoration aquaculture efforts in the past and could support these efforts using traditional 306 funding grants. The hatchery supported portion on the Lake Erie fishery is a critical component of local recreational opportunities and contributes to the local tourist economy. The effort also comes with inherent risks to the native ecology, and working with the DEP Great Lakes Biologist, CRM plays a role in minimizing risks. CRM will continue to monitor developments which may lead to increased opportunities and will coordinate with the Pennsylvania Department of Agriculture, Pennsylvania Fish and Boat Commission, Pennsylvania Sea Grant, and other interested partners and stakeholders if conditions change and commercial aquaculture becomes more viable. In our Section 309 stakeholder engagement survey "Aquaculture" was the lowest rated priority of the 9 enhancement areas. None of the 35 respondents considered aquaculture to be a high priority.

2016 STRATEGY

Pennsylvania CRM is proposing two strategies for the 2016 – 2021 Section 309 enhancement period. The first is minor expansion of the Delaware Estuary Coastal Zone, which will improve CRM's ability to manage multiple enhancement areas. The second is building capacity to facilitate climate adaptation planning and community resiliency in the coastal areas. Changing climate has the potential to impact all of CRM's program policy areas. The strategy seeks to build capacity both within CRM and among the local municipalities in the Delaware Estuary Coastal Zone.

Delaware Estuary Coastal Zone Boundary Expansion
2016 Strategy

I. Issue Area(s)

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

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

The proposed strategy will also enhance CRMs ability to address other enhancement areas such as Wetlands, Ocean Resources, and Marine Debris.

II. Strategy Description

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

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

B. *Strategy Goal:*

The goal of this strategy is to complete an expansion of the Delaware Estuary Coastal Zone boundary. CRM will examine available resources and potential benefits of an expanded coastal zone. CRM anticipates an expansion that will be relatively minor in geographic extent, and one that may be limited to expansion within municipalities that are partially included in the existing coastal zone. The goals include engagement of the local municipalities, completion of the necessary program change documents, and receiving NOAA approval. Also included within the goals of the strategy are amending maps, outreach materials, guidance documents, websites, etc. The public engagement process and announcement of the expansion will be used as an opportunity for broader outreach and promotion of the coastal program.

C. *Description:*

Implement a minor expansion of the Delaware Estuary Coastal Zone boundary in order to better enhance multiple enhancement area priorities. Conduct outreach on the expanded coastal zone in order to implement priority projects by soliciting grant applications from local government and other partners.

III. Needs and Gaps Addressed

During this past assessment period, Chester City in Delaware County was very involved in community resiliency and climate adaptation planning; their efforts continue. During a presentation on Chester City's efforts, and in discussions with Delaware County officials following the presentation, it became apparent that the current coastal zone boundary restricted CRM's ability to help with identified proposed implementation projects. This led to some further analysis of the coastal zone boundary in the Delaware Estuary Coastal Zone. The program would be better able to plan and begin to implement coastal resiliency and climate adaptation projects with an expanded coastal zone.

Communities along the tidal Delaware River continue to design and implement greenway connections along the river. In certain areas it becomes necessary to move the greenway and trails further inland to maintain connectivity while going around working industrial waterfront properties and port facilities. Connector trails from population centers to the riverfront itself are also necessary to reconnect citizens to the estuary and build the broader stewardship. Greenways along tidal tributaries that extend above the head of tide could be more comprehensively addressed. CRM has experienced situations where proposed or conceptual greenways or connector trails are partly in and partly out of the existing coastal zone, which inhibits the program's ability to help implement quality projects. In a few areas, the current coastal zone does not extend to the head of tide. An expanded boundary would help CRM in meeting these public access challenges.

The impacts and impairments due to urban runoff and stormwater in the Delaware Estuary are well documented in the Cumulative and Secondary Impacts section of this assessment,

as well as in multiple regional and watershed specific planning documents. An expansion of the coastal zone boundary could lead to more flexibility in addressing this difficult and on-going stressor. In addition, more opportunities for tidal wetland creation and buffers for inland migration may be available.

IV. Benefits to Coastal Management

If the coastal zone boundary is expanded, the coastal program will be able to use Section 306 funds for implementation projects in a wider geographic area to enhance the program's ability in several enhancement areas, including the three selected as "high priority"; Coastal Hazards, Public Access, and Cumulative and Secondary impacts. The program has identified existing limitations and needs for an expanded zone and anticipates more will become apparent when a more thorough analysis is conducted. A larger geographic area may lead to a more competitive grant application process and allow for more funding to directly relate to the highest priorities at that time. Additional opportunities for tidal wetland and habitat connectivity projects will also be available.

V. Likelihood of Success

CRM has already worked with representatives of Delaware County to discuss the possibilities of expanding the coastal zone. The Delaware County Planning Department has worked with the existing municipalities to develop a draft map of what an expanded coastal zone boundary could look like in Delaware County. There seems to be consensus among the existing municipalities and the draft map appears consistent with what CRM is currently envisioning. Additional outreach and engagement with the municipalities in Bucks County and with Philadelphia will be necessary. At this time, CRM feels the expansion will only include expansion within existing coastal municipalities and only where the existing municipalities agree to the expansion. Bucks County and the individual municipalities may have differing priorities for expansion, but ultimately these local priorities will align with several of the enhancement areas that could be better addressed with an expanded coastal zone. CRM will conduct outreach and seek engagement with the local municipalities early in the strategy process. These conversations will inform not only the expansion effort but also CRM's broader program priorities. The Intergovernmental Coordination policy area of our approved program management plan will be used and potentially strengthened through this process.

Given the early support from local government and the modest geographic extent of the proposed boundary expansion strategy there is a high likelihood of success. The project should be entirely completed within the five-year strategy period.

VII. Strategy Work Plan

Strategy Goal: Coastal Zone Boundary Expansion in the Delaware Estuary including program approval from NOAA and outreach to provide notification of the expanded boundary and associated opportunities for addressing local priorities.

Total Years: Five
Total Budget: $140,000

Year: One
Description of activities: Internally review and analyze existing and potential expansion options. Develop a municipality and key stakeholder engagement plan for presenting information and receiving input. Develop outreach materials including draft maps of various options. Begin municipality/stakeholder engagement process.
Major Milestone(s): Development of draft maps depicting expansion options. Beginning of outreach and solicitation of input and comments.
Budget: $30,000

Year: Two
Description of activities: Finalize municipal and stakeholder engagement, develop an analysis of alternatives document and associated mapping. Use this process as an opportunity for revitalizing engagement and networking with local municipalities. Seek/gain internal DEP approval for moving forward.
Major Milestone(s): DEP executive office staff approval of a preferred alternative for DECZ boundary expansion.
Budget: $30,000

Year: Three
Description of activities: Submit appropriate program change documents to NOAA, publish announcement of changes to Commonwealth of Pennsylvania Coastal Resources Management Program Guidance Document.
Major Milestone(s): NOAA approval of revised coastal zone boundary change and revision to Commonwealth of Pennsylvania Coastal Resources Management Program Guidance Document.
Budget: $30,000

Year: Four
Description of activities: Update individual program support documents such as Grant Application Instruction Guide, Grant Administration Guide, web pages, outreach materials, maps, etc.
Major Milestone(s): Updated maps, web pages, guides, and outreach materials.
Budget: $30,000

Year: Five
Description of activities: Engagement with municipalities, watershed groups, and other stakeholders specific to potential implementation projects in expanded areas that may be eligible and appropriate for 306 grant opportunities.
Major Milestone(s): Submission of grant applications from the expanded geographic area.
Budget: $20,000

VIII. Fiscal and Technical Needs

A. Fiscal Needs: Section 309 funding should be sufficient for carrying out the DECZ boundary expansion strategy. Section 306 funds may be dovetailed into the strategy near the end of the five-year period as CRM begins to focus on needs and opportunities specifically in the expanded area.

B. **Technical Needs**: CRM appears to have the technical abilities to carry out the proposed expansion strategy. There may be specific expertise or technical knowledge from local stakeholders or state agencies that will help to better inform the limits of the proposed boundary, but these have not yet been identified. If specific studies or data needs are identified, CRM will seek to address them.

IX. Projects of Special Merit (Optional)

In addition to the high priority enhancement areas checked above, climate vulnerability and resiliency will be considered when evaluating potential boundary change alternatives. This includes habitat fragmentation and connectivity issues. There may be additional information needed to better evaluate potential climate scenarios or resiliency steps that could be taken if the boundary was expanded. Any potential Project of Special Merit related to the climate considerations of boundary expansion could also be considered under the Building Capacity to Facilitate Climate Adaptation and Community Resiliency strategy which follows.

Building Capacity to Facilitate Climate Adaptation Planning and Community Resiliency
2016 Strategy

I. Issue Area(s)

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

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

The proposed strategy will also help support the wetlands enhancement area.

II. Strategy Description

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

☐ A change to coastal zone boundaries;

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

☒ New or revised local coastal programs and implementing ordinances;

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

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

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

B. Strategy Goal:

The goal of this strategy is to build CRM and stakeholder capacity to better plan and prepare for climate changes within Pennsylvania's unique coastal areas. A key component of this goal is to strengthen networks between the various state agencies and local governments that seek to mitigate human and natural resource impacts due to changing climate conditions. One result of CRM's increased capacity will be making changes to the Commonwealth of Pennsylvania Coastal Resources Management Program Reference Document. These changes will involve modifying some or all of the eleven existing policy areas to consider climate change, adding a

new policy area that specifically addresses climate change, or a combination of both. Another specific goal is to bring together and work directly with interested communities in the DECZ toward building a community resiliency initiative.

C. Description:

The strategy involves concurrent steps on multiple paths.

Part 1

Working with the Delaware Valley Regional Planning Commission (DVRPC) and other partners begin a coastal hazards community resiliency program in the Delaware Estuary. The DVRPC has extensive experience working with the communities in the 9 county metropolitan area of Philadelphia and is currently working with New Jersey's coastal program on a Resilient Coastal Communities Initiative (RCCI). CRM is proposing a similar effort, but one that is specific to the needs of Pennsylvania's DECZ communities. Existing education, outreach, and vulnerability assessment modules and tools will be examined for use within Pennsylvania's DECZ. These may need to be tailored to meet Pennsylvania's specific needs. DVRPC, working with Pennsylvania Sea Grant and others, recently helped Chester City to complete the Chester City Climate Change Adaptation Plan, which was adopted by City Council in June, 2014. This effort will help to inform CRM's community resiliency effort within the DECZ. The original steps of our process will be reaching out to identify interested communities to better understand their unique individual interests and concerns. There appears to be a niche between mitigation planning and comprehensive planning where CRM may be able to offer assistance to better facilitate resiliency and vulnerability mitigation. Since comprehensive planning in Pennsylvania is done on a municipal level, development of model ordinances may be appropriate.

Experience gained and lessons learned while working with DECZ municipalities will be used to inform potential future efforts in the LECZ.

Part 2

Examine each of our nine program policy areas for assessing the appropriateness of adding policies specifically addressing the consideration of or planning for community resiliency that includes climate change. In addition, analyze and consider a new program policy area that directly addresses climate change and/or building resiliency. Public health and safety, threats to natural resources, and economic impacts will be considered and analyzed. CRM will network with the CZAC representatives as well as other partners and stakeholders in analyzing the issues and identifying data and management gaps where CRM can play a role in strengthening overall capacity to build resiliency. CRM will look to other state coastal programs for examples of how they are addressing similar issues. Details of specific program changes, as well as missing information to inform potential program changes, will be identified during the strategy period. CRM will consider program changes that prioritize implementing recommendations associated with resiliency that are

identified in county Hazard Mitigation Plans. Changes to the Commonwealth of Pennsylvania Coastal Resources Management Program Reference Document will occur at the end of our strategy period and will likely continue past this strategy period.

Part 3

Pennsylvania's Coastal Resources Management (CRM) Program was established on September 22, 1980, by Governor Richard Thornburg, when he signed Executive Oder 1980-20. The Executive Order also established the Coastal Zone Advisory Committee (CZAC), to be comprised of representatives of networked state agencies and commissions, and gave CZAC specific functions. The activities of the CZAC are governed by a set of by-laws adopted by the committee. Since the Governor's Executive Order and subsequent NOAA approval of Pennsylvania's Coastal Zone Management Program, there have been changes to the agencies that carry out the responsibilities of the Commonwealth's executive offices. For example, the Department of Environmental Resources was split into the Department of Environmental Protection and the Department of Conservation and Natural Resources, and the Department of Community Affairs and Department of Commerce were merged into the Department of Community and Economic Development. In addition to the agencies under the Governor's jurisdiction, CRM coordinates through Memoranda of Understanding with the Fish and Boat, Game, Historical and Museum, and Public Utility Commissions.

Climate change has the potential to impact multiple resources that fall under the jurisdiction and responsibilities of each of the agencies and commissions listed above. Each of these agencies and commissions will be assessing available resources and potential measures that could be taken to mitigate environmental, economic, and human health and safety impacts from climate change. As part of an effort to help coordinate and foster cooperation between the agencies and commissions within the coastal zones, CRM will bring the CZAC membership up to date. CRM proposes to re-examine any existing Memoranda of Understanding or Memoranda of Agreement with other agencies or commissions and re-examine the membership of the CZAC to determine if additional agencies (such as the Pennsylvania Emergency Management Agency) should be added. The potential inclusion of the Pennsylvania Emergency Management Agency may offer benefits for climate adaptation and resiliency planning and implementation. By updating our CZAC membership, by-laws, and operating agreement(s), CRM feels that we can strengthen our ability to network efforts and more efficiently leverage resources for supporting mutual goals.

III. Needs and Gaps Addressed

Pennsylvania's CRM program has not directly addressed the issue of climate change in managing program grants and priorities. At regional and national meetings it appears Pennsylvania's coastal program is behind many other states in addressing this issue.

Some national mapping and assessment efforts related to coastal vulnerabilities associated with climate change have failed to include Pennsylvania's portion of the Delaware Estuary. Local government planning efforts have just begun to consider this issue and the degree of consideration varies by municipality. This multi-faceted strategy will help identify where CRM can have the most effective impact in leading to more resilient coasts. One key finding of the assessment has been the increase in heavy precipitation events exacerbating significant existing problems related to urban run-off, flooding, and agricultural runoff. Coastal storms add to increased flooding events. The cumulative impacts to Pennsylvania's tidal wetlands has been severe, and sea level rise threatens the less than 5% that are remaining. The vast majority of streams in the DECZ are impaired due to impacts of stormwater. Flooding has become more frequent in the DECZ. Residential and agriculture run-off containing nutrients in the Lake Erie watershed are an existing and growing concern that could be exacerbated. Increased heavy precipitation events may also lead to increased bluff erosion rates. Changes to policy areas in the Commonwealth of Pennsylvania Coastal Resources Management Program Reference Document or changes in grant prioritization may help to alleviate these growing threats.

By closely examining the increased threats to health and safety, the environment, and economy due to the impacts of climate change CRM will be able to better plan for and mitigate impacts that touch most if not all of the enhancement areas and CRM program policy areas.

IV. Benefits to Coastal Management

Coastal management will benefit by developing stronger relationships with state and local partners who share goals related to building more resilient communities and ecosystems. CRM will begin the process of adapting program policies and priorities that will consider the short term and long term impacts of climate change. There will be a general capacity building related to understanding and managing climate change issues within the CRM program and among our coastal communities.

V. Likelihood of Success

Coastal Hazards is one of the three enhancement areas identified most commonly as a high priority by local stakeholders. Many of these coastal hazards are associated with cumulative and secondary impacts such as wetland loss, and were expressed through input that considered Wetlands or Cumulative and Secondary Impacts to be a high priority. So the actual prioritization of Coastal Hazards by local stakeholders is even higher. The process of producing the Chester City Climate Adaptation Plan presents a good example of multiple partners working together to begin to address impacts and hazards associated with climate change. CRM feels that we can use that successful example to expand to other areas of the Delaware Estuary.

In early discussions with other agencies and members of the CZAC there has been support to move forward in building capacity to address climate change. CRM has strong partnerships with the Delaware Valley Regional Planning Commission, Pennsylvania Sea Grant, the Partnership for the Delaware Estuary, and others that will help facilitate successful implementation of the proposed strategy. Program changes will be completed during this 5-year strategy, but undoubtedly this effort is a building block for laying a foundation that will continue beyond the 5-year strategy.

VI. Strategy Work Plan

Strategy Goal: Build capacity to facilitate climate adaptation planning by developing a multi-community resiliency effort in the DECZ, examining program policy areas for potential changes that consider climate change, and examining MOUs, MOAs, and other operating agreements that govern the management of the CRM program.

Total Years: 5 years
Total Budget: $485,000

Year: One
Description of activities: Contract with key stakeholder(s) to facilitate a community resiliency initiative in the DECZ. Conduct outreach to municipalities to determine interest in participation and key concerns. Identify existing modules and tools for potential use in Pennsylvania.

Begin an organized approach to examine each of the eleven existing policy areas identified in the program plan and seek to identify needs and opportunities for changes related to hazard resiliency and climate adaptation. Participate and coordinate with DEP's Climate Change Advisory Committee.

Examination of MOUs, MOAs, and by-laws between CRM and other agencies and commissions. Develop a better understanding individual agency and commission roles and efforts related to climate change.

Major Milestone(s): List of municipalities interested in participation in a climate resiliency initiative. A first indication of key community interests and concerns. Identification of preferred vulnerability and resiliency modules.

The development of a prioritized list of program policy areas where changes are most appropriate. Identification of specific information gaps.

Budget: $95,000

Year: Two
Description of activities: Develop a Task Force Team for the resiliency effort in the DECZ. Schedule meetings and begin to develop a consensus mission statement. Coordinate with DEP Climate Change Advisory Committee. Draft changes to program policies and begin to get feedback from stakeholders and Coastal Zone Advisory Committee.

Specifically identify any needed changes or updates to MOUs, MOAs, or CZAC by-laws. Communicate proposed changes to CZAC.

Major Milestone(s): DECZ climate resiliency task force members identified and framework of mission established.

Draft program policy changes for some priority policy areas.

Budget: $95,000

Year: Three
Description of activities: Work with DECZ climate resiliency task force, identify information needs such as vulnerability assessments or required data for assessments, work to facilitate ways to acquire needed information. Begin to develop model ordinances.

Coordinate with DEP Climate Change Advisory Committee. Finalize changes to some priority program policy areas.

Route any necessary modified MOUs, MOAs, or by-law changes through appropriate channels for necessary approval.

Major Milestone(s): Appropriate changes to some priority program policy areas will be finalized to begin the program change process.

Budget: $95,000

Year: Four
Description of activities: Working with the DECZ resiliency task force, finalize information gathering and vulnerability assessments. Identify recommendations for hazard mitigation actions specific to climate change impacts. Begin to assess applicability of DECZ products and lessons for potential use with LECZ municipalities.

Continue to coordinate with DEP's Climate Change Advisory Committee. Continue working on any changes to program policy areas and draft changes for revised official technical guidance document which serves as CRM's approved program plan.

Finalize any outstanding signatory processes for any changed MOUs, MOAs, or other agreements.

Major Milestone(s): DECZ resiliency task force will identify climate resiliency recommended mitigation actions and begin to draft model zoning ordinances.

Proposed changes to CRM's approved program plan will be finalized and amendments to the technical guidance document will be drafted. The proposed changes to the technical guidance document will be published for public comment.

Budget: $95,000

Year: Five
Description of activities: Outreach will be conducted on any model ordinances that are developed through the DECZ climate resiliency task force. If applicable, begin to apply products and lessons learned from DECZ efforts in similar LECZ effort.

Continue to coordinate with DEP's Climate Change Advisory Committee. Finalize changes to CRM's program management plan technical guidance document.

Major Milestone(s): Model ordinance(s) will be developed and available for use by interested municipalities. A summary will be developed which identifies future needs in the continuing adaptation planning related to climate change.

Budget: $105,000

VII. Fiscal and Technical Needs

A. Fiscal Needs: Section 309 funding will be sufficient to carry out the basic foundation of the proposed strategy. Additional funding would strengthen the proposed strategy or facilitate advancement in understanding of other program policy and enhancement areas.

B. Technical Needs: Pennsylvania CRM has the basic technical knowledge and skills to carry out the proposed strategy. CRM technical knowledge and skills will grow during the onset of the strategy and CRM will also rely on the knowledge and skills of key partners such as the Delaware Valley Regional Planning Commission and Pennsylvania Sea Grant. The strategy and capacity building efforts would be enhanced by working to ensure the Pennsylvania's Delaware Estuary shoreline is included in national and regional efforts that examine coastal vulnerability issues and will work to bring this apparent oversight to the attention of national experts responsible for these studies. Other agencies, such as the Department of Community and Economic Affairs and the

Pennsylvania Emergency Management Agency have unique knowledge and skills and CRM has already begun discussions with these agencies to better network and pool our resources. DEP also has a Climate Change Advisory Committee that can contribute to our efforts.

VIII. Projects of Special Merit

At this time CRM does not have a specific Project of Special Merit to augment this strategy. CRM anticipates developing a Project of Special Merit after more detailed and specific input is gathered. Sea level rise and coastal vulnerability analysis efforts by federal agencies have generally not included Pennsylvania's shoreline, and opportunities for a Project of Special Merit may include filling that gap.

5-Year Budget Summary by Strategy

Strategy Title	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
DECZ Boundary Expansion	30,000	30,000	30,000	30,000	20,000	140,000
Building capacity to facilitate climate adaptation and resiliency	95,000	95,000	95,000	95,000	105,000	485,000
Total Funding	125,000	125,000	125,000	125,000	125,000	625,000

Summary of Stakeholder Engagement and Public Comment

Stakeholder Engagement:

The Coastal Resources Management Program (CRM) identified the following key stakeholders when seeking input on drafting our coastal enhancement priorities:

Statewide:
Pennsylvania Coastal Zone Advisory Committee

Delaware Estuary Coastal Zone:

Delaware Estuary Coastal Zone Advisory Committee
Delaware Valley Regional Planning Commission
Pennsylvania Sea Grant
Partnership for the Delaware Estuary
Delaware County Coastal Zone Task Force
DEP Southeast Regional Office

Lake Erie Coastal Zone:

Lake Erie Coastal Zone Advisory Committee
Erie County Department of Planning
Pennsylvania Sea Grant
DEP Northwest Regional Office

Many of CRM's partners and stakeholders are included within the above committees. CRM preferred face-to-face communication in order to briefly explain the purpose and process of Section 309 and piggy-backed on to existing meetings. A paper copy of a 2-page survey form was provided at the meeting and an electronic form was provided by email so that stakeholders could devote as much time as they wished to communicate their priorities to the program. The first page of the form was fairly simple in asking respondents to check a box indicating the relative priority of the enhancement area (no more than three could be considered a "high" priority. The second page of the form allowed for more narrative to better explain and clarify any suggested priorities depending upon the amount of input the stakeholders wished to provide.

The response from our key stakeholders was strong, with a great deal of effort and thought applied to their responses and comments. The Coastal Resources Management Program acknowledges their interest and efforts in enhancing our program and thanks them for their meaningful input. It is important to note that local priorities can span multiple enhancement areas and there are relationships across enhancement areas. For example, Harmful Algal Blooms (HABs) in Lake Erie are directly related to Public Access, Coastal Hazards, and Cumulative and Secondary Impacts. The Wetlands enhancement area is significantly intertwined with Coastal Hazards (flooding), Cumulative and Secondary Impacts (habitat and WQ), and Public Access. Comments submitted with the simple rankings often confirmed the relationship to another enhancement area.

Provided below is a summary table of the enhancement areas considered as high priority, using page one of the attached example survey form:

Summary of enhancement areas considered "high priority" by key stakeholders as part of draft Section 309 Assessment and Strategy development (2014).

Enhancement Area Priority	Total Respondents (35 respondents)	Delaware Estuary Coastal Zone (19 respondents)	Lake Erie Coastal Zone (11 respondents)	Coastal Zone Advisory Committee (5 respondents)
Wetlands	63%	79%	27%	80%
Coastal Hazards	57%	68%	45%	40%
Public Access	60%	63%	64%	40%
Marine Debris	14%	16%	18%	0%
Cumulative and Secondary Impacts	26%	26%	36%	0%
Special Area Management Planning	17%	16%	18%	20%
Ocean and Great Lakes Resources	26%	05%	45%	40%
Energy and Government Facility Siting	14%	11%	18%	40%
Aquaculture	0%	0%	0%	0%

Wetlands, Public Access, and Coastal Hazards indicate a defined cohort that represents the combined highest priorities of our key stakeholders. When looking at the summarized results these three enhancement areas clearly stand out. It is interesting to note the similarities and differences between the two coastal zones. In the LECZ only 27% of respondents felt the "Wetlands" enhancement was a high priority, compared to 4 out of 5 statewide respondents and

79% of DECZ respondents. However, a higher percentage of LECZ respondents considered Cumulative and Secondary Impacts a "high" priority and wetlands would play a key role in mitigating the specific Cumulative and Secondary Impacts being prioritized. Also of interest is to note that 68% of DECZ respondents considered Coastal Hazards to be a high priority compared to 45% of respondents in the LECZ. CRM has historically placed a high priority on LECZ Coastal Hazards when compared to DECZ. Changing climate and increased flooding concerns were a driver of the 68% DECZ response.

Public Comment

The availability of this draft Section 309 Assessment and Strategy for review was published in the *Pennsylvania Bulletin* on June 6th, 2015, initiating a 30 day public comment period. The draft document was made available on the CRM – DEP web page and through DEP's new eComment System. Notice of the availability of the document was also given to the Coastal Zone Advisory Committee. The public comment period closed on July 7th, 2015. No comments were received during the comment period.

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