III. ASSESSMENT

Wetlands

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

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

1. **Please indicate the extent, status, and trends of wetlands in the coastal zone using the following table:**

Wetlands type	**Estimated historic extent** (acres)	**Current extent** (acres)	**Trends in acres lost since 2006** (Net acres gained & lost)	**Acres gained through voluntary mechanisms since 2006**	**Acres gained through mitigation since 2006**
Tidal (Great Lakes) vegetated	750,000-1,250,000[1]	222,368[2]	+0.35[3]	Unknown	0.35
Tidal (Great Lakes) non-vegetated	350,000 – 650,000	116,198	-12	Unknown	0
Non-tidal/ freshwater	1,000,000-1,250,000	908,584[4]	-513[5]	Unknown	2044

2. **If information is not available to fill in the above table, provide a qualitative description of information requested, including wetlands status and trends, based on the best available information.**

[1] Wiggins, Harold J. *Historic Trends in Wetlands Protection in the State of Virginia.* Virginia Journal of Science, Volume 43, Number 1B, Spring 1992. All figures for historic estimates are based on estimates of 1780s wetlands extent cited in Wiggins, 1992.
[2] Center for Coastal Resources Management, Digital Tidal Marsh Inventory Series, 1992. Comprehensive Coastal Inventory Program, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia, 23062.
[3] VIMS Permitting, 2009 Citation. http://ccrm.vims.edu/wetlands/copyright.html.
[4] U. S. Fish and Wildlife Service. Publication date (found in metadata). National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/
All Table data for non-vegetated tidal wetlands and non-tidal wetlands are taken from the NWI.
[5] "*Virginia Performs*," Agency Performance Measures Report. Virginia Department of Environmental Quality, 2008. http://vaperforms.virginia.gov/agencylevel/src/KeyAtGlance.cfm

The Tidal Marshes Inventory (TMI) and National Wetlands Inventory (NWI) acreage used for current acreage of tidal and non-tidal wetlands respectively was mapped over the course of the last 30 to 40 years. The TMI was developed between 1972 and 1990 with identified wetlands confirmed by on–the-ground visits. The NWI uses remote data consisting of imagery generated between 1970 and the present.

While many voluntary activities throughout the coastal zone in Virginia are leading to restored wetlands, there is no one comprehensive data source for tracking voluntary restoration or creation of wetlands. Various non-governmental groups and federal government entities are known to have restored, purchased, or otherwise protected through easements many acres of tidal as well as non-tidal wetlands in the coastal zone, including the Department of Defense, The Nature Conservancy, Chesapeake Bay Foundation, Elizabeth River Project and other private environmentally interested groups. The Department of Game and Inland Fisheries has also worked to facilitate and effect the voluntary creation and protection of significant acreage of non-tidal wetlands. So, in order to report on the contextual measures below, some mechanism to capture the restored or protected acres must be developed.

3. Provide a brief explanation for trends.

No net loss of wetlands through regulatory programs and a net gain of wetlands through voluntary programs is part of Virginia statute and policy. Compensation for non-tidal wetland impacts is required for essentially all projects. Additionally, the revised Wetlands Mitigation-Compensation Policy and Supplemental Guidelines adopted by the Virginia Marine Resources Commission (VMRC) in 2005 for tidal wetland impacts eliminated a previous threshold of 1,000 square feet for non-commercial projects requiring permit approval, leading to substantially less allowable loss of tidal wetlands.

The law and associated policy, however pertains only to wetlands lost through known, legal activities subject to the permitting process, not illicit unpermitted losses, or losses due to natural causes. For non-tidal wetlands, DEQ has instituted a compliance program that inspects for unpermitted losses due to permittees exceeding allowable, permitted impacts or for sites that have filled wetlands without obtaining permits. In the past two years DEQ has found and required compensation for over 35 acres of nontidal unpermitted impacts.

Trends provided for losses of tidal wetlands are drawn from the Virginia Institute for Marine Science (VIMS) permit database of Joint Permit Applications for impacts to tidal wetlands. Data for 2006, 2007 and six months of 2008 were verified in the field by VIMS staff. Data for the second half of 2008 and 2009, however, were taken directly from permit applications and were not verified in the field. Site visits were conducted for 10-20% of all projects reviewed. VIMS notes that Joint Permit Application reviews frequently identify apparent inaccuracies in these numbers with regard to project impact “footprints” and wetlands resources impacted. Also, actual total losses may not be reflected by data in the VIMS Joint Permit Application database if project modifications submitted immediately prior, or during a public hearing, are not reported to VIMS. Furthermore, actual losses due to construction may not be precisely reflected by VIMS data as construction inspections, if performed, are not reported to VIMS. Finally, detailed mitigation plans for tidal wetlands losses may not be part of the Joint Permit Application

submissions, leaving VIMS unable to verify that mitigation required for “no-net loss” policy has been appropriately planned for tidal wetlands.

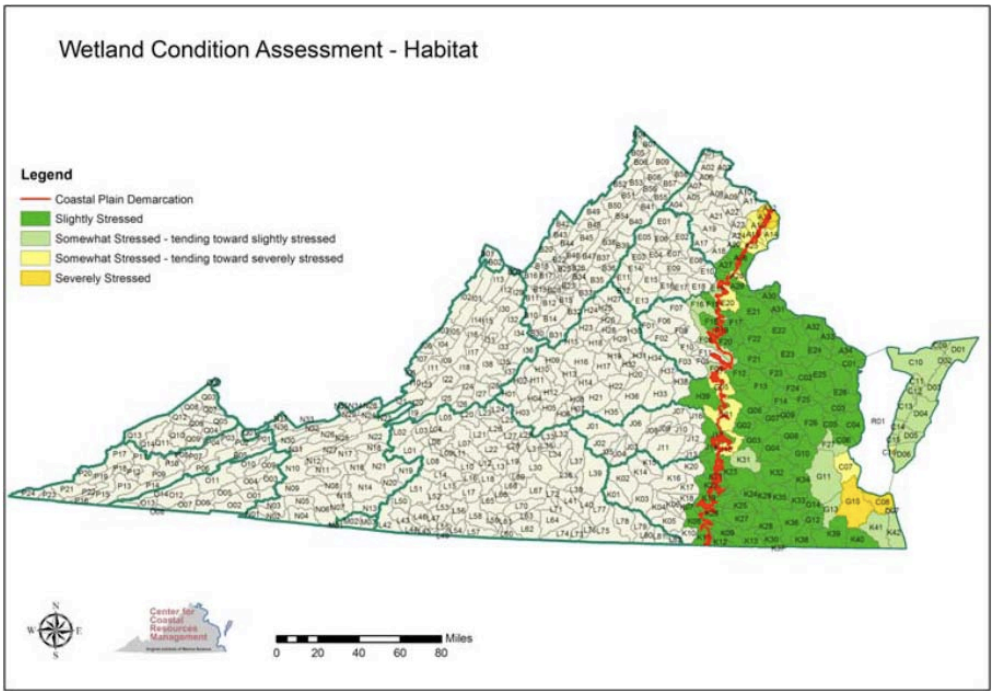
So, in total the above constraints call into question the accuracy of any gains and losses related to tidal wetlands.

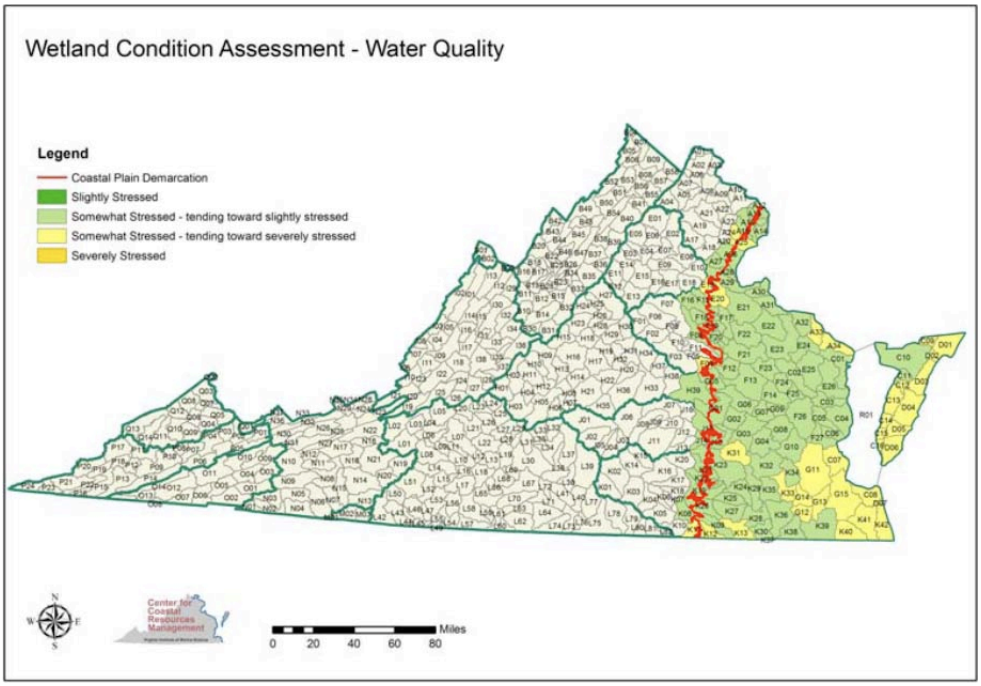
4. Identify ongoing or planned efforts to develop monitoring programs or quantitative measures for this enhancement area.

Wetlands Condition Assessment

Through funding from the EPA Wetlands Program, DEQ wetland managers and VIMS scientists have been working together to determine the status of wetland resources in Virginia, in terms of overall quality of wetlands in each watershed, beginning in the Coastal Plain. Using this information, Virginia can track changes in wetland acreage and function, target certain watersheds and help determine the effectiveness of compensatory mitigation replacing lost wetland acreage and function. Virginia DEQ has developed a long-term strategy for wetland monitoring and assessment that provides a framework for an ongoing assessment of the status of the Commonwealth's wetland resources and the success of both our wetland regulatory and voluntary programs.

Average habitat wetland condition and average water quality wetland condition per 14 digit HUC has been completed to assess overall condition of wetlands in Coastal areas and throughout Virginia. Since 2003, the overall wetland monitoring and assessment strategy has been to establish baseline conditions in various broad contexts, such as land use, watershed, and wetland type.





As additional data are collected, Virginia will use this sequential survey information to look at changes in wetland quantity and quality over time. This temporal analysis will be accomplished by continuing to refine the wetland database with information on wetland losses and gains in each watershed using the permit tracking database, as well as periodically conducting wetland quality assessments in select watersheds to make inferences on wetland condition. This, in turn, will allow for management decisions to be made that could provide additional protections for watersheds experiencing significant declines in wetland quantity and/or quality. For instance, monitoring information could be used to identify exceptional value wetlands for greater protection through permitting programs. Conversely, degraded wetlands could be identified as candidates for targeting wetland restoration projects.

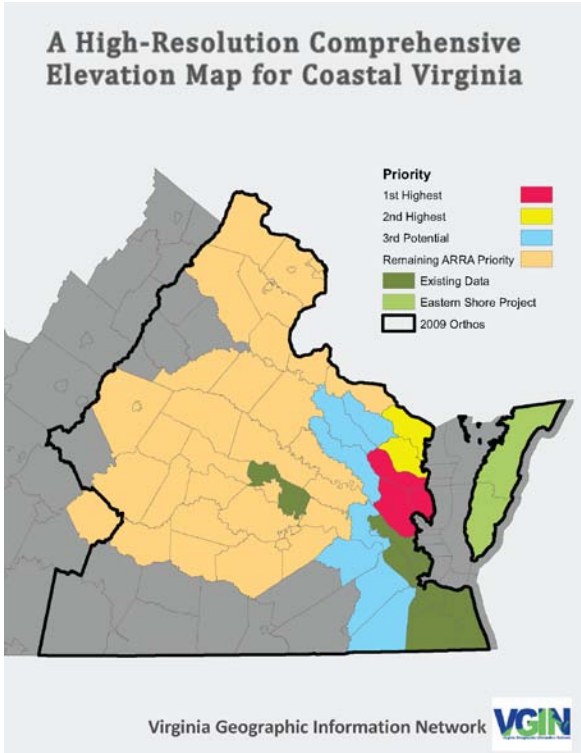
These monitoring objectives are designed to support regulatory decision-making, allow reporting of wetland condition, and provide information for policy development.

LIDAR Coverage

The Virginia Geographic Information Network (VGIN) of the Virginia Information Technologies Agency (VITA) has proposed a collection of high-resolution Light Detection and Ranging (LIDAR) data, and the creation of bare earth DEM datasets, in priority coastal areas of Virginia. The project will collect existing and acquire new high resolution LIDAR data for all of the area estimated likely to be impacted by rising sea levels as identified in the final report of the Governor's Commission on Climate Change.[6, 7]

[6] Governors Commission on Climate Change website: http://www.deq.state.va.us/info/climatechange.html
[7] FY2010 National Map Proposal, Virginia Geographic Information Network, Virginia Information Technologies Agency.

The Governor's Commission on Climate Change report suggested that Virginia agencies and localities should plan for at least a 2.3 foot rise in sea level, with an expected range of 2.3-5.2 feet in local areas. The report also identifies LIDAR data along with additional processing and application development as providing essential capabilities for states and localities in planning for specific sea level rise scenarios, street level storm surge predictions, identifying critical 'at risk' infrastructure, and other planning needs.



5. **Use the following table to characterize direct and indirect threats to coastal wetlands, both natural and man-made. If necessary, additional narrative can be provided below to describe threats.**

Type of threat	**Severity of impacts** (H,M,L)	**Geographic scope of impacts** (extensive or limited)	**Irreversibility** (H,M,L)
Development/Fill	H	E	H
Alteration of hydrology	M	E	H
Erosion	M	E	M
Pollution	L	L	M
Channelization	L	L	M
Nuisance or exotic species	H	E	M
Freshwater input	M	L	M
Sea level rise/Great Lake level change	H	E	H
Lack of freshwater	H	M	H

Development/Fill

Development pressures remain the greatest threat to wetlands in Virginia. While no net loss policies require mitigation to offset elimination of wetlands through development, the impact of construction and particularly residential construction continues to be of great concern. While DEQ tracks performance of non-tidal wetlands mitigation and takes corrective actions when mitigation has failed or not been performed, tracking of in-lieu fees and mitigation for tidal wetlands remains a challenge. The fill of tidal wetlands and hardening of shoreline due to development also has significant consequences related to the threat of sea level rise described below. In some cases, developed land can reduce the migration capacity of wetlands that would otherwise allow for adaptation to rising high-water lines. Existing data does not provide sufficient information regarding the elevation or condition of land in and around developed wetlands areas expected to be affected by sea level rise.

Nuisance or Exotic Species

Invasive species are non-native plant, animal, or microbial species that cause, or are likely to cause, economic or ecological harm or harm to human health.[8] Invasive species pose the second greatest threat to Virginia's native plant and animal species, and the economic loss due to invasive species in the U.S. is estimated ate over $137 billion.[9] Coordination of efforts to address invasive species was codified by the Virginia General Assembly in 2009.

Phragmites Australis, an invasive wetlands grass, is one example of an exotic species requiring continued action. Although several control efforts have been undertaken, the plant still poses a significant threat throughout Virginia's native wetland systems. Work supported by multiple partners, including the Virginia CZM has documented the extent of Phragmites on Virginia's Eastern Shore, Rappahannock River, and Back Bay. Mapping efforts will continue in 2010. These efforts have lead to outreach, education and targeted control by landowners and local, state and federal agencies. Phragmites is highly destructive of native wetland ecological services and values and demands continued attention.

Sea Level Rise

Sea level rise presents the greatest emerging threat to wetlands in Virginia. With conservative estimates of sea level rise in excess of two feet, the inundation of a very significant percentage of wetlands is likely. Virginia, however, unlike some other coastal states does not currently have any estimate of current or potential future losses in wetlands acreage based on elevation data. Though non-tidal wetlands may be affected and/or converted to tidal wetlands, the impact of sea level rise is expected to primarily affect tidal wetlands.

The elevation and condition of wetlands, and adjacent uplands, will determine in part the ultimate consequences of projected sea level rise. Elevations are not, however, currently mapped

[8] Executive Order 13112: Invasive Species. February 3, 1999.
[9] Pimentel, D., L. Lach, R. Zuniga, and D. Morrison. 2000. Environmental and economic costs of nonindigenous species in the United States. BioScience 50:1 53-65.

with sufficient precision to allow for a meaningful analysis, though current Light Detection and Ranging (LIDAR) technologies would offer the necessary level or resolution. A resilient shoreline may be able to adapt to sea level changes as wetlands migrate to appropriate areas thus mitigating some of the potential loss in acreage. It is unknown however, where shoreline conditions would allow for such adaptation.

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

Habitat type	**CMP has mapped inventory** (Y or N)	**Date completed or substantially updated**
Tidal Wetlands	Y	1970 – 1990
Beach and Dune	Y	2005, 2006
Nearshore	N	
Non tidal wetlands	Y	2003 – present

Coastal GEMS

The Coastal GEMS Application is an online inventory of water and land based natural resources developed by the Virginia CZM Program to be a "gateway to Virginia's coastal resource data and maps." Among other data layers, GEMS includes wetlands features from various sources. Interactive spatial data and detailed descriptions are available for the following:

- Tidal and non-tidal wetlands
- Chesapeake Bay dunes
- Beaches above high water
- Submerged aquatic vegetation

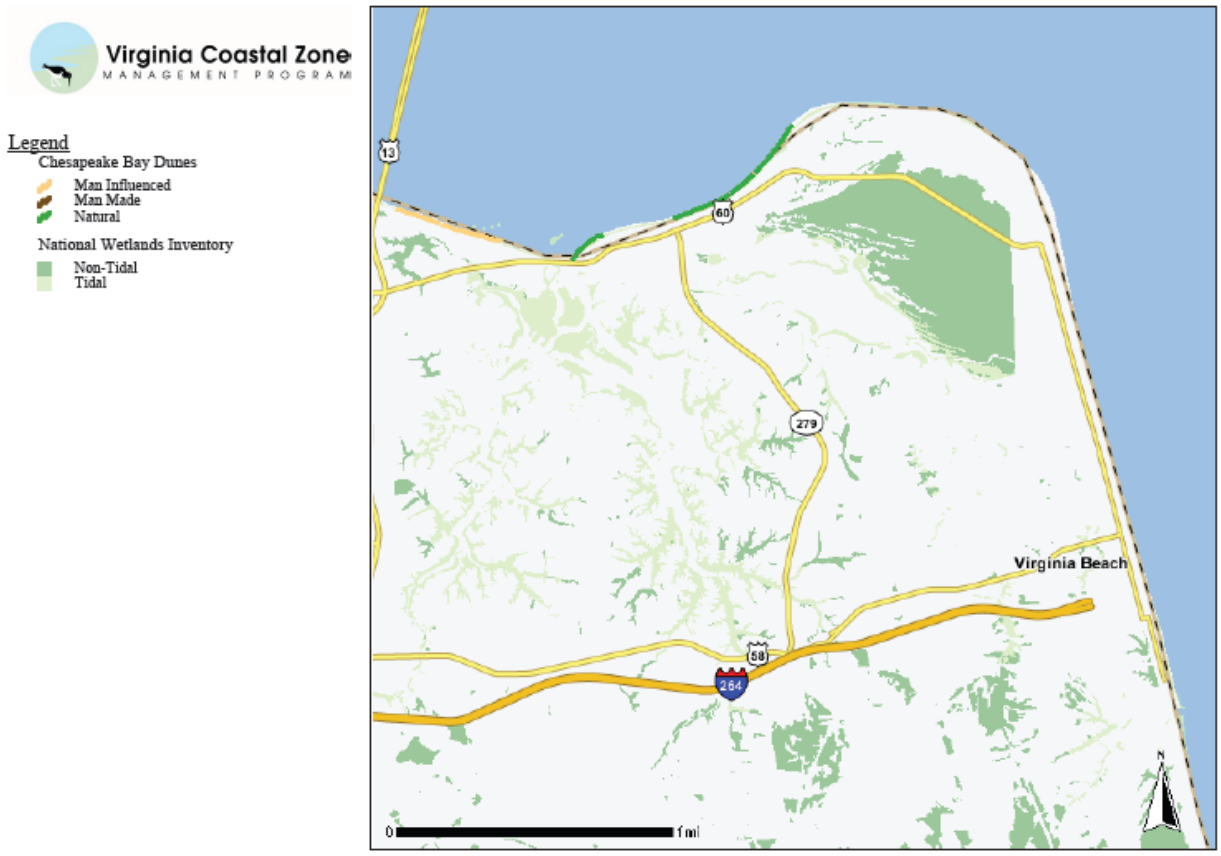
The source for wetlands data is the National Wetlands Inventory (NWI) maintained by US Fish and Wildlife Service. As mentioned previously, the NWI uses imagery generated over a greater than thirty-year inventory. While imagery for parts of the coastal zone has been generated within the past five years, imagery for other parts of the coastal zone has not been generated since the 1980s.

The Chesapeake Dunes spatial data shows primary and secondary sand dunes located along the shores of the Chesapeake Bay. The source of the data is the Chesapeake Bay Dune Systems study completed by VIMS, Shoreline Studies Program between 1998 and 2006. That research was funded by Virginia CZM.

The beaches above high water spatial data was developed in order to determine the extent of supratidal beaches (beaches above mean high water) that were, at the time, unregulated. Virginia's coastal localities that were outside the purview of the Dunes and Beaches Act (non-jurisdictional localities) were analyzed to determine the extent of their beaches. The Non-jurisdictional Beach Assessment data was collected between 2005-2006. In 2008, the Virginia General Assembly expanded the Coastal Primary Dunes and Beaches Act to cover the entire coastal zone, thus providing regulatory protection of supratidal beaches.

Chesapeake Bay Subaqueous Vegetation (SAV) beds mapping data was generated by VIMS from aerial photography flown in 2007. It is a portion of the full SAV dataset that extends back to 1971. While naturally occurring SAV beds have been absent from Virginia's seaside (Atlantic coast) since the 1930's, spatial data also exists for locations where eelgrass seeds have been disbursed by VIMS under the CZM's Seaside Heritage Program.

A Coastal GEMS map of the primary/secondary dunes and wetlands:



Tidal Marsh Inventory

Beginning in the 1970s, the VIMS Wetlands Advisory Program started mapping all tidal wetlands in support of the 1972 Virginia Wetlands Act. Work on developing the Tidal Marsh Inventories continued through the 1990s, with publications on a county-by-county basis. In 1990, a large-scale effort within the Comprehensive Coastal Inventory Program (CCI) created a GIS coverage of all marshes delineated in the Tidal Marsh Inventory Series.

Digital Shoreline Coverage

From 1989 to 1991, the CCI at VIMS developed spatial GIS data of the shoreline as a basic boundary layer for most analysis in coastal Virginia. USGS 7.5 minute, 1:24,000 scale, topographic maps were used to digitize the high water line.

Shoreline Situation Reports

Using TMI data, Shoreline Situation Reports (SSR) for Tidewater cities and localities were developed by VIMS in the 1970s. These reports have been the foundation for shoreline management planning in Tidewater Virginia cities and localities for more than 20 years. CCI has developed new protocols for collecting, disseminating, and reporting data relevant to shoreline management issues of today. With support from the Virginia CZM Program 309 funds, revised SSRs are being generated on a county-by-county basis using a new GIS shoreline database. The reports are now referred to as the Virginia Shoreline Inventory.

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

Contextual measure	**Cumulative acres for 2004-2010**
Number of acres of coastal habitat restored using non-CZM or non-Coastal and Estuarine Land Conservation Program (CELCP) funds	Tidal: 0 Non-tidal: Unknown
Number of acres of coastal habitat protected through acquisition or easement using non-CZM or non-CELCP funds	Tidal: 0 Non-tidal: Unknown

Management Characterization

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

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

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

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

Tidal Wetland Regulatory Program Changes

With Virginia CZM Program funding, the Virginia Marine Resources Commission (VMRC) revised the Wetlands Mitigation-Compensation Policy and Supplemental Guidelines in 2005 to eliminate a 1,000 square foot threshold for non-commercial projects requiring permits.

Additionally the Policy revisions recognized the potential for use of in-lieu fees to fund wetland restoration or creation projects as a last form of mitigation to be used to offset permitted wetland losses.

Another significant change occurred in 2008 when the Virginia Institute of Marine Science (VIMS) reduced its efforts to field verify the accuracy of all joint permit applications for permitted wetlands losses with on-site visits. Currently, on-site visits are performed for only 10-20% of applications. VIMS has redirected its advisory efforts to focus more on training for local wetland board members and staff.

Wetland Assessment Methodologies

As described above DEQ and VIMS have been working together on wetland mapping and assessment. As part of this, the VIMS Center for Coastal Resources Management has developed a multi-level tidal wetland inventory and assessment methodology for the estuarine segments of the York River. This methodology will provide VMRC and Virginia Department of Environmental Quality (DEQ) with the ability to report the current extent and condition of those estuarine wetlands. The methodology also provides a means for assessing three basic ecological functions of habitat, water quality and erosion protection for individual tidal wetland polygons from the National Wetlands Inventory. The methodology is intended to serve as a prototype for expanded investigations into other watersheds in the future.

From 2006 – 2008, CZM funded three VIMS grants, which include measures of tidal wetlands function. In 2006 and 2007, "Shoreline Management: Better Sill Design" Phases I and II researched the impacts of shill design on Chesapeake Bay shoreline health. In 2008, the "Living Shoreline Design and Construction Guidance Manual" project was funded to produce design and construction guidance for contractors, coastal managers, planners, local governments, homeowners and anyone else interested in sound management of Virginia's shorelines, including assessment of ecosystem functions.

As discussed, however, gaps exist in extent mapping, particularly with regard to tracking of actual tidal wetlands creation resulting from mitigation requirements and the use of in-lieu fees paid for mitigation. Additionally, voluntary wetland creation tracking for tidal wetlands is not managed by any one program, leaving Virginia unable to report on net gain commitments associated with Chesapeake Bay 2000 Agreements. For voluntary wetland creation, the issue of tracking gaps also pertains to non-tidal wetland areas. The wetlands database used by DEQ lacks the functions of current GIS technology so tracking precise location and extent of created wetlands is challenging. In order to better understand and report on these wetland issues, the Virginia CZM program worked with VIMs to develop a proposal for NOAA funding through the "Modernizing and Improving State Coastal Zone Management Information Systems" grant opportunity. If funded, the project should significantly expand the capability of VIMS to track and manage wetlands impacts. Although not funded in 2010, the Virginia CZM Program intends to revise and resubmit the proposal as future grant funding opportunities become available.

Special Area Management Plans (SAMPs)

Since the last Assessment, the Virginia CZM Program has funded Special Area Management Plans in the Middle Peninsula and Virginia Seaside. The Seaside SAMP includes significant focus on goals with implications for wetlands. For more information, see the SAMP Section of this assessment.

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

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

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

Gap or need description	**Select type of gap or need** (regulatory, policy, data, training, capacity, communication & outreach)	**Level of priority (H, M, L)**
Mapping of shoreline LIDAR elevations	Data	H
Tracking of actual mitigation efforts for permitted tidal wetlands losses	Data	H
Coordinated, statewide tidal and non-tidal wetlands extent data management	Data, Capacity	H
Restoration and acquisition program	Capacity	H

The 2005 Assessment of wetlands strategies found that there was a strong need for mapping and related data. Specifically, the Assessment found that there was a need for a higher level of field verification of wetland restoration and creation, and a need for a dynamic mapping tool for identification of various wetland types and conditions. No such mapping tool exists for current wetlands and as described above the lack of elevation data is particularly urgent with regard to sea-level rise. Overall, field verification of restored wetlands has actually declined. There is also a continued need for additional funding for wetlands acquisition and public outreach regarding the impact of development and fill.

Enhancement Area Prioritization

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

High __✓___
Medium ____
Low _____

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

The interagency Coastal Policy Team reviewed and ranked this issue at its February 17, 2010 meeting according to the following criteria: feasibility; importance and appropriateness. Up to 5 points were allotted to each of the three criteria so that a maximum score would be 15. Scores from 0-4.99 are considered low priority; 5–9.99 is medium priority and 10-15 is high priority. Wetlands received a score of 11.50.

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

Yes _____
No ___✓___

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

An identified priority need for wetlands was for the development of a database and reporting process for tracking coastal wetlands in Virginia. A project to address this need was submitted for funding under NOAA's "Modernizing and Improving State CZM Information Systems", but was not accepted. The project will be resubmitted as a project of special merit under the cumulative and secondary impacts shoreline strategy rather than developed as a separate strategy.

2000 Assessment		2005 Assessment		This Assessment (2010)	
High	_✓_	**High**	_✓_	**High**	_✓_
Medium	____	Medium	____	Medium	____
Low	____	Low	____	Low	____