

Maryland Department of Natural Resources  
Coastal Zone Management Program

CZMA, Section 309  
Assessment & Strategy

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## List of Acronyms

ARN	Aquatic Resource Network
BMP	Best Management Practices
CCI	Coastal Communities Initiative
CCMP	Comprehensive Conservation and Management Plan
CELCP	Coastal and Estuarine Land Conservation Plan
CSI	Cumulative and Secondary Impacts
CWIC	Chesapeake Bay Watershed Commitment Taskforce
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DMA	Disaster Mitigation Act
DNR	Maryland Department of Natural Resources
GIS	Geographic Information System
LID	Low Impact Development
LIDAR	Light Detection and Ranging
LPPRP	Land Preservation, Parks and Recreation Plans
MCBP	Maryland Coastal Bays Program
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MEIRS	Maryland Electronic Inventory of Recreation Sites
MEMA	Maryland Emergency Management Agency
MGS	Maryland Geological Survey
MOU	Memorandum of Understanding
NCMPMS	National Coastal Mgmt. Performance Measures System
NOAA	National Oceanic and Atmospheric Administration
PDA	Public Drainage Association
POS	Program Open Space
SHMP	State Hazard Mitigation Plan
SSEA	Strategic Shore Erosion Assessment
SWM	Storm Water Management
USACE	U.S. Army Corps of Engineers
VIMS	Virginia Institute of Marine Science
WRAS	Watershed Restoration Action Strategy
WSSC	Washington Suburban Sanitary Commission

## I. Introduction

### **Maryland's Coastal Zone Management Program**

Maryland's Coastal Zone Management (CZM) Program was federally approved in 1978 in response to the passage of the Federal Coastal Zone Management Act in 1972, which provides funds to coastal states to develop and administer coastal zone management programs. These programs must "preserve, protect, develop and, where possible, restore our coastal resources." Maryland defines the boundary of its Coastal Zone as the inland boundary of the counties bordering the Atlantic Ocean, Chesapeake Bay and the Potomac River, as far as the municipal limits of Washington, D.C., and includes 16 of the State's 23 counties and Baltimore City. The Maryland CZM Program coordinates multi-year, multi-agency initiatives that provide a framework for statewide and watershed-specific water quality, coastal hazards, public access and habitat restoration efforts.

### **Section 309 Coastal Zone Enhancement Grant Program**

Section 309 of the Coastal Zone Management Act (CZMA), as amended in November 1990, established a voluntary Coastal Zone Enhancement Grants program, which provides funding for projects that address one or more of nine specified enhancement areas: public access, coastal hazards, ocean resources, wetlands, cumulative and secondary impacts, marine debris, special area management planning, energy and government facility siting, and aquaculture. State CZM Programs undertake activities to address those areas they identify as priorities.

In 2000, Maryland developed a five-year Assessment and Strategy that addressed each enhancement area and established two Section 309 priorities: Cumulative and Secondary Impacts (CSI's) and Coastal Hazards. The State determined that the other Section 309 areas were more appropriately addressed through existing management programs or were of low to medium priority. For its 2006 Assessment, Maryland has again conducted an analysis of the nine enhancement areas and selected several areas for which to develop enhancement strategies. See Table 1 for a summary of enhancement priorities.

**Table 1. Enhancement Area Summary**

<b>Enhancement Area</b>	<b>Priority for §309 Strategy</b>	<b>Strategy Components (2006 – 2010)</b>
<i>Marine Debris</i>	Low	None
<i>Energy &amp; Government Facility Siting</i>	Low	None
<i>Wetlands</i>	Medium	NOAA Performance Measure Tracking Needs
<i>Special Area Management Plans</i>	Medium	None
<i>Cumulative and Secondary Impacts</i>	High	Coastal Community Initiative
<i>Coastal Hazards</i>	High	Coastal Hazards Strategy
<i>Public Access</i>	Medium	NOAA Performance Measure Tracking Needs
<i>Ocean Resources</i>	High	Aquatic Resource Network Vision for Our Ocean
<i>Aquaculture</i>	Medium	Aquatic Resource Network

### **Report Organization**

The remainder of this document is divided into three sections. The first section provides a summary of §309 funded enhancement efforts conducted between 2001 and 2005. The summaries address accomplishments, program changes and improvements. The second section of the document contains the analysis of the nine enhancement areas, in accordance with National Oceanic and Atmospheric Administration's (NOAA) final Section 309 Guidance, dated March 28, 2005. The final section of this report contains the 2006 Enhancement Strategy for Ocean Resources, Secondary and Cumulative Impacts and Coastal Hazards.

## **II. Summary of Past §309 Efforts 2001 -2005**

Maryland's last §309 Strategy (2000) was tied to advancing the management of Cumulative and Secondary Impacts (CSI) and Coastal Hazards. The CSI component of the strategy focused on the development and implementation of Watershed Restoration Action Strategies. The Coastal Hazards Strategy was organized according to several issue areas, including shore erosion, hazard mitigation planning and sea level rise. A number of activities were identified for each of these issue areas for the purposes of modifying and implementing various aspects of the State's Coastal Zone Management Program. An outline of the issue areas and a summary of the associated efforts and their program changes are provided below.

### **Cumulative and Secondary Impacts**

Under Cumulative and Secondary Impacts, the State's efforts focused on the development of Watershed Restoration Action Strategies (WRAS). The WRAS Program was a multi-year, multi-program approach to integrated watershed protection and restoration. The goal of the program was to comprehensively design and implement water quality and habitat improvement activities on a local watershed scale. This was accomplished by providing local governments with the financial and technical assistance necessary to develop and implement the strategies. Components of the planning process included watershed characterization, stream corridor assessment, public participation, goal setting and action plan development.

Maryland has several initiatives that support and/or require a "holistic" watershed approach when looking at issues such as stream buffers, land use, growth, and habitat, including the Chesapeake 2000 Agreement and Total Maximum Daily Loads. The Watershed Restoration Action Strategies worked to combine and coordinate these multiple programs and projects. With these efforts being closely related and having similar goals and approaches, efforts to implement them in a coordinated manner, through the WRAS helped to strengthen partnerships among CZM partners and provide comprehensive information to local governments, who are often the responsible party.

### **Accomplishments**

The WRAS Program provided local counties with extensive watershed technical assessment, capacity support and restoration services. Technical assistance provided by the WRAS Program included the development of a watershed characterization, stream corridor assessment and synoptic survey report. The watershed characterization report is a summary of all readily available natural resources and other data for a given watershed. The characterization report includes information on water quality, land use and cover, living resources and habitat. The characterization report, along with DNR's other technical reports, helped local governments identify and prioritize implementation projects, including those areas for potential wetland restoration and creation. This technical information was also used to develop comprehensive watershed restoration action strategies

The WRAS program provided for the adoption of program changes at the local level. By agreeing to participate in the program, local governments were required to include program changes as a component of their final strategies. This requirement was valuable in institutionalizing the strategy, including incorporation of strategy elements into local comprehensive plans and adoption of local implementing tools. The table below provides an overview of the program changes associated with the individual projects.

**Table 2: Local Government Watershed Restoration Action Strategies funded under §309 (FY2000-FY2005).**

Watershed (Local Jurisdiction)	Anticipated Program Change	Status
Middle Chester River - Kent County) (2001-2002)	<ol style="list-style-type: none"> <li>1) Kent County and Chestertown to review ordinances to facilitate infill development.</li> <li>2) Develop and implement restoration plan for Urieville Lake.</li> </ol>	<ol style="list-style-type: none"> <li>1) Kent County adopted a revised ordinance in 2002 that includes conservation subdivision requirements and encourages infill development.</li> <li>2) A draft restoration plan for Urieville Lake has been developed.</li> </ol>
Manokin River -Somerset County (2001-2002)	<ol style="list-style-type: none"> <li>1) WRAS recommendations to be included in update of County Comprehensive Plan and Land Preservation and Recreation Plan.</li> </ol>	<ol style="list-style-type: none"> <li>1) The October 2005 LPPRP references the WRAS in the Natural Resources Chapter.</li> <li>2) The County Comprehensive Plan is still under revision. The Forest Conservation Ordinance was revised to allow mitigation banking and listing the criteria, including a preference for sites within a WRAS.</li> </ol>
Isle of Wight - Worcester County (2001-2002)	<ol style="list-style-type: none"> <li>1) Develop a “critical area” program element for the Coastal Bays.</li> </ol>	<ol style="list-style-type: none"> <li>1) Passage of the Atlantic Coastal Bays Protection Act.</li> </ol>
Breton Bay - St. Mary’s County (2002-2003)	<ol style="list-style-type: none"> <li>1) Adoption of the Breton Bay WRAS by the County Commissioners.</li> <li>2) Builders for the Bay code and ordinance review.</li> </ol>	<ol style="list-style-type: none"> <li>1) WRAS document not formally adopted. However, WRAS recommendations were included in the Land Preservation Parks and Recreation Plan and Lexington Park Master Plan.</li> <li>2) County development review forum opted not to pursue the Builders for the Bay review.</li> </ol>
Bush River -Harford County (2002-2003)	<ol style="list-style-type: none"> <li>1) Implementation of an inspection program for septic systems.</li> <li>2) Implementation of code and ordinance revisions based on the site planning roundtable.</li> </ol>	<ol style="list-style-type: none"> <li>1) Septic ordinance passed (November 2003). Revises design, installation standards and includes inspection parameters.</li> <li>2) Builders for the Bay Site Planning Roundtable recommended model development principles. County needs to update its codes to incorporate roundtable recommendations.</li> </ol>
Upper Patuxent River - Anne Arundel County (2002-2003)	<ol style="list-style-type: none"> <li>1) Develop a framework for future stormwater retrofit efforts and creation of a business-government-community partnership.</li> <li>2) Development of a stormwater utility enterprise.</li> <li>3) Review and update land use ordinances.</li> </ol>	<ol style="list-style-type: none"> <li>1) Framework has been developed for a low impact implementation area in a targeted subwatershed area identified during the WRAS process.</li> <li>2) A consortium of NGOs funded by private groups is investigating citizen support of stormwater funding mechanisms.</li> <li>3) New Zoning and Development Ordinances have been adopted.</li> </ol>
Upper Patuxent River - Prince George’s County (2002-2003)	<ol style="list-style-type: none"> <li>1) Work with the Washington Suburban Sanitary Commission (WSSC) to develop a county-wide public sector inspection, enforcement and maintenance program for septic systems, including the development of regulations.</li> <li>2) The county will have a policy change to require that Low Impact Development (LID) be used for retrofit and redevelopment projects.</li> </ol>	<ol style="list-style-type: none"> <li>1) As part of the EPA funded LID and septic system demonstration project in the Upper Patuxent Watershed, the County hired a consultant to study the political and financial feasibilities of giving WSSC the responsibility of long-term operation and maintenance for private septic systems.</li> <li>2) The County requires that LID be used whenever it is a best fit. The County has requested funding through the Coastal Community Initiative to prepare legislative amendments to the county codes to prioritize the use of LID.</li> </ol>
Corsica River -Town of Centreville (2003-2004)	<ol style="list-style-type: none"> <li>1) Produce and adopt the Centreville Water Quality Protection Regulation and other supporting ordinances.</li> </ol>	<ol style="list-style-type: none"> <li>1) A Water Quality Protection Regulation has not been developed, but the Town is interested in pursuing this option and other listed ordinances.</li> </ol>
Corsica River -Queen Anne’s County (2003-2004)	<ol style="list-style-type: none"> <li>1) Consideration of a policy to promote the use of nutrient reducing septic system technology.</li> </ol>	<ol style="list-style-type: none"> <li>1) The county is still examining this policy.</li> </ol>
Lower Patuxent River - Calvert County (2003-2004)	<ol style="list-style-type: none"> <li>1) Implement OSDS Management Strategy on a watershed scale.</li> <li>2) Identify and adopt code and ordinance changes to further promote environmentally sensitive</li> </ol>	<ol style="list-style-type: none"> <li>1) County Comprehensive Plan adopted 2004. Waste Management section includes objective to reduce nutrient pollution from sewage treatment facilities and septic systems.</li> <li>2) Comprehensive Water &amp; Sewerage Plan</li> </ol>

	design.	currently being updated. 3) Watershed planner to be hired January 2006 to implement Mill Creek Nutrient Reduction Strategy. 4) The County is in process of rewriting Zoning Ordinance to include modifications to environmental regulations.
Newport and Sinepuxent Bays - Worcester County (2003-2004)	1) Inclusion of the WRAS into the County Comprehensive Plan. 2) Modification of the Comprehensive Plan for Water and Sewer Systems to require pretreatment for septic systems located within the critical area.	1) Watershed plans and specific recommendations contained in the Worcester County Comprehensive Plan, adopted March 2006.
Western Branch - City of Bowie (2003-2004)	1) Adoption of Green Building, LID, Waste Management, and Conservation Landscaping requirements.	1) Passed by the City Council (2003).
Western Branch - Prince George's County (2003-2004)	1) Development of a Green Building program, including adoption of standards and guidelines for retrofit and development projects. 2) A policy change requiring the use of LID in sensitive watersheds.	1) The County has developed a preliminary Greenbuilding Infrastructure Plan and is evaluating greenbuilding legislation for adoption. 2) See Prince George County Accomplishments for Upper Patuxent River WRAS.
Anacostia River - Prince George's County (2004-2006)	Under Development	
Chincoteague Bay - Worcester County (2004-2006)	Under Development	
Upper Chester River - Kent County (2004-2006)	Under Development	
Upper Chester River - Queen Anne's County (2004-2006)	Under Development	

### Statewide Program Changes

*Memoranda of Understanding.* The WRAS Program modified Maryland's program delivery process and included partnerships with other state agencies. A goal of the project was to encourage participation from multiple state agencies, including the Maryland Department of Natural Resources (DNR), Maryland Department of Planning (MDP), Maryland Department of the Environment (MDE), and the Maryland Department of Agriculture (MDA). These partnerships included providing technical assistance to the local government and evaluating potential financial assistance. As a networked program, the Maryland Coastal Zone Management Program (MCZMP) looked to include the watershed planning concepts in the revision of Memoranda (MOU) of Understanding between the DNR, the lead agency for the MCZMP, and other state agencies.

In November 2004, the MOU with the MDP was updated and signed. The revised MOU included the following language linked to the WRAS Program: "MDP and DNR will work together to promote the development of local watershed plans. MDP will provide support to these planning efforts with land use and population data and information when possible."

*Chesapeake 2000.* In addition to the efforts to complete revised MOUs with state agencies, State efforts during the strategy timeframe focused on development of a plan to meet Chesapeake 2000 Commitment 2.2.1, which requires the development of comprehensive watershed plans for two-thirds of the Chesapeake Bay Watershed by 2010. The WRAS Program is one method for meeting this goal. The State, through an



interagency management workgroup, developed a “Maryland Plan for Development, Implementation and Tracking of Watershed Management Plans.” In October 2003, the Governor’s Chesapeake Bay Cabinet adopted the Plan which was folded into the overall Chesapeake Bay Watershed Commitment Taskforce (CWiC) effort at developing criteria and a process to count watershed management plans tied to the Bay watershed commitment. CWiC has developed minimum criteria for counting watershed management plans. To date, 27% of the State’s area within the Bay watershed has or will be covered with watershed management plans after completion of those plans in progress.

## **Coastal Hazards**

Coastal hazard management in Maryland is a coordinated effort among federal, state and local agencies, along with numerous non-governmental partners. Guided by its 2000-2005 Coastal Hazards Strategy, the Coastal Program has taken an active leadership role in this effort over the past several years. The Strategy, implemented over the five-year time frame, was comprised of three main components: (1) comprehensive shore erosion planning; (2) sea level rise response planning; and, (3) hazard mitigation planning. Planning efforts and program change accomplishments with respect to each component are outlined below.

### 1) Comprehensive Shoreline Erosion Planning

Implementation of the shore erosion element of the Coastal Hazards Strategy was a detailed process, comprised of the following combination of data acquisition, planning, and public outreach components.

*Maryland Shorelines Online.* Maryland’s Coastal Program, in cooperation with Towson University, has developed an Internet portal for coastal hazards, titled *Maryland Shorelines Online*. The portal provides information and tools to coastal managers and decision makers, educators, and the public on coastal hazards and shoreline management. This site houses information on Maryland’s legal framework, permitting and regulatory guidance, educational materials, assessments, and spatial decision support tools for shore erosion and sea level rise. The tools provided on the website allow for the identification of potential shoreline protection and restoration options throughout the State to mitigate hazards and enhance natural shoreline habitat. The Portal also assists with enhancing shoreline planning and regulatory activities by centralizing access to shoreline environmental, physical, and infrastructure information.

*Shoreline Changes Study.* In 1997, the Maryland Geological Survey (MGS), in cooperation with Towson University, initiated the update of historical shoreline position maps and calculation of erosion rates throughout the 20<sup>th</sup> century. The multi-phase study was undertaken to support research and management of sources of non-point source pollutants, buffer areas of critical concern, and to reduce vulnerability to coastal hazards. The update of digital shoreline positions and calculations of linear rates of shoreline erosion across the State was completed in 2003. The updated Shoreline Changes Study used the Digital Shoreline Analysis System to create an automated approach to generate more accurate rate of change information. Approximately 250,000 positions (transects) along the shoreline were assessed for shoreline change. In 2005, the Shoreline Changes Study and historical shorelines were made available through an interactive mapping application, Shoreline Changes Online, for coastal managers, planners, and homeowners to view erosion data over the web at <http://shorelines.dnr.state.md.us/launchmapper.asp>.

The availability of new information and data, including the interactive map viewer, has enabled a number of improvements to State and local government shoreline management activities, including:

- Site-specific erosion rate information is now assessed during State review of project applications for shoreline stabilization.
- Kent County uses *Shorelines Online* to determine if non-structural shoreline erosion control methods are suitable in lieu of requested structural erosion control projects.

- Calvert County uses *Shorelines Online* to calculate setbacks based on erosion rate to implement the County's Bluff Setback Policy.
- *Shorelines Online* data is being used by the U.S. Navy to assess the applicability of "living shorelines" projects for shore erosion mitigation.
- Shoreline Change data was used during the development of local government hazard mitigation plans as required through the Disaster Mitigation Act of 2000.
- Shoreline Change data was used by MGS to calculate fine-scale estimates of the contribution of shore erosion to nutrient loading in the Chesapeake and Coastal Bays; to quantify the sediment load from shore erosion caused by Tropical Storm Isabel; and, to assess the potential impact of erosion on the Chesapeake Bay's "dead" zone.
- Shoreline Changes data was used in the 2002 EPA Chesapeake Bay Eutrophication Model to estimate the effects of shore erosion on sediment and nutrient loading to the Bay.
- Shoreline Changes data is used extensively for initial site reviews by Eastern Shore Resource Conservation and Development in implementing the Non-Structural Erosion Control Program for the State of Maryland.
- Shoreline Changes data was used in the Land Conservation and Acquisition Prioritization Criteria for Maryland's Program Open Space to determine potential shoreline restoration opportunities for waterfront parcels available for acquisition.

*Comprehensive Shoreline Inventory (CSI).* Maryland's Coastal Program contracted with the Virginia Institute of Marine Sciences (VIMS) to prepare a Comprehensive Shoreline Inventory that captures baseline shoreline conditions throughout the tidal portions of Maryland's coastal counties. Shoreline features and conditions were identified through a three-tiered shoreline assessment approach. The Inventory divided the shorezone into three regions: 1) immediate riparian zone (land use), 2) bank (bank characteristics such as height, bank type, etc., and shoreline buffers), and 3) shoreline features (shoreline attributes including bulkheads, riprap, marinas, boat ramps, docks, etc.). Data from the survey was processed to create three GIS coverages, displayed through reports, summary tables, and maps, which are viewable online at <http://ccrm.vims.edu/gisdatabases.html>. Uses of CSI, include the following:

- CSI data is viewed by counties (e.g., St. Mary's, Somerset, Worcester, Harford, Anne Arundel) and the Maryland Coastal Bays Program to assist in the day-to-day planning activities related to the Chesapeake and Coastal Bays Critical Area Act.
- St. Mary's County used the CSI to develop a damage assessment of shoreline structures and piers lost during Tropical Storm Isabel.
- The CSI was incorporated into HAZUS-MH to provide shoreline conditions to conduct the level-one analysis of flood vulnerability in Maryland.
- The CSI was merged with the Stream Corridor Assessment used in the development of the Watershed Restoration Action Strategy (WRAS) program to provide a watershed view of non-tidal and tidal shoreline conditions.

*Promotion of Alternative Stabilization Methods.* "Living Shorelines" describes a shoreline management practice that: (1) provides erosion control benefits; (2) protects, restores or enhances natural shoreline habitat; and (3) maintains coastal processes through the strategic placement of plants, stone, sand fill and other organic materials. The Coastal Program has been particularly active in promoting "living shoreline" efforts. The Coastal Program funded a study to evaluate the effectiveness of existing shoreline treatments that incorporate a "living shoreline" components in their design. See Coastal Hazard Assessment for more detail. The Coastal Program also cosponsored a Contractor's Training on Living Shorelines installation. The half-day, entry-level course was designed to introduce participants to site selection criteria, project and design elements, online information and mapping, and permitting considerations. Over 40 participants attended and received complimentary training materials, including a training manual.

*Strategic Shore Erosion Assessment (SSEA).* From 2000 – 2002, a NOAA Coastal Services Center, Coastal Management Fellow, worked with the Coastal Program to initiate the development of a comprehensive approach to shore erosion planning for Maryland. The Fellow was tasked with developing a protocol to create regional strategies to deal with shoreline erosion issues. The Fellow worked closely with two counties, Dorchester and St. Mary's, to identify an approach to balance the need to address risk from erosion, while also maintaining natural shoreline habitat. The developed protocol became the foundation for the Strategic Shore Erosion Assessment (SSEA), currently under development. See the 2006 – 2010 §309 Coastal Hazards Strategy for more information.

In 2002, Coastal Program staff worked with DNR's Shore Erosion Control Program to integrate the protocol developed for the SSEA into the Program's Project Selection Criteria and Financial Assistance Priority Rating System. Environmental and habitat enhancement considerations are now incorporated into the rating system which creates a score for each homeowner's project based on criteria such as infrastructure threat from erosion, and an applicant's financial need.

*Chesapeake Bay Shoreline Erosion Feasibility Study.* In 2003, DNR signed a formal agreement to update the 1990 Chesapeake Bay Shoreline Erosion Feasibility Study. The updated study, titled the Maryland Coastal Management Feasibility Study, is an effort to comprehensively examine erosion hotspots and areas of concern throughout the Maryland portion of the Chesapeake Bay. Final products of this study will be completed mid-2008 and will include a Master Plan for addressing "areas of concern," partial designs for 14 projects, and two outreach manuals for waterfront property owners and marine contractors.

The efforts detailed above have produced a tremendous wealth of data and increased knowledge regarding shore erosion for the State of Maryland. Numerous program changes have resulted, with many more on the horizon as data becomes further integrated into local and state planning processes. Although more work is still needed to fully implement comprehensive shore erosion planning, statewide, the significant accomplishments outlined below lay the framework necessary to complete the process during the next five years.

## 2) Sea Level Rise Response Planning

Much of the framework for furthering sea level rise response planning in Maryland was detailed in the 2000 document, "A Sea Level Rise Response Strategy for the State of Maryland." The efforts and accomplishments discussed below highlight the progress the State has made to implement recommendations contained in the Strategy over the past five years.

*LIDAR Acquisition.* As identified in the Strategy, one of the most outstanding needs to further sea level rise planning and response in the State was the acquisition of high-resolution topographic data, also known as LIDAR. To date, over 1.5 million dollars in funds have been provided by Maryland's Coastal Program, County funds, and NOAA Coastal Services Center grants to acquire and process LIDAR. LIDAR provides elevation information at a scale never before offered and is improving the study and identification of not only sea level rise, but also flood and storm surge hazards. LIDAR acquisition was initiated in the low-lying Eastern Shore counties of Maryland due to their vulnerability to coastal flood events and potential impact from sea level rise.

*Economic Cost of Sea Level Rise Study.* The Coastal Program contracted with Towson University to assess the potential economic impact of sea level rise induced flooding and inundation within pilot study areas in three low-lying coastal areas. LIDAR data was used to derive one, two and three-foot elevation contours to determine the potential reaches of sea level rise over a 100-year time frame within three "broadly representative" non-urbanized communities along the Chesapeake Bay. The contour maps of areas

potentially subject to sea level rise impacts were subsequently supplemented with an analysis to assess the potential economic impacts associated with increased flooding and inundation.

The Study's assumptions and the detailed economic analysis were extremely complex. Therefore, DNR is not utilizing the Study for widespread public outreach efforts or for future funding allocations. The Study is being used, however, as an independent assessment of the potentially extensive impacts of sea level rise in the State of Maryland. Lessons learned from the Study with regard to the type, degree, and timing of potential sea level rise impacts for differing geographic coastal regions will be valuable to the State as it continues its sea level rise and coastal hazard response efforts. Lessons learned in terms of the technical aspect of the modeling effort (i.e., selection of sea level rise scenarios) also proved valuable and have assisted the Coastal Program in design choices for the Worcester County Sea Level Rise Inundation Model.

*Worcester County Sea Level Rise Inundation Modeling.* Starting in 2004, DNR has been working with the U.S. Geological Survey (USGS) to model sea level rise inundation for Worcester County. USGS used three sea level rise scenarios to model the potential zones of inundation. The first scenario was the status quo or the historic rate of sea level rise in the region. The two remaining were based on a range of accelerated rates per the Intergovernmental Panel on Climate Change. Outputs were also developed coupling sea level rise projections with storm surge associated with Category 1 – 4 hurricanes.

Data from the model, along with sample outputs, has been presented and transferred to Worcester County for analysis. USGS and DNR are currently in the process of completing the final report (anticipated for release in August 2006), which will accompany the model. Despite its draft status, data from the modeling effort has already proven quite useful to local planners and elected officials who are charged with implementing several action items related to sea level rise planning contained in the Comprehensive Conservation and Management Plan for Maryland's Coastal Bays National Estuary Program and the updated the Worcester County Comprehensive Plan. Following the release of the final report, the Coastal Program will be working with the Worcester County Department of Comprehensive Planning to evaluate opportunities for integrating use of the model into local decision-making processes.

*Town of Crisfield, Comprehensive Plan Update.* The Town of Crisfield was selected as a Priority Place in 2005. To receive program redevelopment funds and technical assistance through the Priority Places Program, an updated comprehensive plan was required that outlines opportunities to implement smart growth principles. Crisfield is a low-lying coastal community with a large portion of the community one foot above sea level and at an elevation below a Category 1 Storm Surge event. Therefore, smart growth concepts of clustering and increasing density were not compatible with flood hazard mitigation strategies. The Coastal Program provided the Town of Crisfield the best data available related to sea level rise, coastal flooding and storm surge for analysis during their ongoing comprehensive planning process. The Program also provided information and data on erosion hazards and outlined opportunities to redirect critical facilities like a hospital and new development out of harms way. This effort provided a framework of products and services the Coastal Program is hoping to provide too many other Eastern Shore communities.

### 3) Hazard Mitigation Planning

The 2000-2005, §309 Coastal Hazards Strategy outlined several opportunities for improving hazard mitigation at the State and local levels. Accomplishments related to hazard planning are outlined below.

*Floodplain Map Modernization.* The Maryland Department of the Environment (MDE) Business Plan for Map Modernization (2004-2008) outlines the State's vision for modernization of the State's flood studies and maps. Maryland's vision for floodplain management is closely coupled with its vision for map modernization. MDE seeks to reduce costs associated with traditional detailed studies by developing a new set of "live" studies (digital verses paper product), which can be modified as watershed conditions change.

Any proposed changes can be modeled to keep the maps current as permits are issued. LIDAR data is being used to develop the more accurate map products.

*Surge Inundation Mapping.* LIDAR data has also been used by the U.S. Army Corps of Engineers to develop surge inundation models for Maryland's Eastern Shore Counties. These counties are the lowest areas in the State and some areas are experiencing significant growth pressures. The maps are essential in expanding our knowledge of potential impacts and identifying vulnerable communities and infrastructure. These maps have been provided to local comprehensive planning and emergency management offices. Extension of these mapping efforts into all coastal counties is needed and under consideration.

*Coastal Bays Hazards Initiative.* In February 2004, the Coastal Bays Policy Committee comprised of the Secretaries of DNR, MDE, MDP, and MDA; Mayor of Ocean City; Worcester County Commissioners; and Superintendent of Assateague National Seashore and the EPA, directed the formation of a Task Force to develop recommendations within six months on the most effective, efficient and economical means to integrate new hazard planning technologies into existing planning processes. Work Group Findings and Recommendations, published in August 2004, established the groundwork for extending the application of the tools and products throughout the State, and resulted in the following accomplishments:

- The findings influenced the development of the Worcester County Hazard Mitigation Plan.
- Surge inundation was subsequently incorporated into Worcester County Sea Level Rise Inundation Modeling efforts.
- Promoted the Coastal Program's development of *Maryland Shorelines Online*, and the move towards serving information and maps through interactive web-based applications.
- Findings highlighted the disconnect between emergency management and comprehensive planning when addressing and managing coastal hazards and influenced the Coastal Program to sponsor two staff representatives from each of the State's 16 coastal counties to attend the *Hurricane Isabel in Perspective Conference*.

*Local Hazard Mitigation Plans.* In November 2004, the Maryland Emergency Management Agency (MEMA) completed the Maryland State Hazard Mitigation Plan (SHMP) and associated mapping pursuant to regulations established by the Disaster Mitigation Act (DMA) of 2000. The goal of the SHMP is to reduce the loss of life and property damage associated with hazard events in Maryland. MEMA complied with this priority as considerable effort has been put forth to map state-owned and critical facilities, as well as the hazard areas for eleven other hazards. The most important aspect of this mapping effort was the identification of facilities, total populations at risk, and vulnerable populations at risk within hazard areas. The data sets and mapping effort will continue to evolve and improve as new data and technologies become available. MEMA considered historic shoreline changes data during the development of the SHMP, which was then used by local governments as the baseline/starting point of information for local hazard mitigation planning activities.

Under the DMA, local governments are also required to develop multi-hazard mitigation plans and generate map products on vulnerable populations. Plans must be revised on a 5-year schedule; however, annual reviews, particularly map updates are encouraged. Fifteen of Maryland's coastal counties have adopted local hazard mitigation plans. §309 funding was awarded to Baltimore and Prince George's Counties through a competitive grant process to further develop and expand the coastal aspects of their local hazard mitigation plans. Both counties concentrated on coastal flooding in their respective counties to improve future hazard management and mitigation responses. Both Plans were completed just prior to Hurricane Isabel making landfall in 2003. Baltimore County used the products from the flood hazard mitigation portion of their Plan to identify potential flood prone areas and then tailored their evacuations efforts in accordance to these mapped areas.

### **III. Enhancement Area Analysis**

Every five years, Coastal Zone Management Programs are asked by the National Oceanic and Atmospheric Administration (NOAA) to assess the status of nine coastal enhancement areas identified in Section 309 of the Coastal Zone Management Act, as amended. The enhancement areas are: public access, coastal hazards, ocean resources, wetlands, cumulative and secondary impacts, marine debris, special area management plans, energy and government facility siting and aquaculture. The assessment process gives states an opportunity to review the status of these programs, record changes and identify gaps.

The 2006 Assessment was developed by answering the assessment questions prepared by NOAA in its guidance dated March 28, 2005. The goal is to determine the status of each enhancement area since the previous Assessment. The following information is provided for each enhancement area: (1) §309 program objectives; (2) resource characterization; (3) management characterization; and, (4) conclusion. The priority of each area is ranked as “high,” “medium,” or “low.” Throughout the document, §309 funded activities are identified by a statement to that effect. If no reference is made to §309, other resources supported the activity.

## A. PUBLIC ACCESS

### Section 309 Programmatic Objectives

1. *Improve public access through regulatory, statutory, and legal systems.*
2. *Acquire, improve, and maintain public access sites to meet current and future demand through the use of innovative funding and acquisition techniques.*
3. *Develop or enhance a Coastal Public Access Management Plan which takes into account the provision of public access to all users of coastal areas of recreational, historical, aesthetic, ecological, and cultural value.*
4. *Minimize potential adverse impacts of public access on coastal resources and private property rights through appropriate protection measures.*

### Resource Characterization

#### **Extent and Trends in Providing Public Access.**

1. Provide a qualitative and quantitative description of the current status of public access in your jurisdiction. Also, identify any ongoing or planned efforts to develop quantitative measures to assess your progress in managing this issue area.

DNR's Coastal Program enhances public access sites each year. Table 3 outlines public access improvements funded by the Coastal Program between 2000 and 2005. The Coastal Program will be working over the next year to better assess progress in managing public access and to develop necessary quantitative measurements under the National Coastal Management Performance Measures System.

**Table 3.**

<b>Site</b>	<b>Project</b>	<b>Year</b>
<i>Otter Point Creek</i>	Pier replacement and an ADA walkway created.	2000
<i>Otter Point Creek</i>	Parking lot improved. ADA parking spots included and native vegetation planted.	2001
<i>Patuxent River Research Park</i>	Installation of restrooms and an Educational Wet Lab.	2003
<i>Town of Denton/Crouse Park</i>	Installation of ADA compliant boardwalks with educational signs.	2004/2005

The State is participating in the Chesapeake Bay Program Public Access Workgroup. The workgroup is composed of representatives from state, federal, and local government and is charged to address the public access commitments set forth in the Chesapeake 2000 Agreement. The Workgroup promotes public access to the Chesapeake Bay and its tributaries. Inventories, mapped existing sites, and technical reports on how to select and develop public access areas are products of the workgroup. The Gateways Program is currently promoting the linkage of access areas and the development of water trails. A future focus will include working with localities to address public access in local comprehensive plans.

DNR's Greenways and Water Trails program has mapped over 600 miles of water trails in the State. This effort has been funded by the Land and Water Conservation Fund, created by Congress in 1964 and funded primarily from fees paid by companies drilling offshore for oil and gas. DNR's Waterway Improvements Program also has funded Greenways and Waterways. Lands and waters provide recreational opportunities, provide clean water, preserve wildlife habitat, enhance scenic vistas, protect archaeological and historical sites, and maintain the pristine nature of wilderness areas.

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

Demand for coastal public access is great. DNR conducted a Maryland Waterway Use Survey in 2003, with a public access demand component. Results of the survey were compiled in Maryland's Recreational Boating and Infrastructure Plan (DNR, 2004). As stated in the Plan, there are substantial new and ongoing needs with regard to boating facilities. As the state's population continues to increase, the demand for boating facilities and access will also grow. Existing facilities are aging and in need of continual maintenance and substantial upgrades. New facilities for trailered and non-trailered boats located outside the heavily concentrated area in the central part of the state would improve boating conditions and safety. The majority of boating facilities were developed 20 to 40 years ago, before the establishment of the Critical Areas Law and before the decline in aquatic resources and degradation of water quality required more stringent regulation of shoreline alterations. Today, it is more challenging to find suitable sites for new facilities and the existing facilities are of an age where extensive upgrades are commonly needed. Additionally, demand for public access is assessed through local and state Land Preservation, Parks and Recreation Plans (LPPRP), which are updated every six years.

### **3. Identify any significant impediments to providing adequate access, including conflicts with other resource management objectives.**

The price of coastal lands makes purchase challenging. Forestry, agriculture, conservation, and recreational user groups compete for undeveloped coastal land. For example, the Coastal and Estuarine Land Conservation Program (CELCP) was developed to protect coastal and estuarine lands with important ecological, conservation, recreational, historical or aesthetic value. CELCP can provide substantial funding to DNR's Program Open Space (POS), but the money is not to be used for land that continues to be used for forestry or agriculture.

### **4. Please explain any deficiencies or limitations in data.**

Data from state, county, local, and other lands with coastal public access is not compiled in a comprehensive database that would permit mapping or tracking of data. There are three databases used to track public access:

Program Open Space Database. POS has managed 4,700 projects since 1969. POS maintains an Access database of POS lands. Data for early years is in microfilm. The database contains a "facility code" category (e.g., piers, fishing access) and a category for funding information relating to properties.

Maryland Electronic (Online) Inventory of Recreation Sites (MEIRS). MEIRS is an interactive database of statewide recreational sites maintained by the MDP with assistance from DNR. The database was begun in 2003 to provide an up-to-date inventory of public and private land with outdoor recreation sites and facilities related to distribution and expenditure of POS funds. Data populating the database is voluntarily provided by counties and state agencies and thus differs in completeness, quality, and definitions of categories. DNR data was last comprehensively updated in 1996 and a bulk data upload tool is desired by DNR in order to again update the database. In the future, the public will be able to search the inventory for recreational sites that meet their needs using a modified version of the application.

DNR Resource Planners Database. DNR's Resource Planning Division provides statewide technical assistance and analysis for public land acquisition, development and resource management, including land and water mapping services, use plans, property control functions and impact assessments. The Resource Planning Division also maintains a database of DNR lands. The Resource Planning and POS databases link via the common category of deed (i.e., of DNR owned land and conservation easements). The Resource Planning database may be the best place to enter and track Coastal Program recreation data (e.g., dune walkovers, ADA compliant access) because DNR planning interacts both with POS and MEIRS.



**Table 4.**

<b>Access Type</b>	<b>Current Numbers</b>	<b>Changes Since 2000</b>
State /County /Local parks  Acres of parks	State DNR land: 239,134 acres and 175 parks.  County and Municipal recreational lands inventoried in MEIRS: county: 28,824 acres, municipal: 27,557 acres	DNR land: increase of 34,413 acres and 18 land units. County and municipal data in MEIRS not tracked by year
Beach/Shoreline access sites	Worcester County has approximately 30 miles of coastline on the Atlantic Ocean (9 miles of ocean beach in Ocean City and 21 miles of beach on Assateague Island). A comprehensive list of beaches and shoreline access sites occurring on state, county, and public right of way is not currently available or tracked.	Unknown (data not compiled)
Recreational boat (power or non-power) access sites	152 boat ramps listed in coastal counties on DNR's boat ramp locator web page: <a href="http://mddnr.chesapeakebay.net/fish/state2.html">http://mddnr.chesapeakebay.net/fish/state2.html</a> and 183 boat ramps and slips listed in MEIRS	Unknown (MEIRS and DNR boat ramp locator not tracked yearly)
Designated scenic vistas or overlook points	25 scenic byways are designated in coastal counties	Increase of 25
State/locally designated perpendicular rights-of-way (i.e., street ends, easements)	A list of perpendicular rights-of-way is not currently tracked or available.	Unknown (data not compiled)
Fishing points (i.e., piers, jetties)	206 fishing points comprised of 82 fishing piers, 21 ocean sites and 103 estuarine sites (MEIRS). 261 boat ramps and piers (east of the fall line) listed in the 2000 Public Access Guide: Chesapeake Bay, Susquehanna River, and Tidal Tributaries.	Unknown (MEIRS not tracked yearly)
Coastal trails / boardwalks and # miles	Boardwalks can be found at Ocean City, Havre de Grace, Chesapeake Beach, North Beach, Rock Hall, Cambridge, Annapolis, and Eastern Neck National Wildlife Refuge. Approximately 600 miles of potential and existing watertrails have been mapped in Maryland.  330 miles of coastal trails (e.g., bike, off road vehicle, hiking, equestrian, multiple use) listed in MEIRS. Motorized vehicles share use with a designated hiking trail along most of the 21 miles of beach on Assateague Island.	Unknown (MEIRS not tracked yearly)
% ADA compliant access	9.2% of accessible county/municipal/DNR fishing sites; 3.8% of accessible DNR piers/boat ramps; one accessible walkway listed in Accessibility for All Database of DNR lands. The Accessibility for All database provides a searchable tool for accessibility on state lands.	Unknown (data not tracked yearly)
Dune walkovers	A comprehensive list of dune walkovers is not currently available or tracked.	Unknown (data not compiled)
% of total beach miles that are public beaches with water quality monitoring and public notice	All of Maryland's beaches (approximately 250) are now considered for monitoring, with high-priority beaches (i.e., more people, proximity to potential pollutants) receiving monitoring. Counties are responsible for monitoring and notification. The decision of whether and how to close or post advisories is discretionary.	Unknown (beach miles not tracked by MDE)
Beach mile days that are closed due to water quality concerns	Advisory and closure data unavailable for 2000-2002. Five beaches were closed in 2003, number of advisories is unavailable. Twelve beaches were closed and twelve received advisories in 2004. Ten beaches were closed and eighteen	Unknown (MDE missing data for 2000 and number of days affected not tracked)

	received advisories in 2005. Number of days advisories/closures in effect not provided by MDE. Beach length data unavailable.	
Existing public access sites that have been enhanced (i.e., parking, restrooms, signage)	A comprehensive list of enhanced public access sites is not currently available or tracked. Information may be available from MEIRS if “public access sites” and “enhanced” were defined in a way that corresponds with current categories.	Unknown (data not compiled)

**5. Does Maryland have a Public Access Guide or website? How current is the publication or how frequently is the website updated?**

DNR’s Coastal Program posts an online map of public access sites enhanced by the program at [http://www.dnr.state.md.us/bay/czm/public\\_access\\_02.pdf](http://www.dnr.state.md.us/bay/czm/public_access_02.pdf). The Maryland Coastal Bays Program and DNR’s Coastal Program published the map: “Boater’s Guide to Maryland’s Coastal Bays” in 2003 for public use. DNR’s Greenways & Water Trails Program lists its water trails and maps online at [www.dnr.state.md.us/greenways/watertrails.html](http://www.dnr.state.md.us/greenways/watertrails.html). DNR’s Fisheries Program maintains an online map of public boat ramp facilities throughout the state at <http://mddnr.chesapeakebay.net/fish/state2.html> and an online description of water trails in the state at <http://www.dnr.state.md.us/outdoors/boating.html>. DNR also provides a listing of ADA accessible features on public lands at <http://www.dnr.state.md.us/accessforall/>. Websites are updated every one to five years.

The Chesapeake Bay Program maintains an interactive map of public access sites at <http://maps2.chesapeakebay.net/> and a searchable guide to over 500 major public access sites in the Chesapeake Bay region at [www.chesapeakebay.net/info/visit.cfm#rec](http://www.chesapeakebay.net/info/visit.cfm#rec). The Chesapeake Bay Gateways Network is a partnership system of 145 parks, wildlife refuges, museums, historic communities and trails in the Chesapeake Bay watershed. The National Park Service coordinates the Chesapeake Bay Gateways Network’s online, searchable database of Chesapeake Bay destinations at [www.baygateways.net/visit.cfm](http://www.baygateways.net/visit.cfm).

**Management Characterization**

**For each of the management categories below, identify significant changes since the last assessment.**

**Table 5.**

Management Category	Changes Since Last Assessment	Funding Source (§309, §306, or other)
Statutory, regulatory, or legal system changes that affect public access	None	N/A
Acquisition programs or techniques	CELCP	§306
Comprehensive access management planning (including development of GIS data layers or databases)	Waterway Trail maps	Portion from §306
Operation and maintenance programs	None	N/A
Funding sources or techniques	Governor’s Land Conservation Policy	Other
Education and outreach (access guide or website, outreach initiative delivered at access sites, other education materials such as pamphlets)	Gateways Program	Other
Beach water quality monitoring and/or pollution source identification and remediation programs	Revised Water Quality Standards	Other

**For categories with changes: Summarize the change. Specify whether it was a §309, 306a, or other CZM driven change and specify funding source. Characterize the effect of the changes in terms of both program outputs and outcomes.**

*Coastal and Estuarine Land Conservation (CELCP).* In June 2005, DNR submitted its Coastal and Estuarine Land Conservation Plan (CELCP) to NOAA for approval. CELCP targets those lands for preservation that have the greatest ecological value based on detailed scientific analysis. CELCP identifies protected and unprotected Green Infrastructure land within Maryland's coastal zone, as well as ecologically significant areas (ESAs). CELCP identifies the process and the parameters the State will use when seeking to preserve land with CELCP program funds. One of the objectives of CELCP is to improve public access.

*Maryland's Land Conservation Program Policy.* In December 2003, Governor Robert L. Ehrlich, Jr. announced a new focus for State land conservation and preservation efforts. The Governor identified new administrative policies to enhance Maryland's existing conservation and preservation programs. Accordingly, Maryland will focus all land conservation programs on the Bay, outdoor recreational facilities, and land base for agricultural and forestry industries. Governor Ehrlich also directed State agencies to meet existing state land preservation goals of the 2000 Chesapeake Bay Agreement and the prime agricultural land preservation goals of Senate Joint Resolution 10 (2002) for Prime Agricultural Land.

*Greenways and Water Trails.* Since 1999, DNR's Greenways and Water Trails Program has focused on creating a statewide network of water trails to compliment the statewide greenways and green infrastructure networks. The Greenways and Water Trails Program coordinates the development of water trails statewide and provides technical, mapping and design assistance to local governments to help plan, implement, and promote water trails. Greenways and Water Trails staff is responsible for tracking and reporting on Maryland's progress in achieving the 2000 Chesapeake Bay Agreement goals for establishing new water trails and improving public access and also serve on the Bay Program's Public Access Workgroup and the National Park Services' Gateways and Water Trails Workgroup. The Greenways Program has mapped watertrails for over ¾ of the Potomac River; watertrails in Fishing Bay and Point Lookout; and issued a new Statewide Land and Water Trails Map in 2002.

*Revised Water Quality Standards.* In Maryland, Water Quality Standards and regulations for beaches are published in COMAR 26.08.09 and 26.08.02.03. Maryland recently amended 26.08.09 to be consistent with the federal National Beaches Act of 2000 and approvable by the U.S. Environmental Protection Agency (EPA). Changes include: (1) adopting *E coli* and *Enterococci* as bacteriological indicators for beach monitoring; (2) prioritizing the monitoring of beaches based on risk; and, (3) including all beaches in the prioritization of beaches that may receive monitoring.

## **Conclusion**

### **1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

Although there has been some success providing public access within the coastal zone, the need for additional shoreline access is recognized. The current method for identifying acquisition sites does not make water access a priority. In fact, there are several issues, which make shoreline access more difficult than inland or tributary access. These include: (1) the amount of private property along the shoreline; (2) the cost of property; (3) neighborhood concern; (4) property maintenance and liability; and, (5) the lack of a comprehensive plan that includes shoreline access as a focus. In addition, the lack of a specific method to track public access in the State makes moving forward in this enhancement area difficult.

There are several opportunities for the Coastal Program to further public access in Maryland. First, the Program can continue to complete a limited number of public access projects each year. The Program could

also help find a mechanism through which the three State databases can be used collaboratively to track public access in the State. Additionally, the Coastal Program can assist the State with assessing public demand and need for public access.

**2. What priority was this area previously and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Medium      This Assessment: Medium

Ongoing efforts, such as Program Open Space, Rural Legacy, and Water Trails are working on land acquisition and public access issues. In addition, both the Chesapeake Bay Program and the Coastal Bays Program are continuing efforts in this area. Since acquisition programs are not funded under Section 309, other State funding sources will be used to continue these efforts.

The Coastal Program will continue to look for public access opportunities each year. Proposed activities, utilizing existing funds under the CZMA §306, include: (1) sponsoring a Local Government Information Exchange to explore the obstacles, barriers, and liability issues which appear to be hindering public access opportunities; (2) working with the Coastal and Watershed Resources Advisory Committee to identify ways of improving public access opportunities; (3) identifying appropriate sites through existing Programs; and, (4) continuing communication with Program Open Space.

This Assessment did reveal a need to improve tracking of public demand of public access throughout the State's coastal zone. This is an issue at both the State and local level. Section 309 funds could be used to help improve tracking, particularly with respect to increasing the State's ability to accurately report fulfillment of measurable goals for public access under the National Coastal Management Performance Measurement System.

## B. COASTAL HAZARDS

### Section 309 Programmatic Objectives

1. *Direct future public and private development and redevelopment away from hazardous areas, including the high hazard areas delineated as FEMA V-zones and areas vulnerable to inundation from sea and Great Lakes level rise.*
2. *Preserve and restore the protective functions of natural shorelines features such as beaches, dunes, and wetlands.*
3. *Prevent or minimize threats to existing populations and property from both episodic and chronic coastal hazards.*

### Coastal Hazards Characterization

1. **Characterize the general level of risk in your state from the following coastal hazards:**

**Table 6.**

<i>Hazard</i>	<b>High Risk</b>	<b>Medium Risk</b>	<b>Low Risk</b>
Hurricane/Typhoons		✓	
Flooding	✓		
Storm Surge	✓		
Episodic Erosion	✓		
Chronic Erosion	✓		
Sea/Lake Level Rise	✓		
Subsidence		✓	
Earthquakes			✓
Tsunamis			✓
Other (specify)			

2. **If the level of risk or state of knowledge about any of these hazards has changed since the last assessment, please explain. Also, identify any ongoing or planned efforts to develop quantitative measures for this issue area.**

Overall, the level of risk for these coastal hazards has not changed; however, the State's level of understanding continues to change as indicated by a number of efforts described below.

*Hurricanes.* Awareness of impacts from tropical depressions by the public and coastal managers has heightened since the last assessment. Tropical Storm Isabel made landfall on the western shore of the Chesapeake Bay on Sept 18, 2003 and represents the catalyst for increased responsiveness to hurricane events. Isabel was a learning moment for the residents of the Chesapeake Bay, as coastal flooding of such magnitude (4-10 feet) had not been documented in Maryland since the Storm of 1933 that broke open the existing Ocean City Inlet. Damages from Tropical Storm Isabel included significant shoreline erosion and structural erosion control failure, as well as extensive flooding of our historic waterfront communities that were constructed before the adoption of the Flood Hazard Mitigation Program and building/construction standards.

*Flooding and Storm Surge.* Flooding is considered the single greatest hazard for the State of Maryland. The State is prone to three types of flooding: nontidal flooding (flooding from rivers and streams), tidal flooding

(flooding from tides and storm surges), and coastal high hazard flooding (the addition of wave action to tidal flooding). The majority of flooding incidents in Maryland are watershed events driven by heavy rains and runoff.

In September 2003, the State had a large coastal flooding event associated with Tropical Storm Isabel. During the recovery from Isabel, concern was expressed about the ability to monitor water levels in some areas of tidewater Maryland as the storm passed over the Bay. Large contiguous areas of the Bay were without the essential anecdotal information on rising water levels needed for response and evacuation activities. A new water level gauge was designated to be installed in a portion of Dorchester County exposed to Bay type water levels and forces. Installation of this device addressed a major data and monitoring gap in Maryland's portion of the Chesapeake Bay.

Assessments of the vulnerability of Maryland's built environment from flooding are improving through the utilization of GIS and mapping technologies. The State Flood Program estimates that 68,217 structures are located within the floodplain in the State of Maryland, with these buildings representing almost \$8 billion in assessed value. To better identify and address flooding vulnerability, the State and its local and federal partners have put forth considerable financial resources to improve the State's digital elevation products by acquiring high-resolution elevation data (LIDAR). For more information on mapping efforts conducted in the last five years, refer to the Summary of Past §309 Efforts: 2001-2005.

The State recently submitted a business plan to the Federal Emergency Management Agency (FEMA) that outlines plans for modernization of the State's flood studies. FEMA will provide \$1 million dollars over the next five years in an effort to create updated digital map products. The new flood studies will be based on the best available technology including the use of LIDAR to develop terrain models, the most current watershed model to calculate hydrology, and hydraulic models to determine water surface elevations to delineate floodplains. The Maryland's Wetlands and Waterways Program, which now reviews proposed changes to the floodplain submitted by outside engineers to issue Waterway Construction Permits, will be able to model any proposed changes and keep the maps current as permits are issued.

*Shore Erosion (episodic/chronic).* §309 funds were used to complete an update of digital shoreline positions and calculations of linear rates of shoreline erosion across the State in 2003 by MGS. The Shoreline Changes Study confirmed that shore erosion is a considerable issue in the State of Maryland as over 69% of Maryland's 7,700-mile shoreline has undergone measurable recession over the last 50 years. Of the 69% of shorelines experiencing erosion, over 13% (839 miles) is eroding at a rate greater than 2 feet per year. The majority of shoreline erosion, 56% or 3,740 miles, occurs at a rate less than 2 feet per year. This trend is to be expected and is likely to increase as shoreline erosion is driven by sea level rise.

*Sea Level Rise.* Sea level rise is a significant factor contributing to shore erosion in the State of Maryland. Sea level rise contributes to coastal erosion by influencing and exacerbating on-going coastal processes, making coastal areas more vulnerable to extreme events. As sea level rises, storm surges will heighten and storm waves will extend further into the coastal zone, flooding homes, businesses, and roadways. Tide gauge measurements in the Chesapeake Bay and the Mid-Atlantic show rates of sea level rise nearly twice those of the global average. The average rate of sea level rise on Maryland's coastline has been 3-4 mm/yr, or approximately one foot per century.

Since the last §309 Assessment, DNR has conducted a number of research efforts to advance our understanding of potential sea level rise impacts. These efforts include the development of the Worcester County Sea Level Rise Inundation Model and The Economic Cost of Sea Level Rise Study. For more information on these efforts, refer to the Summary of Past §309 Efforts: 2001-2005.

*Subsidence.* Relative sea level rise at a particular location is calculated by combining global (eustatic) sea level change and vertical land movement. Research suggests that local land subsidence due to post-glacial

crustal movement, sediment loading, and large scale tectonic activity is the factor contributing to the increased rate of sea level rise in Maryland.<sup>1</sup>

**3. Summarize the risks from inappropriate development in the state, e.g., life and property at risk, publicly funded infrastructure at risk, resources at risk.**

Maryland has the 5<sup>th</sup> fastest growing population in America. Although the majority of the growth is in urban areas, the State is facing increased development pressures of its rural areas and coastal communities. Coastal flooding, erosion, and other hydrologic impacts are a problem in the coastal plain of the Western Shore of the Chesapeake Bay as well as the extensive areas on the Eastern Shore. One potential long-term issue will be the impact of hydrologic change on local infrastructure, as development area storm drains that outfall to coastal waters will slowly become submerged over many areas. Significant portions of land in the lower eastern shore are being annexed into town boundaries and slated for development. In many cases the residential land use designations and future growth areas are located in highly vulnerable flood and erosion hazard areas. However, the capacity of many rural towns to identify or address coastal hazards is minimal. Economic revitalization opportunities are tremendous for these communities. However, these investments may be in harms way from future floods and the extensive costs to recover from disaster events.

Previous urban development along the Atlantic coast in Ocean City and the historical lack of a long term sand management plan put the shoreline of Ocean City and Assateague Island at risk. Destruction of dune features during significant storm events may continue to jeopardize the beach and infrastructure in Ocean City. However, this risk has been reduced due to the completion and subsequent maintenance of the Ocean City Beach Replenishment and Hurricane Protection Project. The Project provides protection from wave attack and storm surges from 100-year frequency storms through the periodic renourishment of beach sand to the Ocean City beach and dunal areas.

Increasing risk from coastal hazards along the State’s coastline will continue due to coastal erosion and storm events exacerbated by projected increases in sea level. It is currently estimated that 839 miles of Chesapeake Bay shoreline are eroding at greater than 2 ft/yr with development along the shoreline at greatest risk. Public facilities and infrastructure as well as vital coastal habitats are in danger of being degraded or completely destroyed. Current efforts to reduce coastal hazard risk include a reconnaissance report by the US Corps of Engineers (USACE) and the initiation of a Maryland Coastal Management Feasibility Study. For more information on these efforts, refer to the Summary of Past §309 Efforts: 2001-2005.

**Management Characterization**

**1. In the table below, indicate changes to the State’s hazards protection programs since the last assessment.**

**Table 7.**

<b>Mechanism</b>	<b>Changes since Last Assessment</b>	<b>Funding Source (§309, CZM driven, §306, or other)</b>
Building setback/restriction	Significant	CZM driven
Repair/rebuilding restrictions	None	N/A
Restriction of “hard” shoreline protection structures	Moderate	§309 driven, other
Renovation of shoreline protection structures	None	N/A

<sup>1</sup> Holdahl, S. R., and Morrison, N. L.. 1974. Regional investigations of vertical crustal movements in the U.S., using precise relevelings and mareograph data: Tectonophysics, v. 23, p. 373-390.

Promotion of alternative shoreline stabilization methodologies	Significant	§309, other
Beach/dune protection	None	N/A
Permit compliance	None	N/A
Inlet management plans/dredge material management	Moderate	Other
Local post-disaster redevelopment plans	None	N/A
Special Area Management Plans	None	N/A
Local hazards mitigation planning	Significant	§309, other
Methodologies for determining setbacks	None	N/A
Real estate sales disclosure requirements	None	N/A
Restrictions on publicly funded infrastructure	None	N/A
Public Education and Outreach	Significant	§309, other
Mapping/GIS/tracking of hazard areas	Significant	§309, other

**2. For categories with changes that are identified as significant or moderate provide the following information for each change: (1) Summarize the change; (2) Specify whether it was a §309 change or other CZM driven change and specify funding source; and (3) Characterize the effect of the change in terms of both program outputs and outcomes.**

*Building/setback provisions.* The Atlantic Coastal Bays Protection Act (§4-1006.1) was passed in 2002. This Act essentially incorporated the coastal bays and tributary streams into the 1984 Chesapeake Bay Protection Act, often referred to as the “Critical Area Act.” The Critical Area is defined as all lands within 1000 feet of tidal waters’ edge, or from the landward ward edge of adjacent tidal wetlands, and the lands under them. In addition to the 1000-foot boundary, a 100-foot buffer of natural vegetation is established landward from the Mean High Water Line of tidal waters or the edge of tidal wetlands and tributary streams for development. The 100-foot buffer requirement increased existing building and setback restrictions in Worcester County and Ocean City.

*Restriction of “hard” shoreline protection structures.* The State of Maryland currently does not allow for the construction of new bulkheads along tidal marshes except under a reconstruction application. In cases of reconstruction, the State Tidal Wetlands Program works with homeowners to consider other options constructed of rock and natural materials. In 2005, Kent County updated its County Comprehensive Plan to include a regulatory hierarchy for shore erosion control structures. The hierarchy requires the implementation of non-structural and hybrid approaches to occur if determined to be an option appropriate for on site conditions.

*Promotion of alternative shoreline stabilization methodologies.* The State of Maryland has put forth considerable effort to promote “living shoreline” approaches where applicable in the Chesapeake and Coastal Bays. “Living Shorelines” are a shoreline management practice that provides 1) erosion control benefits; 2) protects, restores or enhances natural shoreline habitat; and 3) maintains coastal processes through the strategic placement of plants, stone, sand fill and other organic materials. The term has been embraced by many in Maryland and is now used and demonstrated in other States such as North Carolina and Virginia.

The Living Shoreline Stewardship Initiative (LSSI), established in 2004, is a bi-state collaborative project in Maryland and Virginia supported by several public and private entities. The overall goal of the LSSI is to improve water quality and enhance habitat for living resources in the Chesapeake Bay through the shoreline management efforts of individual waterfront property owners. Key strategies to reaching the goal include: using science to drive appropriate types and locations for “living shorelines” treatments; and facilitating the



institutionalization of living shorelines approaches through contractors and shoreline management policy makers. The ultimate desired outcome is to have Maryland and Virginia shorefront property owners routinely consider and frequently choose living shoreline approaches.

Coastal Program funds were provided to the University of Maryland, Horn Point Laboratory and Burke and Associates LLC to evaluate the effectiveness of existing shoreline treatments that incorporate a living shoreline component in their design. The study assessed 8 projects total, 4 of which were supported directly by CZM funds. The projects assessed included marsh toe protection structures, groins with plantings, and low profile riprap shallow water sills that had been constructed in the last 7-12 years. This study has provided a foundation of empirical information to discuss the benefits and tradeoffs of these options in outreach/educational interactions with homeowners and marine contractors.

Maryland's Coastal Program, in cooperation with Burke and Associates LLC, the Chesapeake Bay Education Center, and the Eastern Shore Resource Conservation District (RC&D) developed a half-day, entry-level course designed to introduce participants to site selection criteria, project and design elements, online information and mapping, and permitting considerations. Marine contractors and related design professional interested in learning more about "living shoreline" treatments were encouraged to attend the free training opportunity. Over 40 participants attended and received complimentary training materials including a comprehensive manual. §309 funds were used to support the training.

*Dredged Material Management Planning.* The Maryland Dredged Material Management Act was passed in 2001. The Act changed the way Maryland manages dredged material placement in the Chesapeake Bay by emphasizing beneficial use and innovative reuse of dredged material and phasing out the practice of openwater placement of dredged material. The Act also created an Executive Committee responsible for reviewing and recommending Dredged Material Management Program Options to meet both short and long term dredged material placement capacity requirements.

*Local Hazard Mitigation Planning.* Significant strides were made to advance hazard mitigation at the local level. In November 2004, the Maryland Emergency Management Agency (MEMA) completed the Maryland State Hazard Mitigation Plan (SHMP) and associated mapping pursuant to regulations established by the Disaster Mitigation Act (DMA) of 2000. Under the DMA, local governments are also required to develop multi-hazard mitigation plans and generate map products on vulnerable populations. Plans must be revised on a 5-year schedule; however, annual reviews, particularly map updates are encouraged. Fifteen of Maryland's coastal counties have adopted local hazard mitigation plans. Section 309 funding was awarded to Baltimore and Prince George's Counties through a competitive grant process to further develop and expand the coastal aspects of their local hazard mitigation plans. For more information on these efforts, refer to the Summary of Past §309 Efforts: 2001-2005.

*Public Education and Outreach.* The Coastal Program has conducted a number of public education and outreach efforts in addition to those discussed previously, in the Summary of Past §309 Coastal Hazards Efforts.

Coastal Hazard Public Outreach Panels. A recent initiative to promote public awareness is the development of educational panels on sea level rise and coastal hazards for coastal communities around the State. The Coastal Program worked with Maryland Sea Grant to develop four display panels on coastal erosion, sea level rise, storms, and coastal flooding that will be placed in tourist access areas throughout the Maryland portion of the Chesapeake Bay. Each panel shares a basic template in layout and background information. An additional portion of the panel provides an opportunity to showcase information specific to a given location. This local information was developed in coordination with each local sponsor community and addresses coastal hazard issues most pertinent to that location. §306 funds were used to support production of the outreach panels.

Hurricane Isabel In Perspective Conference. The State capitalized on the increased public awareness of coastal hazards created by the arrival of Hurricane Isabel in September 2003 to further outreach efforts. The Coastal Program was a major cosponsor of the Hurricane Isabel in Perspective Conference held in November 2004. The conference was organized to discuss the many factors that exacerbated Isabel's impact on the Chesapeake Bay ecosystems and its coastal communities. A primary goal of the conference was to create an open dialog between the scientific and management communities. To achieve this, conference organizers balanced the sessions with presentations and panel discussions that were of interest to both members of academia and the scientific community, as well as representatives of federal, state and local agencies involved in management, planning and emergency response. Sponsor funding was used to reduce or eliminate conference fees for the local planners and emergency managers in order to encourage participation. Numerous plenary, paper and panel presentations encompassed elements of coastal hazard and sea level rise research and policy issues. §309 funds were used to support the conference.

Property Owners Guidebook for Shoreline Management. The guidebook represents one of the products to stem from the Maryland Coastal Management Feasibility Study, currently under development with the USACE. The main objective of this outreach material is to update an existing homeowner guide produced in the 1980's. The original guidebook has been heavily used by DNR Shore Erosion Control Program and MDE Tidal Wetland Program, but is currently out of print. This updated book will expand upon the original by examining a greater range of shoreline management options and will assist homeowners in determining where living shoreline practices can be successfully implemented. Site assessment and project selection criteria will be provided as well as guidance with selecting a contractor.

K-12 Interactive Educational Lesson Plans on Coastal Hazards. A series of educational resources and lesson plans were developed to support science and environmental studies educators and to assist them with integrating the interactive mapping and MD Shorelines Online website into classroom lessons. The goal of creating these lessons was to enhance student learning of science concepts with the use of technology and current scientific data. The lesson series aims to facilitate the involvement of teachers and students in authentic science and environmental investigations. The MD Shorelines Online website is used to gather information on coastal hazards and analyze data on historical trends of shoreline change and potential flooding risks. The lessons are hosted on the website and will be provided in hard copy format for distribution. §309 funds were used to support development of the lesson plans.

Risk Communication. Assessment and awareness of evacuation plans and preparedness for hurricanes has become heightened due the most recent severe storm seasons (2004-2005). In particular, elected officials and managers are drawing upon the State's experience from Isabel to better understand if events like Hurricane Katrina could occur in Maryland. A special session convened by the Maryland Legislature, Environmental Matters Committee on November 17, 2005 generated discussion of Maryland's environmental, building, and evacuation programs/policies that affect our preparedness and vulnerability to hurricane events. An extensive dialogue on coastal hazards issues occurred and provided an excellent opportunity to highlight many of the accomplishments associated with the §309 Enhancement Strategy.

*Mapping/GIS/Tracking of hazard areas.* Substantial improvements have been made to map and track coastal hazards in the State of Maryland since the last Assessment. A detailed discussion of a number of these efforts is outlined in the Summary of Past §309 Efforts: 2001-2005.

One additional effort, not previously mentioned is, HAZUS-Multi Hazard (MH), a risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. HAZUS-MH estimates damage before, or after, a disaster occurs and takes into account various social and economic impacts of a hazard event. MDE recently partnered with Salisbury University to complete a statewide analysis of flood vulnerability estimated through the HAZUS-MH flood module. The Level One analysis completed in June 2005, estimates flood damage from a 100-year coastal or riverine flood event to commercial and residential properties. This study takes the next step from identifying flood vulnerability to

understanding the risk to the built environment. The final report, “An Assessment of Maryland’s Vulnerability to Flood Damage” is now available.

**2. Discuss significant impediments to meeting the §309 programmatic objectives; e.g., lack of data, lack of technology, lack of funding, legal defensibility, inadequate policies, inadequate implementation of policies, lack of political will, lack of public understanding, lack of public acceptance.**

In the course of providing coastal hazard planning technical assistance to local governments, the Coastal Program has identified two major impediments for advancing coastal hazard management in Maryland. The first is a general lack of capacity at the local level to balance growth pressures with the need to keep development out of vulnerable areas. The second impediment is the lack of public acceptance that nonstructural and/or alternative shore protection practices (i.e., “living shorelines”) will protect them from shoreline erosion. This is due to a lack of public understanding, further influenced by a number of existing loan programs which are based on a fixed-year term. Property owners want some guarantee that shore protection projects will outlast the term of their loan.

**Conclusion**

**1. Identify major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

One of the most significant gaps in coastal hazard planning in the State of Maryland is the integration of recently acquired data and technology into decision-making processes at the local level. Funding and technological limitations at the local level are further complicated by a general lack of communication between emergency responders and comprehensive planners. Section 309 funds could be used to build the capacity to integrate shore erosion, coastal flooding and sea level rise data and mapping efforts into local planning efforts.

**2. What priority was this area and what priority is it now for developing a §309 strategy and designating §309 funding and why?**

Last Assessment: High

This Assessment: High

**3. Briefly justify the proposed priority ranking.**

Coastal Hazards remain a high priority for the State. Recent major activities within the State include: (1) acquisition of crucial data to improve hazards delineation such as LIDAR and initiation of new mapping products; (2) creation of a Coastal Hazard web portal with interactive mapping capabilities; and, (3) signing of the Maryland Coastal Management Feasibility Study with the Army Corps of Engineers. Continuing our efforts to coordinate with state and local governments and building upon the foundation developed during the last strategy will be critical with moving forward the implementation of a sound approach to managing for coastal hazards in Maryland.

## C. OCEAN RESOURCES

### Section 309 Programmatic Objectives

1. *Develop and enhance regulatory, planning, and intra-governmental coordination mechanisms to provide meaningful state participation in ocean and Great Lakes resource management and decision-making processes.*
2. *Where necessary and appropriate, develop a comprehensive ocean resource management plan that provides for the balanced use and development of ocean and Great Lakes resources, coordination of existing authorities, and minimization of use conflicts. These plans should consider, where appropriate, the effects of activities and uses on threatened and endangered species and their critical habitats. The designation of specific marine protected areas should be considered.*

### Resource Characterization

1. **In the table below, characterize ocean resources and uses of state concern, and specify existing and future threats or use conflicts.**

**Table 8.**

<b>Resource or Use (MD's categories)</b>	<b>Threat or Conflict</b>	<b>Degree of Threat</b>	<b>Anticipated Threat or Conflict</b>
Beach sand	recreation, development, shoreline erosion control	High	erosion, shoreline development
Offshore sand	use conflict among sand mining, artificial reefs, fisheries, and wildlife	Medium	MD sand projected to be depleted in 2014
Dredge material disposal	pollution, site location	Medium	habitat loss and impacts
Fisheries	overfishing, development, pollution, channel dredging, competition between fin- and shell-fishing, and between recreational and commercial boating	Medium	reduced stocks, biological habitat degradation, disease, fish kills, increased nutrients, habitat loss, user-conflict, reduced stocks, and habitat degradation
Endangered and Threatened Species, migratory birds, sea turtles, seabirds, marine mammals	habitat alteration, competition with fisheries, and increased recreational boating	Medium	loss of foraging areas, user-conflicts, and disturbance from aircraft or boats.
Underwater archaeological resources	channel dredging, sand mining, erosion, residual ordnance, pollution/spills, salvage/recreational diving competition	Medium	intensification of shoreline development, user-conflicts, lack of emergency response preparedness

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

*Offshore Sand Resources.* Over the past several years, the Maryland Geological Survey has been actively identifying and characterizing offshore sand resources that will most likely to be used for both beach nourishment projects and commercial mining in Maryland. The change in threat level from “low” to “medium is due to the fact that the most proximate sources of sand are currently being heavily utilized and

mined and the sand resources that are located further off-shore are smaller in quantity and the size of the sand grain is less suitable for beach nourishment projects.

*Fisheries:* DNR, in cooperation with Chesapeake Bay Program, Atlantic States Marine Fisheries Commission, and National Marine Fisheries Service Mid-Atlantic Fisheries Management Council, is responsible for managing Maryland’s fisheries resources. Fishery management plans exist for species that serve economical, recreational, ecological and sociological importance to Maryland. Several fishery resources have improved in recent years (e.g., striped bass), others are improving (e.g., summer flounder, black sea bass), and some have decreased in abundance (e.g., blue crabs). Threats to fisheries resources vary and include overfishing and habitat degradation. Changes and threats to fisheries resources are extremely dynamic. The establishment of fishery management plans, which are reviewed annually, enable the management bodies to address these changes in a timely manner.

*Archeology:* While there are more than 1,562 known sites of State concern under the waters of the Chesapeake Bay and its tributaries, the State has not completed a full survey of its underwater archeology along the ocean coast. The Maryland Historical Trust, Office of Archeology, however, recently conducted a survey of the National Parks Service’s ½ mile of ocean holdings, within Maryland’s waters. Known threats to underwater archeology include casual vandalism by divers, fishing lines and nets and the increasing threat that aquaculture may pose. The Maryland Historical Trust suggests that the greatest threats to archeological resources in the future will be posed by the continuing intensification of shoreline development, dredging/beach nourishment activities both near and off shore, lack of preparedness planning for emergency response, both natural and manmade (e.g., hurricanes, tornados, oil or other hazardous material spills), and ongoing use of destructive methods of seafood harvesting (i.e., crab scrapes and clamming drags).

**Management Characterization**

- 1. In the table below, identify significant state ocean management programs and initiatives developed since the last assessment.**

**Table 9.**

<b>Program</b>	<b>Status</b>	<b>Funding Source (§309, CZM driven, §306, or other)</b>
Statewide comprehensive ocean management statute	None	N/A
Statewide comprehensive ocean management plan / system of Marine Protected Areas	None	N/A
Single purpose statutes related to ocean resources	None	N/A
Statewide ocean resource research/planning/working groups	Moderate	CZM driven
Regional ocean resources planning efforts	Moderate	CZM driven
Ocean resources mapping or information system	Moderate	other
Dredged material management planning	Moderate	other
Habitat research, assessment, monitoring	Moderate	other
Public education and outreach efforts	Moderate	other
Other – Marine Managed Areas research/planning	Moderate	CZM driven, other

- 2) For categories with changes, 1) summarize the change, 2) specify whether it was a 309 or other CZM driven change and specify funding source, and 3) characterize the effect of the changes in terms of both program outputs and outcomes.**

*Statewide Ocean Resource Research/Planning/Working Groups.* The recently completed report of the U.S. Commission on Ocean Policy, *An Ocean Blueprint for the 21<sup>st</sup> Century* (2004), as well as the report prepared

by the Pew Oceans Commission, America's Living Oceans: Charting a Course for Sea Change (2003), highlight the economic and social importance of ocean uses in the U.S. 200-mile Exclusive Economic Zone, and call for new integrated approaches to governance of ocean areas through collaboration among states, federal agencies, and stakeholders.

The Maryland Coastal Program began working with the University of Delaware, Center for Marine Policy, in January 2006 to conduct a one-year reconnaissance of Maryland's ocean resources and ocean issues in the Mid-Atlantic region of special concern and value. A final report to be prepared by the University will highlight the economic and social values of the ocean for Maryland; review the major ocean policy issues present in state waters and in the broader Mid-Atlantic region; and, present options for Maryland's potential role in regional ocean governance.

*Regional ocean resource planning efforts/ocean resource mapping/ habitat assessment.* MGS is actively identifying and characterizing sand resources that will most likely be used for both beach nourishment projects and commercial mining in Maryland. The Minerals Management Service (MMS) and the Corps are currently investigating the environmental impact of sand mining in these sand deposits. Previous environmental assessments of these regions were published in 1999 and 2000 by both MMS and USACE. More studies are planned to address resource conflicts and habitat enhancement. MMS is developing a management plan for the mining of these resources and restoration of post-mined regions. A long-term cooperative agreement between MMS and MGS was renewed in 2001 to conduct pre-and post-dredge surveys in and around sand borrows areas to determine the rate and character of bottom habitat change and recovery. This pro-active stance will make sand more readily available in times of emergency. MGS is continuing to evaluate changing patterns in sand usage and needs along the coast.

Maryland will increasingly rely on sand deposits in federal waters for beach replenishment as instate sand resources become depleted. Offshore resource use conflicts between sand mining and commercial and recreational interests must be identified. Interest has been shown in a series of fossil coral reefs approximately 100 miles off the coast of Maryland. Maryland wants to be able to set conditions and help determine how lease sales are made. Investigation of potential programmatic changes that would assist planning for offshore activities, including sand mining, oil leasing, and associated use conflicts, would be of use.

Current beach sand management techniques should be reexamined. The effects of recycling of sand from the inshore and beaches should be more closely examined because these activities may potentially increase erosion rates by changing the wave climate and increasing the gradient of the shore. Conservation and construction practices and sand recycling methods should be reevaluated for minimizing storm damage on existing property and decreasing the dependence on offshore sand. As our knowledge of dredging-related environmental issues matures, we need to address ways of improving sand management once it is placed on the beach. Post-dredge bottom habitat restoration efforts should be evaluated.

*Dredged material management planning.* The Maryland Dredged Material Management Act was passed in 2001. The Act changed the way Maryland manages dredged material placement in the Chesapeake Bay by emphasizing beneficial use and innovative reuse of dredged material and phasing out the practice of openwater placement of dredged material. The Act also created an Executive Committee responsible for reviewing and recommending Dredged Material Management Program Options to meet both short and long term dredged material placement capacity requirements.

*Public Education and Outreach Efforts.* Maryland has continued to implement a breadth of public education and outreach efforts since the last §309 Assessment. In 2002, the State joined forces with a number of educational groups to further Chesapeake Bay and ocean resource education during the 2002 Volvo Ocean Race. Educational activities and public information booths were developed for the event. The State will also be participating in educational events for the 2005 – 2006 Volvo Ocean Race. Students and teachers will be

able to follow the Volvo Ocean Race online at <http://www.oceanraceadventure.net/home.php> to learn about geography, ocean ecology and marine life and the importance of teamwork.

*Marine Managed Areas Research and Planning.* A President's Executive Order on Marine Protected Areas (MPAs) was passed in May 2000. The Order seeks "an expanded and strengthened comprehensive system of marine protected areas throughout the marine environment." To meet the goals of the Executive Order, the National Marine Protected Areas Center has been established within the National Oceanic and Atmospheric Administration (NOAA). The Center is currently working to inventory marine managed areas (MMAs) in place across the nation. A goal of the Center is to develop a framework for a national system of marine protected areas. In addition, the final report from the U.S. Commission on Ocean Policy includes a discussion on employing marine protected areas as a management tool, recommending the development of national goals and guidelines

Maryland's Coastal Program has assumed a leadership role in addressing the need for marine managed areas research and planning for both ocean and estuarine waters in the State. The Program has hosted numerous inter-agency meetings and briefings to garner support and determine a strategy for moving the issue forward. Additionally, lessons learned during the Sensitive Areas Planning Process in the Coastal Bays are helping shape the strategy. Currently, the National MPA Center is working with federal agencies and coastal states across the country to compile a MMA inventory. Through NOAA, funding is provided to coastal states for an intern to work with state agencies to survey of all MMA sites. Maryland hired an intern through Maryland Sea Grant to complete the State's inventory. Upon completion of the inventory, the State will work with the National Inventory Team to perform QA/QC on the data. Only information approved by the state will be included on the MPA Center website.

The Maryland Historical Trust, Office of Archeology has also been involved in marine managed areas planning by participating in meetings and submitting comments to the U.S. Commission on Ocean Policy. The Office is in the final year of a Cooperative Agreement with the National Park Service to survey and record cultural resources up to one mile off Assateague Island National Seashore. The Office has an ongoing mandate to survey all State waters to inventory submerged archeological historic property. These data are continually added to the State's Geographic Information System.

As a response requirement, the U.S. Coast Guard cites the protection of "historical/cultural resources" in its *Incident Management Handbook* (2001, P. 9-11 (l.)). The condition of sites currently on Maryland's inventory and determining Maryland's priorities for protection in the event of an emergency in a given region needs to be assessed. A cooperative agreement or MOU with DNR to more closely integrate management considerations would be helpful. The current legislation (COMAR Article 83B Submerged Archeological Historic Property Act) and its implementing regulations are dated and due for revision.

## **Conclusion**

### **1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

The State of Maryland has, to date, largely focused its coastal management efforts on the important resources found in and around the Chesapeake Bay, and, more recently, in the Maryland Coastal Bays. As in many other states, citizens and public officials have paid less attention to the ocean lying offshore Maryland's beaches and bays, and to the issues that are posed in the management of valuable offshore resources and uses such as: marine fisheries; marine mammals; offshore oil, gas, and other minerals; transportation; historical and archeological resources; and, recreation. Management of ocean resources is a priority for Maryland and one that is in need of further understanding. §309 funds should be sought to support the State in ocean resource planning efforts.

Additionally, there is a outstanding need to further marine managed area research and planning efforts in the State. While the Coastal Program has taken a leadership role to initiate discussions and determine a strategy for moving forward with mapping and research efforts, much work is still needed. There are a number of organizations and interests in this issue area at the federal, state and local levels in Maryland. §309 funds should be used to support the development of a spatial management support system to serve as the coordinating and data support structure for marine managed area mapping and management efforts.

**2. What priority was this area previously and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Medium

This Assessment: High

Now is a key time for the State of Maryland to examine the major ocean resources and uses that take place offshore Maryland—from commercial and recreational fisheries, marine mammal protection, whale and dolphin watching, marine transportation, potential exploitation of oil and gas resources, exploitation of offshore sand resources for beach nourishment, to environmental health issues such as nonpoint source pollution, ocean waste disposal and the introduction of exotic species, to issues related to coastal hazards (such as erosion and coastal storms), use of the seabed (such as marine cables, military use, and artificial reefs), and historical and archeological resources.

There is a growing desire in the State and region to develop a means for assessing and managing both ocean and estuarine aquatic resources through a spatial management system. The Chesapeake Bay Program's Scientific and Technical Advisory Committee held a workshop on this issue in April 2004. Recommendations from the workshop spoke strongly toward the need for an inventory of spatially managed areas. Within the Mid-Atlantic region, North Carolina, Virginia, and New Jersey have completed the initial MMA inventory data collection and are undergoing quality assurance. Virginia's Coastal Program is moving forward with the identification of "blue infrastructure" within the coastal zone. Delaware and Pennsylvania are in the process of collecting the initial data for the inventory. Maryland is ready to begin actively pursuing development of a spatial management network for ocean and coastal aquatic resources.



## D. WETLANDS

### Section 309 Programmatic Objectives

1. *Protect and preserve existing wetlands, as measured by acreage and functions, from direct, indirect and cumulative adverse impacts, by developing or improving regulatory programs.*
2. *Increase acres and associated functions (e.g., fish and wildlife habitat, water quality protection, flood protection) of restored wetlands, including restoration and monitoring of habitat for threatened and endangered species.*
3. *Utilize non-regulatory and innovative techniques to provide for the protection and acquisition of coastal wetlands.*
4. *Develop and improve wetlands creation programs as the lowest priority.*

### Resource Characterization

**Table 10. Extent of coastal wetlands.**

Wetland Type	Acres (cite year and data source)	Trend 2000-2005 (+/- acres/ year)	Explain trends
Tidal	261,309	+6 acres/year	Represents loss of vegetated tidal wetlands and gains through mitigation and voluntary marsh creation.
Non-tidal/freshwater	344,172 <sup>1</sup> (1995)	+358 acres/year	Represents loss of nontidal wetlands and gains through mitigation and voluntary wetland restoration/creation. Precise information unavailable for coastal zone.
Publicly acquired (protected) wetlands	N/A until 2006	N/A until 2006	Analysis to be conducted in 2006
Restored wetlands	4,270	+300 acres/year	Declining gains
Created wetlands	131	+30 acres/year	Variable

<sup>1</sup>This includes all non-tidal wetlands and 38,563 vegetated tidal freshwater wetlands based on an estimate from Wetlands of Maryland (1995).

**Table 11. Characterize direct/indirect threats to natural/man-made coastal wetlands.**

Threat	Scope of Threat	Trends 2000-2005, Explain	Impediments to Resolving Threat
Development/fill	Medium-high	Increasing	Staff constraints
Alteration of hydrology	Low-medium	Increasing	Local land use decisions
Erosion	Low-high	Increase in loss of tidal wetlands	Staff constraints
Pollution	Low	Reducing/Monitoring	Funding/Local land use management
Channelization	Low	No change	N/A
Nuisance or exotic species	Medium-high	Increasing	Lack of funding, staff constraints, property access
Freshwater input	Low	No change	N/A
Sea level rise	High	Monitoring	Planning, mitigation
Other: heritage resources	Medium	No change.	Public understanding, outreach/education

- 3. If information is not available to fill in the above table, provide a qualitative description of wetlands status and trends based on the best available information. Also, identify any ongoing or planned efforts to develop quantitative measures for this issue area. Provide explanation for trends.**

MDE is the lead for permitting and tracking voluntary restoration activities in wetlands and is the lead for tracking regulated restoration (i.e., replacement wetlands without net water quality gains) activities. The Coastal Program will be working with MDE to improve its ability to track and report for the National Coastal Management Performance Measures System. The Coastal Program will assist MDE in obtaining funding needed to upgrade tracking, data management, and analysis of trends information.

- 4. Characterize direct and indirect threats to coastal wetlands, both natural and man-made. For threats identified, provide the following information: scope of threat, recent trends, and impediments to addressing the threat.**

*Development/fill.* Development continues to be the primary threat to wetlands. Maryland is preparing for an increase of over a million new citizens. Increased population growth continues to be the primary impediments. Direct threats include conversion of non-tidal wetland during development. Indirect threats to both tidal and nontidal wetlands result from roads, and land use change, including fragmentation. Development and fill on upland and wetlands blocks the ability of a wetland/marsh to migrate in response to sea level rise. MDE tracks and compensates impacts through programmatic and required permitted mitigation. The availability of mitigation sites is decreasing and the price for potential sites is increasing.

*Alteration of hydrology.* Development within Maryland's coastal watersheds is continuing at a rapid pace, increasing the amount of impervious surface. There is a trend by local governments toward implementing Low Impact Development (LID), infiltration practices, and other innovative storm water management (SWM) approaches that desynchronize floods. Improvements in SWM plans are offset by continued population growth predicted by MDP, resulting in a net increase of impervious surface into the foreseeable future. This may result in excess discharges to remaining wetlands, or a loss of their recharge area.

The largest percentage of historic wetland loss can be attributed to agricultural conversion. Public Drainage Associations (PDAs) are corporate entities that can assess taxes on farmers to maintain ditches in palustrine wetlands. PDAs are not currently draining new palustrine wetlands. Wetlands drained typically were seasonal and palustrine and the soil would take years of periodic inundation to return to a wetland soil. PDA maintenance practices are becoming more environmentally friendly (e.g., management from only one bank, water control). In 2000, a PDA Task Force issued a series of best management practices to reduce nutrient export and increase habitat quality. These recommendations are currently being implemented.

*Erosion.* Coastal wetlands along Maryland's coast are particularly susceptible to erosion. Rates of erosion vary from region to region, with some stretches of shoreline experiencing over 8 feet of loss per year. Sea level rise in the Mid-Atlantic is partially to blame, along with the unconsolidated silts and clays that make up much of the coastal plain. Several efforts are underway to quantify the amount of marsh loss due to both erosion and sea level rise. See the Coastal Hazards Assessment for more detail.

*Pollution.* Runoff from continued growth and development is currently leading to increased pollution in wetlands, creating a disturbance that allows for the introduction of non-native or invasive species. Impediments to resolving this threat are varied and include lack of sufficient funding to fully implement agricultural BMPs and nutrient reduction plans, and continued growth and development.

*Channelization.* There is no new channelization in tidal wetlands. Maintenance of existing ditches for open water marsh management is allowed for fish to swim into all reaches of a marsh for the purpose of eating mosquito larvae. This type of channelization has less of an impact than historic Public Drainage Association

(PDA) ditching, which eliminated some wetlands entirely by drawing the water table down and drying up the top soil. Maintenance of existing PDA ditches is allowed.

*Nuisance or exotic species.* Non-native *Phragmites* is an invasive species that can take over entire marshes and usually begins in areas with disturbed soils or altered hydrology. The plant can be laboriously removed by spraying with Glyphosate in the fall, burning the entire marsh, and repeating the spraying and burning process the following fall. Maryland currently operates a technical assistance and cost-share program to assist property owners in managing *Phragmites*. Thousands of acres have been reported as being treated and treatment is relatively inexpensive.

Current bay grass populations are less than 25 percent of historic levels, due to multiple human and wildlife impacts including excessive nutrient pollution and the destruction caused by the foraging of the exotic mute swan population. The Chesapeake 2000 Agreement commits the State to certain submerged aquatic vegetation (SAV) related actions and DNR has implemented mute swan control to protect SAV. Continuing trade and introduction of more new species is an impediment to resolving the threats posed by exotic species.

In addition, Nutria can cause large “eat outs” which over time become devoid of vegetation, enlarge, coalesce, and result in the formation of interior ponds. Once ponds reach one acre or more in size, further expansion of the pond is driven by erosion, particularly during storm events. Nutria have been identified as a particular concern in the Blackwater Wildlife refuge on the eastern shore, where they were first identified in 1943. Since 1970, populations in the marsh have increased, as has the rapid degradation of marshes in the Refuge. The general scientific consensus is that Nutria are not the major, or primary cause of marsh loss, but that they are a contributing cause, a catalyst, or a trigger, which may be accelerating marsh loss due to other on-going natural processes.

Nuisance and exotic species pose a serious, widespread, and increasing threat. The impediments cannot be solved without tremendous monetary, technical, legal and personnel resources that do not currently exist.

*Sea Level Rise.* Sea level in the Chesapeake Bay is currently rising between 3 – 4 mm/year. Sea level rise threatens to drown intertidal marshes that do not accrete sediment or soils at a pace steady with sea level rise or that can not migrating laterally. Development and fill on upland (and wetlands) impedes the migration of tidal wetlands.

## **Management Characterization**

**1. Within each of the management categories below, identify significant changes since the last assessment:**

**Table 12.**

<b>Management Category</b>	<b>Changes Since Last Assessment</b>
Regulatory program	Moderate
Wetlands protection policies and standards	Moderate
Assessment methodologies (health, function, extent)	Moderate
Impact analysis	Moderate
Restoration/enhancement programs	Moderate
Special Area Management Plans	Moderate
Education/outreach	Moderate
Wetlands creation programs	Moderate
Mitigation banking	Moderate
Mapping/GIS/tracking systems	Moderate
Acquisition programs	None
Publicly funded infrastructure restrictions	None

**2. For categories with changes, provide the following information for each change: characterize the scope of the change, describe recent trends, and identify impediments to addressing the change.**

*Regulatory Programs*

MDE is the lead for permitting, compensatory mitigation, and tracking voluntary restoration activities in wetlands. Changes to MDE's tidal and nontidal wetland program are detailed below.

- Nontidal wetland regulations were amended in 2000 to include additional nontidal wetlands of special State concern that merit more stringent protection measures, however, new required guidance maps were not finalized by the end of the review period due to State and local staff constraints. Numerous other sites are believed to qualify as nontidal wetlands of special State concern, but have not been officially designated due to Program staff constraints that prevent timely adoption of new regulations.
- Over the next year, MDE will begin developing major revisions to the nontidal wetland regulations. Major revisions will include changes to provisions for compensatory mitigation to improve compliance with this requirement and achievement of "no net loss" of wetland acreage and function. The changes are needed due to the failure of applicants to complete successful projects in a timely manner, and the lack of effort by the State to ensure compliance with mitigation requirements due to staff limitations.
- MDE also began development of a wetland monitoring strategy that will detail steps and data needs for developing new standards for wetlands to meet Clean Water Act requirements. Data collection to support standard development has been slowed due to lack of funds and staff.

A significant impediment to addressing change is the substantial and ongoing decline of MDE staff since the early 1990's, as over 40% of staff positions have been lost. The loss of staff has resulted in delays in the review of applications. The time needed to complete the review of a project by MDE is extended due to the current staffing shortage and a backlog of projects assigned to individual reviewers. Attempts to secure funding for additional staff through application fees were rejected by the State legislature. An independent report by Dr. Judith Stribling of Salisbury State University found that there were serious constraints of understaffing, poor technological facilities, and lack of immediate enforcement capability in an assessment of wetland management in the Coastal Bays. Losses from illegal activity were not quantified. Record keeping was also found to be inadequate.

*Wetland Protection Policies & Standards*

Maryland's Critical Area Program was expanded to include the Coastal Bays in 2002 by the passage of the Atlantic Coastal Bays Protection Act (§4-1006.1). The Critical Areas Program increased the protection of wetlands, beyond that which was currently addressed through Maryland's Tidal Wetland Acts by restricting activities within a 100-foot buffer of tidal wetlands.

A revised Maryland State Programmatic General Permit (MDSPGP-2) was issued by the U.S. Army Corps of Engineers. The MDSPGP-2 authorizes certain activities that are approved by Maryland State wetland and waterway regulatory programs. The standard operating procedures for coordination and response were more complicated than in the previous MDSPGP and failed to result in improvements to resource protection and efficient and effective review of proposed activities in wetlands and waterways. Lack of MDE staff is a major impediment to reversing the trends of less effective wetland management and no net loss of wetland acreage and function.

The Governor committed Maryland, through signature of the Chesapeake Bay Agreement 2000, to creating, restoring, and enhancing 15,000 acres of wetlands in Maryland's Chesapeake Bay watershed. The goal was met in 2005 and a revised goal of restoring or creating 15,000 acres of wetlands and enhancing 35,000 acres of wetlands was established. Lack of adequate funding for incentives to landowners and staff are impediments to successfully achieving this goal.

The Nutria Eradication and Control Act of 2003 (P.L. 108-16) authorized the Secretary of the Interior to provide financial assistance to the States of Maryland and Louisiana for a program to implement measures to: (1) eradicate nutria in Maryland; (2) eradicate or control nutria in Louisiana and other States; and (3) restore marshland damaged by nutria. Funds from this Act have supported the Nutria Partners Project, which involves the systematic removal of nutria in the Chesapeake and Delaware Bay watersheds. This area is primarily composed of the Blackwater National Wildlife Refuge, Fishing Bay Wildlife Management Area and Tudor Farms. To date over 65,000 acres have been cleared of nutria.

*Assessment Methodologies.* A wetland monitoring strategy for Maryland will be completed by 2008. Several pilot efforts are underway. Additional funding and staff resources are needed to collect data of sufficient quality to document wetland designated uses and water quality standards under MDE regulation. Additional extensive resources will be needed to implement a monitoring program for wetlands. The Plan, *Priority Areas for Wetland Restoration, Preservation, and Mitigation in Maryland's Coastal Bays*, was completed in December 2004. The report was completed to fulfill MDE's commitment under the Comprehensive Conservation and Management Plan (CCMP) for the Coastal Bays, which contained the goal of protecting existing and new wetlands and increasing the amount of wetlands by 10,000 acres in order to improve water quality, replace lost function of wetlands, and improve habitat for living resources.

*Impact Analysis.* The time needed to complete review of a project is extended due to a backlog of projects assigned to individual reviewers. Consistent guidance to efficiently assess proposed impacts and alternatives to impacts is needed. As part of the analysis, approaches and tools for determining current wetland extent, condition, and function, and documenting the findings of impact analyses, are also essential.

*Restoration/Enhancement Programs.* The Chesapeake Bay 2000 Agreement set a goal to restore 25,000 acres of wetlands by 2010. Maryland's portion of the goal is to restore 15,000 acres of wetlands. "Restoration" was defined broadly under this Agreement to include creation, restoration, and enhancement projects to achieve a gain in wetland acreage and function. MDE estimates that over 50,000 acres of wetlands were created, restored and enhanced Statewide from 1998-2004, with most gains resulting from enhancement projects to eradicate Phragmites or nutria. In 2005, the goal was re-evaluated. Future wetland tracking activities will fall into three categories: acres gained (restored and created wetlands), function gained (enhancement projects such as Phragmites and nutria control, and rehabilitation projects such as ditch plugging) and protection (easements, POS purchases). Maryland's new goal for created and restored acres is approximately 8,000 acres from 2005-2010, bringing the acreage gain to 15,000 acres. An additional goal is to enhance or rehabilitate 35,000 more acres of wetlands. As of 2004, cumulative progress on the wetland goal using the revised tracking system, as reported by MDE is as follows: 7038 acres restored, 467 acres created and 61,676 acres enhanced/rehabilitated in the Chesapeake Bay watershed.

The Chesapeake Marshlands National Wildlife Refuge Complex Draft Environmental Assessment and Comprehensive Conservation Plan were completed in 2005. The Plan provides a framework for management of the Chesapeake Bay National Wildlife Refuges and defines how the biological integrity, diversity and environmental health of refuge lands will be maintained. Poplar Island once covered over 1,100 acres. The island has recently eroded to a point where it had nearly disappeared, covering only 5 acres. Since the last Assessment, the Corps' Baltimore District, the Maryland Port Administration and other Federal and State agencies have come together to restore Poplar Island using dredged material from the Baltimore Harbor and Channels Federal navigation projects (only approach channels). Poplar Island is being restored

to its former size and important ecological function. Approximately 40 million cubic yards (mcy) of dredged material will be placed to develop 570 acres of wetlands and 570 acres of uplands.

New guidance is under development by MDE for wetland creation as a shoreline stabilization practice for erosion control and habitat. The guidance is being developed based on research conducted by the University of Maryland and MDE.<sup>2</sup>

The Conservation Reserve Enhancement Program for Maryland was reauthorized in 2004. The Program provides incentives to farmers to establish or extend watershed buffers and wetlands to protect water quality.

The Maryland Stream ReLeaf Progress Report on the Chesapeake Bay Riparian Forest Buffer Initiative (1996-2003) was published in 2004. The Maryland Stream ReLeaf Implementation Plan 2005-2010 was published 2005 and calls for buffer restoration and conservation. Tracking and monitoring of buffers will be enhanced through improved GIS mapping systems.

*Special Area Management Plans.* Components of the Middle River Neck Peninsula Special Area Management Plan (1995), prepared by the Baltimore County Department of Environmental Protection and Resource Management and the Draft Middle River Neck Peninsula Special Area Management Plan, Volume II: Consolidated Middle River Neck Sewer Service Area (1998), prepared by the Baltimore County Department of Environmental Protection and Resource Management Geo-Technology Associates Inc., are considered during application reviews by MDE.

*Education/Outreach.* Due to lack of staff, education and outreach efforts by the regulatory programs have decreased. A grant awarded by the U.S. Environmental Protection Agency for improvements to Maryland's regulatory wetland programs for FY 07 will help address this concern. MDE's Wetlands and Waterways web page is updated for major news and new guidance, but comprehensive revisions may be needed. Technical guidance is under development for identification of priority wetlands for restoration and preservation. There will also be outreach on new techniques for shore erosion control. The Maryland Wetland Conservation Plan also offers recommendations for education and outreach.

DNR's Teaching Environmental Awareness in Maryland (TEAM) teaches Watershed Studies and Marine Studies to students. DNR's Nanticoke and Patuxent Wetland Projects mailed educational flyers on wetland research and benefits of wetlands to landowners while soliciting permission to conduct research on private property.

*Mitigation Banking.* There are single entity mitigation banks, operated by local governments, and one entrepreneurial bank. Regulations and low wetland losses remain a disincentive for mitigation banking. Regulations may be proposed during the next review period to remove disincentives. Banking will be encouraged due to the benefits of establishing larger projects and improved monitoring and adaptive management capabilities. Lack of staff at MDE has prevented timely follow up of mitigation projects to ensure that projects are constructed, become successful and effectively result in a no net loss of wetland acreage and function.

*Mapping/GIS/Tracking Systems.*

Maryland's tidal wetlands protection program began in 1970. Regulatory jurisdictional limits are depicted on official wetland maps created from aerial photographic interpretation. These maps were completed in 1972 using low-level aerial photography. By law, every property owner with land designated as regulated tidal wetland was notified by certified mail. Tidal wetlands maps have not been formally updated since 1972.

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<sup>2</sup> Bosch et al. 2006. Constructed Wetlands for Shoreline Erosion Control: Field Assessment and Data Management. University of Maryland.

Since 1972, the boundaries of tidal wetlands have moved farther inland from a variety of factors, including shoreline erosion and sea level rise. Over time, the maps have become less accurate for their purposes of identifying limits of tidal wetlands, and notifying landowners of the presence of tidal wetlands on parcels of property. This has resulted in less effective and efficient protection of tidal wetlands through the State program. Staff must spend additional time making formal amendments to the maps on a parcel-by-parcel basis for areas that are no longer tidal wetlands. The State also lacks authority to regulate newly identified wetlands under the tidal wetland statute due to inaccurate mapping. Some maps are also in poor condition and have proven difficult to store.

In 2006, MDE will begin creating electronic maps from its paper or mylar records to preserve these legally binding records. This information will be available for internal use and web-based viewing for potential applicants. However, MDE does not have sufficient funds to create a georeferenced data layer from the scanned image to allow for adjustments to the wetland boundary or overlay with other digital data layers. MDE would like to conduct a pilot project to collect location information needed to create a digital data layer that can be modified and used with other electronic data layers and photographs for regulatory and planning purposes, develop new boundaries of tidal wetlands for guidance purposes, and conduct a pilot project investigating costs and feasibility of adopting new regulatory tidal wetland maps.

Wetland maps exist for the entire State from the National Wetlands Inventory and on digital orthophoto quarter quads (DOQQS). These maps are at scales of 1 inch = 2000 feet and 1 inch = 600 feet respectively. There are also hard copy maps of the legal State tidal wetland boundary at 1 inch = 200 feet. DNR continues to distribute much of its GIS data and maps via free download over the Internet. Wetland data are one of the most popular downloads. Maryland's Coastal Program has supported additional shoreline data collection efforts including a *Comprehensive Shoreline Inventory* that seeks to capture baseline shoreline conditions throughout Maryland's coastal counties. Data from the survey are processed to create three GIS coverages, displayed as maps, which are viewable online at <http://ccrm.vims.edu/gisdatabases.html>. Shoreline inventory data has captured some fringe marshes that may supplement fringe marsh information previously mapped.

Maryland's Green Infrastructure Assessment was completed in 2001. The Assessment identified two million acres of green infrastructure land, the state's most important natural lands (e.g. forests, wetlands and other natural lands). The Assessment identified large contiguous blocks of natural land (hubs), interconnected by corridor to allow animal and plant dispersal and migration. Hubs and corridors were ranked within their physiographic region for a variety of ecological parameters and for development risk factors, as well as combinations of these.

Wetland gains and losses from the regulatory program are tracked in a shared database with the U.S. Army Corps of Engineers and a database maintained by MDE. This latter database currently has limited capacity to produce reports, and improvements have been delayed for years due to lack of funds and available technical support. In 2005, MDE received a grant from EPA to complete substantial upgrades to its database and report on wetland acreage and functional gains and losses, wetland types, reporting by county and watershed, and various other parameters. Wetland gains from voluntary creation, restoration, and enhancement projects are also recorded in various levels of detail. Gain information is readily available by County and sponsoring program. The Chesapeake Bay Program is expanding its database to better report on acreage and functional wetland gains by watershed.

## **Conclusion**

- 1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

Maryland has a strong regulatory foundation to protect and restore wetlands but lacks the staff and resources to fully address existing and future programmatic needs. However, this issue is not something that can be addressed through a §309 Strategy; as §309 funds can not be used for program implementation. The Coastal Program is committed to working with MDE to explore other funding sources that may be more applicable. Additionally, the Coastal Program will continue working with MDE to improve its ability to track and report for the National Coastal Management Performance Measures System and will be assisting MDE with obtaining funding needed to upgrade tracking, data management, and analysis of trends information. The Coastal Program will also work with MDE to obtain funding to assist with mapping updates, such as the development of a georeferenced data layer and a pilot project to collect location information needed to create a digital data layer.

**2. What priority was this area previously and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Medium

This Assessment: Medium

Although wetlands are a high priority for the State of Maryland, enhancements to wetland management is not a high priority for designating §309 funding, at this point in time. Improvements to the current management programs are being made and a number of future changes are in the works. The State has recently completed several plans that will assist in wetland restoration and conservation (Maryland Wetland Conservation Plan and the *Priority Areas for Wetland Restoration, Preservation, and Mitigation in Maryland's Coastal Bays*). Watershed Restoration Action Strategy activities have also assisted in identifying priority wetland protection and restoration sites and the strategies have been included in Maryland's more comprehensive state prioritization effort for wetland restoration and preservation. Over the last five years, the State has also achieved progress toward its Chesapeake 2000 Agreement wetland restoration goals. There are major gaps in wetland mapping, functional assessment and tracking efforts. The wetland monitoring report that will be completed in 2008 will outline steps to fill some of these gaps. Additionally, the Coastal Program is committed to working with MDE to obtain the funding and program support necessary to help fill the needs identified through this Assessment.



## E. CUMULATIVE AND SECONDARY IMPACTS

### Section 309 Programmatic Objectives

1. *Develop, revise or enhance procedures or policies to provide cumulative and secondary impact controls.*

### Resource Characterization


1. **Identify areas in the coastal zone where rapid growth or changes in land use require improved management of CSI. Provide the following information for each area: (1) type of growth or change in land use (i.e. residential, industrial, etc...); (2) rate of growth or change in land use; (3) types of CSIs.**

According to projections prepared by the Maryland Department of Planning (MDP), the State's population will increase from 5.6 million (2005) to 6.5 million by the year 2025, a 16% increase. Households are estimated to increase 21% from 2.1 million to 2.5 million. The largest increase in population is expected to occur in the Baltimore and Washington suburban region, although substantial growth will also occur in the Southern Maryland region (Calvert, Charles and St. Mary's counties) and on Maryland's Eastern Shore (Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, and Worcester County).

A tremendous amount of data concerning land use and growth in Maryland is available through the Maryland State Data Center's website <http://www.mdp.state.md.us/msdc/program>. The Maryland State Data Center is a partnership program between the MDP and the U.S. Census Bureau. MDP coordinates the Program in Maryland. The SDC monitors development trends, analyzes social, economic and other characteristics and prepares population, housing, employment, labor force, and income projections, which provide the baseline for planning for growth and development in the State. Historic population and growth data for Maryland available through the SDC is detailed in Table. 13.

**Table 13.**

County	Historic Population	Projected Population		Projected Population Increase per year (2005 - 2030)	Total Housing Units Authorized for Construction			Associated CSIs in County
	2000	2005	2030		2000	2002	2004	
Anne Arundel	489,656	512,000	567,700	2,228	3,078	2,359	2,364	increased invasive species, loss of stream buffers, habitat, wetlands
Baltimore	754,292	785,600	846,800	2,448	2,707	2,706	2,103	increased nutrient and toxin loading
Calvert	74,563	88,740	105,950	688	931	928	525	loss of wetlands, habitat, farmland and open space
Cecil	85,951	97,300	160,000	2,508	768	968	811	loss of forests, increased invasives
Charles	120,546	138,700	206,050	2,694	1,233	1,470	1,000	increased nutrient and toxin loading
Caroline	29,772	31,300	47,550	711	154	174	316	loss of farmland, open space, wetlands
Dorchester	30,674	31,300	39,900	344	109	179	423	loss of farmland, open space, wetlands
Harford	218,590	238,750	290,500	2,070	1,702	1,883	1,836	loss of forests, open space, stream buffers

Kent	19,197	19,650	23,200	142	334	395	221	loss of forests, farmland, open space, stream buffers
Prince George's	801,515	850,500	993,100	5,704	3,456	2,563	1,948	increased nutrient and toxin loading
Queen Anne's	40,563	45,650	61,000	614	419	549	362	loss of wetlands, habitat, farmland and open space
Somerset	24,747	26,000	30,350	174	27	74	185	loss of wetlands, habitat, farmland and open space
St. Mary's	86,211	96,550	152,150	2,224	1,163	914	1,384	loss of wetlands, habitat, farmland and open space
Talbot	33,812	35,250	41,800	262	339	387	625	loss of wetlands, habitat, farmland and open space
Wicomico	84,644	89,550	117,060	1,100	480	841	1,000	loss of wetlands, habitat, farmland and open space
Worcester	46,543	49,400	62,650	530	810	1,148	1,225	loss of wetlands, habitat, farmland and open space
						 = County displays continual increase in housing units authorized for construction over past 5 years		

Source: Data prepared by the Maryland Department of Planning, Planning Data Services, September 2005. Available online at [www.mdp.state.md.us](http://www.mdp.state.md.us).

Balancing the effects of growth on coastal communities is a continuing challenge throughout Maryland's coastal zone. Cumulative and secondary impacts associated with increased population in growth include increased nutrient and toxic loadings entering State waters, loss of wetlands and habitat, conversion of forests, farmland and open space to development, increase in invasive species, and loss of stream buffers.

**2. Identify areas in the coastal zone which possess sensitive coastal resources (e.g., wetlands, waterbodies, fish and wildlife habitats, threatened and endangered species and their critical habitats) and require a greater degree of protection from the cumulative or secondary impacts of growth and development.**

**Table 14.**

Area	CSI Threats / Sensitive Coastal Resources
Wetlands	loss of wetland habitat, draining and filling, erosion, development, invasive species
Farm lands	conversion of land to development, nutrient loading, fragmentation, loss of rural identity
Forest lands	forest loss, parcelization, exotic and invasive species, fragmentation, loss of habitat, conversion of land to development
Urban Areas, Development	transportation congestion, impervious surfaces, loss of habitat, erosion, nutrient and sediment loading
Streams/Rivers	nutrient, sediment and toxic loading, habitat modification, stream flow modification, erosion
Coastal Bays	nutrient loading, habitat loss, invasive species, conflicting uses, clamming / submerged aquatic vegetation, fisheries
Chesapeake Bay	nutrient loading, toxic loading, invasive species, conflicting uses / submerged aquatic vegetation, oysters, fisheries,
Historical and Archeological Resources	loss, damage

## Management Characterization

**1. Identify significant changes in the state's ability to address CSI since the last assessment (i.e., new regulations, guidance, manuals, etc.). Provide the following information for each change: (1) Identify the change & whether it was a §309 change; (2) Briefly summarize the change; (3) Characterize the effect of the change.**

*Smart Growth and Priority Places Programs.\** In October 2003, Governor Robert L. Ehrlich, Jr. established the Priority Places Strategy Executive Order. The Priority Places Strategy is designed to make well-planned development and community revitalization easier to achieve in cities, suburbs and small towns across the State. The Priority Places Strategy builds upon past Smart Growth Initiatives by focusing on encouraging redevelopment in older communities and neighborhoods. The Priority Places Strategy is supported by the Smart Growth Subcabinet, which includes agencies that are involved in land-use and growth decisions. The Sub Cabinet reviews applications from local governments to designate Priority Places. To date, the State has selected 6 towns and neighborhoods as Priority Places. Four of the six are located in the coastal zone.

*Maryland Coastal Bays Program\** In 1999, the efforts of the Maryland Coastal Bays Program culminated in a Comprehensive Conservation and Management Plan (CCMP) aimed at preserving Maryland's precious coastal resources. Since 1999, substantial progress has been made towards implementing the targeted actions in the CCMP. Management plans have been developed to address aquatic sensitive areas and subwatershed management. For more details on the CCMP and associated management plans, go to the Special Area Management Plan section of this Assessment.

Maryland, Virginia, and Delaware stakeholders have come together and are forming the Delmarva Atlantic Watershed Network in order to address regional growth and development issues. The group is made up of government, nonprofit, and business representatives and met in both 2004 and 2005. This group plans to continue to meet to address issues of mutual concern.

*Tributary Strategies.\** The Tributary Strategies Program was created to reduce Maryland's nitrogen and phosphorus pollution to the Chesapeake Bay, through cooperative efforts by state agencies, local governments, Tributary Teams and others. Since 1985, Maryland has made significant progress in reducing nutrient load inputs to the Bay. Since the last Assessment, the Program has focused on revising Tributary Strategy goals, developing Tributary Strategy implementation plans, promoting implementation of Tributary Strategies and coordinating the overall Tributary Strategy effort. The Tributary Strategy teams have worked closely with government agencies, non-government organizations and Maryland citizens to move Tributary Strategy efforts forward.

In April 2004, the Tributary Strategies Program released its revised strategies for nutrient load reductions. These revised annual loading goals, 37.25 million pounds of nitrogen and 2.92 million pounds of phosphorus, represent a 50% cut in nutrients loading from 1985. The revised strategies continue to push for the implementation of a wide range of best management practices in agricultural and urban/suburban environments. The strategies also push for reductions from point sources and from mobile sources (e.g. air) through implementation of the Clean Air Act. At the same time, there is the clear recognition that innovative practices need to be implemented and dedicated sources of funding found (e.g. to address urban/suburban stormwater runoff) to meet full strategy goals. The estimated cost of fully implementing the strategy is over \$10 billion. The Draft Tributary Strategy Statewide Implementation Plan was released in February 2006. Comments on the draft plan are currently being reviewed by the Bay Cabinet Agencies and the draft plan will be revised accordingly. A final plan is expected to be released in Fall 2006, however this is a dynamic plan, that will be updated regularly as new resources are generated and programs and polices are enacted that will continue to increase the implementation of Maryland Bay clean up plan, or Tributary Strategy.

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\* Changes discussed in this section were not funded by §309.

*Marine Sewage Pumpouts/Discharge.\** DNR has a Boat Sewage Pumpout Program to install sewage disposal stations for boats in Maryland marinas. The Program has a stated goal of having at 527 pumpouts at Maryland marinas by 2010. As of June 2005, there were 448 pumpouts installed in 357 marinas. Pumpout grants are available to any public or private marina for up to \$15,000 with the grant funds used for the purchase and installation of a pumpout station. Grant funding is also available for pumpout operations and maintenance, pumpout upgrades and replacement. Pumpout information is also available online at [www.dnr.state.md.us/boating/pumpout](http://www.dnr.state.md.us/boating/pumpout). As a result of dedicated efforts by boaters to use these stations, it is estimated that well over one million gallons of sewage is collected annually.

In 2001, Maryland applied to the Environmental Protection Agency, under Section 312 of the Clean Water Act, to establish two “no discharge” zones: the Northern Coastal Bays (Isle of Wight/Assawoman watersheds) and Herring Bay. In “no discharge” zones there is a complete prohibition of boating sewage discharges whether treated or untreated. EPA approved both applications.

*Coastal Nonpoint Pollution Control Program.\** Since the last §309 Assessment, the Maryland Coastal Nonpoint Source Program used federal funds to focus on several key areas: promoting innovative environmental design techniques to reduce urban nonpoint source pollution; building local capacity of coastal counties to manage on-site disposal septic systems; strengthening State efforts to control and prevent shore erosion; supporting Maryland’s Clean Marina program and the implementation of marina management measures and measuring overall Coastal NPS Program success.

The Coastal Nonpoint Source Program is currently updating the 1999 Nonpoint Source Management Plan. The updated management plan will measure past progress against 1999 management plan goals and contains future five-year strategies (2006 – 2010) to address coastal nonpoint source pollution. The plan will also discuss Maryland’s long-term strategy to implement management measures to address coastal nonpoint source pollution.

In 2000, the Maryland General Assembly reviewed legislation that would have required counties to designate Areas of Special Concern. These areas would be analyzed for septic system impacts and nitrogen removal technology would be required when necessary to meet water quality goals. Although legislation did not pass, Maryland counties have taken steps to improve on-site disposal system management.

Coastal Nonpoint Source Program funds have been used by coastal counties (Anne Arundel, Harford, Prince George’s, Queen Anne’s, Talbot, Wicomico), to develop accurate inventories, databases and maps of properties managed by septic systems. These inventories have identified areas that require increased monitoring due to potential water quality impacts, areas that should be hooked up to sewer systems and areas where homeowners may be targeted for outreach on system maintenance. This work is key to local government’s ability to reduce the impacts of septic systems and protect environmentally sensitive areas. In addition to funding septic system inventories the program also funded the following projects:

- The Mid Shore Tri-County Regional Council worked with Caroline, Dorchester and Talbot County Health Departments to develop a standardized on-site disposal systems database for the mid-shore region. The Mid-Shore Regional Council created a database geo-locating over 5,000 permitted septic systems within the mid-shore region. About 2,100 of these permitted properties have been geo-located within the Chesapeake Bay Critical Area.
- Calvert County developed an OSDS management plan for the Solomon’s Harbor watershed. The Calvert County Comprehensive Plan (2004) included an objective to “reduce nutrient pollution from sewage treatment facilities and septic systems.” Also, the draft Sewerage Map that accompanies the Water and Sewerage Plan has been amended to add a new district for “Areas of Concern for OSDS.” Calvert

County also developed a watershed model for Solomon's Harbor that indicated septic systems, lawn fertilizer and atmospheric deposition were the three greatest sources of nitrogen in the watershed.

- The University of Maryland, Center for Environmental Science, used Coastal Nonpoint Source funds to support local government quantification of septic system input to surface waters.
- Talbot County has followed up on its development of septic system inventories and mapping through the development of an OSDS Strategic Plan. The plan promotes the use of innovative systems and has strong management controls to insure proper operation and maintenance of on-site disposal systems.

In May 2004, Governor Robert L. Ehrlich, Jr. signed the Bay Restoration Fund into Law. The principal purpose of this law is to create a dedicated fund, financed by wastewater treatment plant users, to upgrade Maryland's wastewater treatment plants with enhanced nutrient removal technology so they are capable of achieving wastewater effluent quality of 3 mg/l total nitrogen and 0.3 mg/l total phosphorus. Sixty percent of the funds, not targeted for waste water treatment plant upgrades, will be used for septic system upgrades and the remaining 40 percent will be used for cover crops. Bay Restoration Funds will be provided for upgrades of existing systems to best available technology for nitrogen removal or for the marginal cost of using best available technology instead of conventional technology. Priority will be given to failing septic systems within the Critical Area.

*Environmental Design Projects.* During the summer of 2004, the Coastal Program released a Request for Proposals for projects that would highlight different innovative design techniques. The program received 24 proposals and selected 19 Environmental Sensitive Design projects. Projects are located in Baltimore City and Ocean City and Worcester, Harford, Anne Arundel, St. Mary's and Prince George's Counties. Projects include the implementation of bioretention facilities, the incorporation of permeable pavers in parking lots, the greening of vacant city lots, addressing runoff at boat launches and installing a living roof at a community college. The public will have access to all projects, so that it may see first hand how innovative urban best management practices work. Program projects will be completed in 2005, 2006 and 2007. \$310 monies were used to fund the environmental design projects.

*Riparian Forest Buffer Initiative (RFBI).* §309 funding was used to develop a Riparian Forest Buffer Implementation Plan for the Maryland Stream ReLeaf Program. The Plan was designed to identify appropriate sites and site owners and to create appropriate incentive packages, including educational and outreach elements, sufficient to encourage private land owners to establish RFB's on their lands. The Stream ReLeaf Program provides the framework for reaching the goal of re-establishing 600 miles of streamside buffers by the year 2010.

Maryland and the other Bay states met their original Chesapeake Bay Forest Buffer Commitment by 2003. A new goal of 10,000 miles of riparian forest buffers for the Bay watershed was adopted in December 2003. Maryland's portion of this goal is to create 2,032 new forest buffer miles by 2010. As of 2004, Maryland created 1,153 miles of buffers. The Stream Releaf Implementation Plan for 2005 – 2010 outlines the strategy for reaching the new commitment.

*Green Infrastructure.* In 2001, DNR completed the Green Infrastructure Assessment. The assessment identified over two million acres of green infrastructure land that provides the natural foundation needed to support a diverse plant and animal population and enables valuable natural processes like filtering water and cleaning the air to take place. Although two million acres of green infrastructure was identified and mapped, only about a quarter of this land is currently protected. From 2001 – 2003, the Maryland legislature provided funds through the GreenPrint Program for DNR to acquire additional green infrastructure land. CZMA §306 funds were used to support a portion of the Green Infrastructure Assessment.

*Coastal and Estuarine Land Conservation (CELCP).* In June 2005, DNR submitted its Coastal and Estuarine Land Conservation Plan (CELCP) to NOAA for approval. CELCP targets those lands for preservation that have the greatest ecological value based on detailed scientific analysis. CELCP identifies protected and unprotected Green Infrastructure land within Maryland's coastal zone, as well as ecologically significant areas (ESAs). CELCP identifies the process and the parameters the State will use when seeking to preserve land with CELCP program funds. CZMA §306 funds were used to support development of Maryland's CELCP Plan.

*Watershed Restoration Action Strategies (WRAS).* Maryland's 2000 – 2005, §309 Strategy for Cumulative & Secondary Impacts was tied to the development of Watershed Restoration Action Strategies for "priority" watersheds. Priority watersheds were identified through Maryland's Unified Watershed Assessment (UWA). The UWA was a comprehensive integrated analysis of state watersheds to identify and prioritize those watersheds most in need of protection and restoration. §309 funds were used to provide financial and technical assistance to local governments to develop watershed plans to improve local water quality and habitat. WRAS plans also help fill a critical void in counties not required to prepare watershed plans under the Clean Water Act NPDES MS4 permit program. A considerable area is covered by local NPDES plans in Baltimore, Anne Arundel, Prince George's and Charles Counties, and other non-WRAS plans have been prepared in Calvert and St. Mary's Counties. By the close of 2006, WRAS's will have been developed for 14 coastal watersheds. Additional information about the WRAS Program can be found in the Summary of Past §309 Efforts.

*Coastal Communities Initiative (CCI).* In the course of providing technical assistance to local governments, through such efforts as WRAS, the Coastal Program recognized a need for additional resources to assist local governments with issues related to balancing natural resource protection with growth and development pressures. The *Coastal Communities Initiative* was subsequently designed by the Coastal Program to address this need. A Request for Proposals for a pilot phase of the CCI was issued in October 2005 and the Coastal Program funded five proposals. Over the next year, the Coastal Program will be piloting implementation of the CCI and will be providing both technical and financial assistance to select coastal communities to "promote the incorporation of natural resource and/or coastal management (e.g., coastal hazards, public access, water-use activities) issues into local planning and permitting activities. CZMA §306 funds were used to support the pilot phase of the CCI.

## **Conclusion**

### **1. Identify significant gaps in addressing the programmatic objectives for this enhancement area (i.e., inadequate authority, data gaps, inadequate analytical methods, lack of public acceptance, etc.).**

As described in the management characterization, Maryland has a wide variety of initiatives underway that include components to manage cumulative and secondary impacts. In the course of implementing these initiatives and providing technical assistance to local governments over the years, the Coastal Program has identified several planning hurdles. Despite the creation of issue specific plans (forestry, watershed, etc.) at the local level, changes are only realized if these plans are subsequently adopted and codes/ordinances are modified. Land use planning in the State of Maryland is delegated to local governments with few State mandates. Land use decisions are generally at the discretion of local elected officials, who are often in need of additional information and training in order to understand the impacts of their decisions.

### **1. What priority was this area and what priority is it now for developing a §309 strategy and designating §309 funding and why?**

Last Assessment: High

This Assessment: High

Maryland has a wide variety of communities located within its coastal zone. Some communities are facing pressure from growth and development, while looking to maintain their coastal and rural characteristics. Others are looking to new economic growth opportunities as the local landscape and culture change. The *Coastal Communities Initiative* is an opportunity for counties and municipalities to work with DNR and its partners to plan for growth and economic development while taking into account the natural, coastal, and socio-cultural characteristics of the area.

## F. MARINE DEBRIS

### Section 309 Programmatic Objectives

1. *Develop or revise programs that reduce the amount of marine and lake debris in the coastal zone.*

#### Assessment Characterization

1. **Characterize the extent of marine debris and its impact on the coastal zone.**

**Table 15.**

Source (Maryland's categories)	Impact	Type of Impact (navigation hazard, aesthetic, threat to human health, degradation to environment, threat to wildlife, etc.)
Abandoned boats	Significant /Moderate	Significant hazard to navigation (limited occurrence), environmental hazard if boat is leaking (e.g., fuel, battery acid), aesthetic impact
Debris washed down during floods (e.g., Susquehanna, Potomac)	Significant	Navigation hazard, aesthetic (occurred after floods of 2003, 2004)
Urban stormwater runoff (i.e., Baltimore)	Moderate	Aesthetic, threat to wildlife, environmental impacts. Complaints from visitors and boaters (regular occurrence).
Trees, vegetative debris	Moderate	Aesthetic, environmental impacts (regular occurrence).
Structures (docks, flotation)	Moderate	Significant hazard to navigation (limited occurrence).
Debris from recreational boaters, marinas, fishing vessels (e.g., derelict fishing gear)	Insignificant	Aesthetic, wildlife, environmental impacts.
Debris from cruise ships, commercial tankers, military ships, tug boats, off-shore operations	Insignificant	Aesthetic, wildlife, environmental impacts.
Debris from public access sites	Insignificant	Aesthetic, wildlife, environmental impacts.

2. **If any of the sources above, or their impacts, have changed since the last assessment, please explain.**

There was a slight increase in the amount of marine debris resulting from Hurricane Isabel, however; overall the sources and impacts have not changed since the last §309 Assessment. The amount of debris expected each year is difficult to estimate due to unpredictable weather patterns.

2. **Do you have beach clean-up data? If so, how do you use this information?**

Beach clean-ups are conducted along tributaries and coastal waters by the Maryland Coastal Bays Program, DNR's Tributary Teams, and NGO's (e.g., Ocean Conservancy, Assateague Coastal Trust, Alison Ferguson Foundation, Alliance for the Chesapeake Bay Lower Susquehanna Heritage Greenway), watershed associations, and other organizations. Quantity of debris removed is recorded by some organizations (e.g., 2,883 volunteers removed >49,851 pounds of marine debris from 2000-2004 from 12 shoreline sites). The Trash Free Potomac Watershed Initiative holds a goal to eliminate debris from the watershed by 2013.



**Management Characterization**

**1. In the table below, identify state ocean/Great Lake management programs and initiatives developed since the last assessment.**

**Table 16.**

<b>Program</b>	<b>Status (Yes, Developing, No)</b>	<b>Funds (\$309, Other)</b>
State, local program requiring recycling	Ongoing Implementation*	Other
State, local program to reduce littering	Ongoing Implementation*	Other
State, local program to reduce wasteful packaging	No	Other
State, local program managing fishing gear	No	Other
State, local regulations consistent with Marine Plastic Pollution Research and Control Act	No	Other
Marine debris concerns incorporated into harbor, port, marina and coastal solid waste management plans	Ongoing Implementation*	Other
Education and outreach programs	Ongoing Implementation	Other
Other: Abandoned Vessel Program	Ongoing Implementation*	Other

\* Reflects existing programs implemented or supported by Coastal Zone Management Program or the State of Maryland.

**2. For the changes identified above, provide a brief description of the change and its effect; Characterize the scope of the change; Describe recent trends; Identify impediments to addressing the change; and Identify successes.**

*Recycling Programs.* Recycling programs in Maryland are conducted by all coastal counties and Baltimore City. MDE compiles recycling information submitted by cities and counties, publishes an annual Maryland Waste Diversion Activities report, and maintains a recycling web page. There is a statewide waste diversion goal of 40% by the year 2005, consisting of a 35% recycling rate plus up to 5% credit for source reduction activities.

Stormwater run-off in urban centers (i.e., Baltimore) is a major source of debris. A ten-acre tidal marsh was created near Ft. McHenry, Baltimore for mitigation purposes. The marsh, located at the head of a tidal tributary receiving waters from three urbanized watersheds is subject to high tides and heavy rain that deposits large amounts of marine debris. More than 15 tons of debris was removed from the marsh over the period of two days in December of 1998. The continual presence of marine debris apparently caused the restoration project to fail.

Upgraded combined sewer treatment systems that remove solids, floatables, and trash from storm drain input have been installed in Baltimore City and part of Cambridge. These control measures effectively reduce marine debris entering from sewer and stormwater systems, but will cost billions of dollars to implement throughout the state.

Large woody debris (trees, dock pilings) and trash are washed in large quantities to the coastal zone during storms and floods. DNR's programs are not authorized to address marine debris that is washed onto the shoreline by storm surges. Local jurisdictions are primarily responsible for debris on land and no specific funding sources exist at the state or federal level to assist with land-strewn debris. Some local jurisdictions waive tipping fees at county landfills for storm/flood-generated debris, including building materials not

otherwise accepted, during a few weeks after storms/floods. Local cleanup organizations desire guidance as to whether debris, especially construction debris, should be removed from marshes, or if removal would be a further harm to the sensitive ecosystem.

*Marina Management Plans/Public Outreach Programs.* DNR's Clean Marina Program incorporates marine debris concerns into marina management plans and boater education. The Clean Marina Program has certified 100 Clean Marinas, including Clean Marina Partners (smaller entities such as public boat ramps) since the last assessment. The Program distributed 40,000 petroleum control kits and clean boating tip cards since the last assessment. Challenges for the Program currently include lack of outreach from regulatory agencies to marinas and boatyards, the majority of whom are unaware of the regulations or permits that apply to their operation, despite attempts to learn. Clean Marina staff expend large effort on compliance assistance and permit review. The current state-wide hiring freeze has resulted in only one full time person staffing the program.

*Abandoned Vessel Program.* DNR's Natural Resources Police maintain an abandoned vessel removal program and remove major obstructions that impact navigation for recreational boaters. The Abandoned Boat program receives \$300,000 annually in Waterway Improvement Funds used to provide grants to local jurisdictions for derelict vessel and marine debris removal. Over four hundred abandoned boats were identified and 395 were removed by state and local jurisdictions from 2000-2005 in Maryland. Baltimore City removes abandoned vessels, operates trash skimming boats and picks up trash along shoreline parks. In 2001, legislation passed which reduced the number of days it takes for a boat to be legally declared abandoned on private property from 180 days to 90 days. The law enables a greater number of derelict vessels to be removed.

Establishing disposal sites where citizens could safely dispose of unwanted vessels and developing technology to recycle fiberglass vessels may reduce the number of abandoned boats. Increasing criminal and civil penalties for abandoning a boat in Maryland may also reduce the number of abandoned boats. The cost of removing abandoned boats is increasing because the size of abandoned vessels is increasing and mobilization costs for marine contractors is increasing due to high fuel costs.

## **Conclusion**

### **1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

Maryland has a significant number of programs in place to meet the programmatic objectives of the marine debris enhancement area. Continued implementation of these existing programs should further reduce the impacts of marine debris in the coastal zone. Working with and supporting local government and watershed associations to educate the public and clean up debris should also further improve this enhancement area.

### **2. What priority was this area and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Low

This Assessment: Low

Relative to other Section 309 Objectives, this issue is not considered a high priority. The gaps identified will be addressed through existing programs.

## G. SPECIAL AREA MANAGEMENT PLANNING

### Section 309 Programmatic Objectives

1. *Develop and implement special area management planning in coastal areas applying the following criteria:*
  - a) *Areas with significant coastal resources (e.g., threatened and endangered species and their critical habitats, wetlands, waterbodies, fish and wildlife habitat) that are being severely affected by cumulative or secondary impacts.*
  - b) *Areas where a multiplicity of local, state, and federal authorities hinder effective coordination and cooperation in addressing coastal development on an ecosystem basis.*
  - c) *Areas with a history of long-standing disputes between various levels of government over coastal resources that has resulted in protracted negotiations over the acceptability of proposed uses.*
  - d) *There is a strong commitment at all levels of government to enter into a collaborative planning process to produce enforceable plans.*
  - e) *A strong state or regional entity exists which is willing and able to sponsor the planning program.*

### Resource Characterization

**Using the criteria listed above, identify areas of the coast subject to use conflicts that can be addressed through special area management planning (SAMP).**

**Table 17.**

<b>Area</b>	<b>Major conflicts</b>
Maryland Coastal Bays	Large seasonal populations and extensive development in a relatively small area threaten to destroy the environmental and economic benefits of the region.

### Management Characterization

**1. Identify areas of the coast that have or are being addressed by a special area plan since the last Assessment:**

Since 1995, the Maryland coastal bays and their associated watershed have been addressed by a special area plan as part of a §309 Strategy.

**2. Identify any significant changes in the state's SAMP programs since the last assessment (e.g., new regulations, guidance, Memorandums of Understanding, completed SAMPs, implementation activities). Provide the following information for each change: Characterize the scope of the change, describe recent trends, identify impediments to addressing the change, and identify successes.**

Maryland's Atlantic coastal bays watershed was accepted as the Maryland Coastal Bays Program (MCBP) National Estuary Program in 1995. The MCBP Comprehensive Conservation and Management Plan (CCMP) was approved by U.S. EPA in October, 1999 and since that time the 500 + actions prescribed in the Plan are being implemented. The Program is a partnership with the Towns of Ocean City and Berlin; Worcester County; Maryland Departments of Natural Resources, Agriculture, Environment, and Planning; National Park Service; U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration. As of September 2004, the end of Phase One, 53.4% of the CCMP has been implemented, with a majority of actions showing substantial progress. Phases Two and Three are expected to realize more

initiatives on the landscape of the watershed in addition to those actions affecting the water quality and wildlife within the bays.

Between 2000 and 2005, the Coastal Bays Program benefited from sub-watershed Watershed Restoration Action Strategies (funded by §309) for the Northern Bays, Newport and Sinepuxent Bays; a Builder's for the Bay roundtable process; a compilation of recommendations from the Sensitive Areas Initiative; development and research into nutrient reduction strategies; completion of fishery management plans; the first ever State of the Coastal Bays Report; and, the adoption of Quantifiable Goals and Indicators. The action commitments from its member partners include the establishment of new septic and stormwater control measures, completion of a Comprehensive County Forest Management Strategy, development of a Navigation and Dredging Planning Guide , and modifications to local codes and policies so that communities are designed with safety features that protect them from coastal hazards and minimize economic loss.

## **Conclusion**

### **1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

There has been substantial progress in implementing the actions in the CCMP, as well as taking steps beyond the CCMP to protect and conserve natural resources in the coastal bays and their associated watershed. Currently the Program and its partners are developing a Delmarva Atlantic Watershed Network to improve regional planning efforts between the three States involved (Maryland, Delaware, and Virginia). §309 funding could be used to help further this effort.

### **2. What priority was this area previously and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Medium

This Assessment: Medium

The Maryland Coastal Bays Program is well on its way to achieving its goals. The CCMP is being implemented, legislative changes have occurred to increase environmental protection and conservation, and partners are established and working together to address conflicts in the coastal bays region. At this time, the Maryland Coastal Program does not feel that additional Section 309 funds are needed to further efforts in the coastal bays and associated watershed. However, core Coastal Program staff will continue to work with the Maryland Coastal Bays Program on a routine basis.

## H. ENERGY & GOVERNMENT FACILITY SITING

### Section 309 Programmatic Objectives

1. *Enhance existing procedures and long range planning processes for considering the needs of energy-related and government facilities and activities of greater than local significance.*
2. *Improve program policies and standards which affect the subject uses and activities so as to facilitate siting while maintaining current levels of coastal resource protection.*

### Resource Characterization

Maryland's energy facilities in the coastal zone include: five coal-fired, nine oil-fired, and three natural gas power plants, as well as, one nuclear power plant, three alternate fuel plants, one hydroelectric plant, and the nation's largest liquefied natural gas import and storage facility (which began receiving ships in 2003). Maryland's Public Service Commission (PSC) has sole authority over powerplants and overhead transmission lines. Maryland's coastal zone supports significant federal infrastructure that uses airspace, land, and coastal waters. Federal infrastructure is a major part of Maryland's economy and includes: Aberdeen Proving Grounds, Edgewood Arsenal, Fort Belvoir, Fort George Mead, Naval Ship R&D Academy, Naval Base, U.S. Naval Plant, U.S. Naval S.E.A., Patuxent Naval Airforce Center, Naval Surface Weapons Center, Andrews Airforce Base, V.A. Medical Center, Patuxent Wildlife Research Center, and USDA National Agricultural Research Center.

### Management Characterization

1. **Identify significant changes in the state's ability to address the siting of energy and government facilities since the last Assessment (e.g., new regulations, guidance, manuals, etc.). Provide the following information for each change: characterize the scope of the change, describe recent trends, identify impediments to addressing the change, and identify successes.**

*State Agency Guidelines.* State agency guidelines for evaluating multiple power plants were created in 2002 to address power plant site suitability in situations where multiple power plants are proposed in close proximity to one another. The guidelines were created in response to significant interest on the behalf of power plant developers to construct new power plants, all located within approximately 25 miles of each other. A Task Force was convened in June 2002 and guidelines were submitted to the Public Service Commission in December 2002. Following submission of the guidelines, however, all but one of the proposed powerplants withdrew their permit applications and the State did not pursue enactment of the proposed guidelines.

*Carbon sequestration.* DNR's Maryland Geological Survey, University of Maryland, and Maryland Energy Administration recently joined the Midwest Regional Carbon Sequestration Partnership. This seven-state, DOE-funded partnership addresses the most suitable technologies, regulations, and infrastructure for future capture, storage and sequestration of CO<sub>2</sub>, a greenhouse gas. One underground location in the southeastern portion of the eastern shore of Maryland (the lower Cretaceous unit "Waste Gate Formation") has been identified as a potential sink. Infrastructure would be required to investigate feasibility, transport the gas, change it from gas to liquid, drill deep holes, and sequester the liquid.

*Environmental Review.* DNR's Watershed Services, Environmental Review Section participates in the permitting process for energy and government facility siting in Maryland. This Section reviews approximately 25,000 permits a year that address dredging, oil and gas, toxic materials, waste management, dams, wetlands, and other aspects of energy and government facility siting. Environmental Review is a link between DNR and other agencies for permit review on a variety of additional topics (e.g., wildlife, fisheries, forestry). A major change during the assessment period is the reduction in staff from 5 to 3 persons and

there is no longer an operating budget. Insufficient funding and staff is an impediment to successfully addressing siting requirements.

*Energy Policy Act.* At the Federal level, Congress passed the Energy Policy Act of 2005. Section 311 of the Act restricts the State's ability to regulate LNG facilities by providing FERC with "exclusive authority to approve or deny applications for the siting and expansion or operation" of LNG terminal onshore or in state waters. The states do retain their authority under the CZMA, Clean Air Act, and Clean Water Act, except as provided in the Energy Policy Act.

*Coastal Facilities Review Act.* The CFRA requires a permit for certain types of oil and gas related facilities in the "coastal area." Facilities include pipelines, as well as certain immediate production terminals and refineries, crude oil storage facilities, facilities for processing, transmission or storage of natural gas, ports and harbor facilities, and fabrication yards. A Routine Program Change, incorporating the Coastal Facilities Review Act, into Maryland's Coastal Program was approved by NOAA in August 2005. This Routine Program Change permits that all federal activities, licenses, permits, and assistance which may affect coastal resources or uses will be subject to review for consistency with those enforceable policies of the Coastal Facilities Review Act found in Maryland Code Environment Article, Title 14, Subtitle 15, as specified in the approval request by NOAA.

In general, Maryland has a sophisticated energy facility siting process. One identified gap is that the Maryland Public Service Commission has jurisdiction over only "overhead" transmission lines, according to the Power Plant Siting and Research Act of 1971. This law was written when few if any underground lines existed. The gap in this law, particularly combined with the lack of state jurisdiction of coastal waters beyond 3 miles, could affect the State's ability to review and regulate energy and government facility siting. Underground lines, however, would still be subject to tidal wetland permitting processes administered by the MDE.

## **Conclusion**

### **1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

No significant gaps or priority needs exist for energy and government facility siting that could be addressed by a §309 Strategy.

### **2. What priority was this area previously and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Low                      This Assessment: Low

The State of Maryland considers this issue to be adequately addressed through existing management programs and activities.

## I. AQUACULTURE

### Section 309 Programmatic Objectives

1. *Enhance existing procedures and long range planning processes for considering the siting of public and private marine aquaculture facilities in the coastal zone.*
2. *Improve program policies and standards which affect aquaculture activities and uses so as to facilitate siting while ensuring the protection of coastal resources and waters.*

### Resource Characterization

1. **Briefly describe the state's aquaculture activities (e.g., existing procedures, plans, program policies and standards).**

Maryland's Aquaculture Program was established by the State Legislature in 1987 to encourage the orderly development of an aquaculture industry while ensuring that aquaculture operations do not adversely impact the state's wild stocks of fish and shellfish. Aquaculture is categorized as: 1) shellfish aquaculture on leased bottom, which requires a Lease of State Lands, or 2) aquaculture in freshwater, indoors, or in structures in public waters, which would require an Aquaculture Permit from DNR. Additional state and federal permits may also be necessary for aquaculture operations.

There are 780 existing leases for shellfish (e.g., hard clam, oyster) aquaculture on the bottom, encompassing approximately 7,200 acres in the Chesapeake Bay and coastal bays. Oyster diseases significantly impair successful shellfish culture in the Chesapeake Bay. Most leases currently involve raising hard clams in the coastal bays, where over 200 acres of bottom have been leased in recent years.

Maryland has nearly 150 organizations operating under current Aquaculture Permits. In terms of annual sales, the state's largest aquaculture sector is ornamental goldfish and aquatic plants cultured for the water garden market. Some food fish are raised for seafood markets and fee-fishing operations. Maryland does not have a commercial sport fish hatchery. Other species are raised in smaller niche operations, including marine shrimp, turtles, and live corals and fish for the aquarium trade. Eleven Aquaculture Permits have been issued for operations in tidal waters, primarily for shellfish culture.

2. **Briefly describe environmental concerns (e.g., water quality, protected areas, impacts on native stock and shell fish resources). Also, describe any use conflicts (e.g., navigational, aesthetic, incompatible uses, public access, recreation, and future threats (e.g., shoreline defense works, introduced species).**

Bivalve utilization of particulate food resources and removal of minerals from the system, as well as, competition between farmed and wild species are potential impacts of aquaculture. Environmental concerns stemming from aquaculture primarily involve the introduction of wastes (e.g., nutrients, organic matter) from the operation of intensive culture systems, and chemicals (e.g., pesticides, drugs, antifoulants) in fish culture. Most effects are site specific and influenced by environmental conditions. Siting policies and NPDES permit requirements address these issues.

To protect native or wild species and their habitat, Maryland has aquaculture laws and regulations that 1) define and specify activities that use hybrid animals, genetically modified organisms or non-native species, and 2) allow for the prohibition of cultivating certain species. Invasive or unwanted introduced species are considered a serious potential threat, as demonstrated by the snakehead fish populating the Potomac River and its tributaries.

Conflicts arise most commonly in tidal waters, where recreational and commercial fishing and boating are primary users of navigable waters. Access is important to aquaculture development, maintenance, and expansion. Access includes waterfront access to navigable waters and regulatory access to the water column. Waterfront landowners, tourists, and recreational users may object to the aesthetics of aquaculture structures. Fishing is allowed inside aquaculture areas and on leases, and aquaculture is not allowed on natural oyster or clam bars. Both fishing and aquaculture may conflict with conservation interests held by representatives of all user groups. Aquaculture operations that utilize structures in public waters must receive a joint state/federal permit that addresses proposed aquaculture activities. Maryland's increasing human population and the increase in coastal land values heighten competition among user groups.

### **Management Characterization**

**1. Identify significant changes in the state's ability to address the planning for and siting of aquaculture facilities since the last Assessment (new regulations, guidance, manuals, etc.). Provide the following information for each change: Characterize the scope of the change, describe recent trends, identify impediments to addressing the change, and identify successes.**

A new aquaculture and seafood Act took effect July 1, 2005 (HB 971) which reorganizes Maryland's aquaculture policy development and regulatory processes. The legislation was based on recommendations from the two-year Task Force to Study the Economic Development of the Maryland Seafood and Aquaculture Industries. The intent behind the law is to provide a clearer regulatory pathway to permits, including the establishment of pre-permitted aquaculture enterprise zones; and, address policy issues, including aquaculture's interactions with natural resources and other stakeholders in public waters.

HB 971 also retitles the Aquaculture Advisory Committee as the Aquaculture Coordinating Council and modifies its duties. The Aquaculture Coordinating Council will establish and coordinate policy development. The Council will formulate proposals to the Governor and State Legislature for advancing Maryland aquaculture, establish a grant program for the implementation of projects to bolster the industry, and make recommendations to the Aquaculture Review Board regarding needed regulatory changes. Among other duties, the Council must oversee the establishment of Best Management Practices for all segments of the aquaculture industry by December 31, 2006 and establish aquaculture enterprise zones for sustainable development in the Chesapeake Bay and coastal bays.

The legislation also establishes an Aquaculture Review Board within the Maryland Department of Agriculture. The Review Board will review regulatory issues, coordinate the development of statewide aquaculture policy, and streamline permit processes. The reorganized boards will review and recommend changes to current regulations and laws affecting aquaculture in Maryland. Key issues include recent interest in off-bottom shellfish culture in tidal waters, which many state agencies must address with new regulations, and bottom lease laws that have not evolved to meet modern economic needs.

At the National level, Congress passed the *National Offshore Aquaculture Act of 2005 (S.1195)*. The bill grants the Secretary of Commerce new authority to issue permits for offshore aquaculture in Federal Ocean waters, while providing environmental and other safeguards to protect wild stocks, marine ecosystems, and other users. The Act specifically provides for coordination and consultation with other federal agencies, Fishery Management Councils, and coastal states. Maryland's Aquaculture Review Board should be directly involved with any aquaculture projects proposed under this authority.

Although efforts, as discussed above, are underway to address shortcomings in regulatory systems to enable more timely and appropriate permit approvals, technical and economic issues remain as roadblocks. Diseases of shellfish strongly affect production in many traditional regions, and scientists have been unable to provide cost-efficient solutions to the problems. The State otherwise lacks abundant natural resources



available to aquaculture, such as inexpensive land or non-polluted waters, and lies in a region of low unemployment, making labor expensive. Tidal waters exhibit ever-increasing nutrient and human pathogen loads resulting from the densely populated watershed.

## **Conclusion**

### **1. Identify priority needs or major gaps in addressing the programmatic objectives for this enhancement area that could be addressed through a §309 Strategy.**

*HB 971* presents the State and in particular Maryland's Coastal Program with an opportunity to actively participate in the development of Best Management Practices and/or the delineation of aquaculture enterprise zones. Section 309 funding could be used to support this planning effort, including the development and necessary acquisition of data and technological information.

### **2. What priority was this area previously and what priority is it now for developing a §309 Strategy and designating §309 funding and why?**

Last Assessment: Medium

This Assessment: Medium

There is a strong linkage between the process of mapping and developing aquaculture enterprise zones and the process of mapping and identifying marine managed areas. Section 309 funding will be sought to support the development of an Aquatic Resource Network that will include components of both of these mapping efforts in Maryland. Please reference the Ocean Resources Assessment for a more complete description of this Enhancement Area.

## IV. Strategy

The Maryland Coastal Zone Management Program has identified three general areas to concentrate efforts for the §309 Coastal Enhancement Strategy: (1) Ocean Resources; (2) Cumulative and Secondary Impacts; and (3) Coastal Hazards. Each area was identified as a high priority during the §309 Assessment, which reviewed and commented on all nine enhancement areas found in the Coastal Zone Management Act. The following strategies focus on filling gaps recognized under these enhancement areas in the Assessment. In addition, the Assessment identified a need to utilize §309 Funds to support implementation of the National Coastal Management Performance Measurement System

### Overview of Proposed Budget

Table 18.

<b>§ 309 Enhancement Area</b>	<b>FFY 2006</b>	<b>FFY 2007</b>	<b>FFY 2008</b>	<b>FFY 2009</b>	<b>FFY 2010</b>
Ocean Resources	\$101,000	\$106,000	\$106,000	\$106,000	\$106,000
1) <i>Aquatic Resource Network</i>	1) \$54,159				
2) <i>Vision for Our Ocean</i>	2) \$46,841				
Cumulative and Secondary Impacts <i>Coastal Communities</i>	\$180,000	\$180,000	\$180,000	\$220,000	\$220,000
Coastal Hazards	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
National Coastal Management Performance Measurement System	\$40,000	\$40,000	\$40,000	\$0	\$0
Totals	\$521,000	\$526,000	\$526,000	\$526,000	\$526,000

### Strategy Format

The remainder of this strategy will be divided into the §309 enhancement areas. For each, the following components are included: (1) summary of problem, (2) proposed program changes, (3) anticipated effects, (4) appropriateness of program change, (5) fiscal and technical needs, (6) budget, (7) workplan, and (8) likelihood of success.

## Ocean Resources: Aquatic Resource Network<sup>3</sup>

### Issue Summary

Management of aquatic and near shore resources for both the State's ocean and estuarine resources is accomplished through the implementation of numerous State statutes, laws, regulations and programs, administered by varying State agencies. As a result, aquatic resources and habitats are generally mapped and managed independent from one another (i.e., SAV beds, oyster sanctuaries, etc.). There is a growing desire, however, to develop a means for the consideration of a broad range of habitat conservation issues, collectively.

Over the past five years, several projects, as discussed below, illustrate the State's initial efforts to begin moving in this direction.

*Coastal Bays Sensitive Areas Initiative.* In 2000, the Coastal Program formed partnerships with the Maryland Coastal Bays Program, Salisbury University, federal, state, and local agencies, and other stakeholders to develop a means to balance resource protection with recreational use in the Coastal Bays. Subsequently, sensitive aquatic species and habitats were mapped, ranked and prioritized and a management plan was developed.

*Green Infrastructure Assessment.* Maryland's Green Infrastructure Assessment, completed in 2001, mapped over two million acres of land-based natural resources and habitats. The goal of the Assessment was to identify large contiguous blocks of natural land (hubs), interconnected by corridor, to allow animal and plant dispersal and migration. Hubs and corridors were ranked within their physiographic region for a variety of ecological parameters and for development risk factors.

*Strategic Shore Erosion Assessment.* As a component of its 2000 §309 Coastal Hazards Strategy, the Coastal Program began mapping aquatic and near shore resources for the purposes of developing the "environmental sensitive areas" element of a prioritization and targeting tool (SSEA) for the selection of shore erosion protection alternatives.

A number of additional efforts are underway or anticipated in the near future to map aquatic and near shore resources along Maryland's ocean coast, and within the coastal and Chesapeake Bays. These efforts include: (1) a state-wide marine managed area inventory; (2) mapping and designation of Aquaculture Enterprise Zones; (3) mapping and inventory of submerged archeological historic properties; and, (4) ocean resource mapping.

The State is proposing to use §309 funds to develop a spatial management support system over the next five years that will serve as the coordinating and data support structure for the mapping and management efforts detailed above. This network, to be called the "aquatic resource network," will ultimately enable a shift in the way Maryland currently views and manages its aquatic and near shore resources. The purpose of the network will be to strive to preserve, protect and restore essential near shore and aquatic habitat in an ecologically meaningful way and connect them to terrestrial conservation corridors.

The Strategy, outlined below, details the proposed program changes, fiscal and technical needs, budget, workplan, and a discussion of the likelihood of success resulting from the proposed project.

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<sup>3</sup> For the purposes of this Strategy, the definition of Ocean Resources has been expanded to include aquatic and nearshore resources located along Maryland's ocean coast and within the Atlantic Coastal Bays and the Chesapeake Bay.

## Proposed Program Changes

It is anticipated that the creation of an Aquatic Resource Network will enable the State to look at aquatic and near shore resources in a different way. It will change the way the State currently maps and classifies its aquatic resources and the way it currently manages these resources. At the outset of this project, foreseeable program changes include the following:

- *Designation of Aquaculture Enterprise Zone.* The Coastal Program is proposing to work with the Maryland Aquaculture Coordination Council to coordinate data collection efforts, particularly in the Coastal Bays, to facilitate the designation of shellfish farming areas. Data compiled through the Coastal Bays Aquatic Sensitive Areas Initiative will support this effort.
- *Revised Memorandum of Understanding (MOU) with Maryland Department of Planning.* To date, the Coastal Program has not been actively involved in issues related to the State's underwater archeological resources. The Coastal Program is interesting in adding the Maryland Historical Trust, housed within the Maryland Department of Planning, to the list of networked Coastal Program Partners.
- *Designation of new or expanded Marine Managed Areas, Marine Protected Areas, and/or No Discharge Zones.* Maryland is currently in the process of conducting an inventory of its Marine Managed Areas<sup>4</sup>: The development of an Aquatic Resource Network in Maryland will further the process of designating new or expanded MMA's, No Discharge Zones, and potentially Marine Protected Areas.
- *Strategic Shore Erosion Assessment (SSEA).* Data gathered through the Aquatic Resource Network will support the SSEA, which is designed to be a targeting and prioritization tool for the selection of shore protection alternatives for federal, state and local governments. The Coastal Program is anticipating program changes at all levels of government to integrate use of the tool in decision-making processes.

## Anticipated Effects of Program Change

Generally speaking, aquatic resource management efforts in the State of Maryland are hindered by the following:

- A singular focus on implementation of one tool (e.g. tidal wetlands law) for one particular resource rather than consideration of a broad range of habitat conservation approaches.
- The lack of understanding of the relationship between terrestrial corridor and aquatic habitat complexes.
- The lack of an effective forum for stakeholder input.

The anticipated effects of this program change will be to attempt to resolve these deficiencies and, in turn, enhance the exchange of aquatic resource information; improve aquatic resource management; and to strengthen the State's analytical ability to assess user and land-based impacts to aquatic resources. All of these will ultimately result in a measurable improvement in the health of aquatic and near shore ecosystems.

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<sup>4</sup> MMA's are defined as areas in coastal or tidal waters, identified through legislation or regulations with clear boundaries that offer protection for one or more species. Potential Maryland examples: oyster sanctuaries and reserves, spawning areas, and seagrass beds.

### Appropriateness of Program Change

Over the past several years, Maryland has developed and worked on several new initiatives in the near shore environment, resulting in a number of accomplishments. A need still exists, however, to further explore and resolve a number of near shore and aquatic resource management issues. Furthermore, NOAA's Section 312 Program Evaluation Recommendations (2004) encouraged the Coastal Program to "continue and improve its focus on the near shore environment and seek opportunities for partnerships to further identify, address and improve management of near shore resources."

At the federal level, a President's Executive Order on Marine Protected Areas (MPAs) was passed in May 2000. The Order seeks "an expanded and strengthened comprehensive system of marine protected areas throughout the marine environment." Also, the final report from the U.S. Commission on Ocean Policy included a discussion on employing marine protected areas as a management tool, recommending the development of national goals and guidelines. Maryland is currently working to inventory its marine managed areas, however, given its current management system and the existing data framework for aquatic resources, is not ready to entertain the designation of marine protected areas. The development of an Aquatic Resource Network is necessary in order to determine if additional marine managed areas and/or marine protected areas are a sound aquatic management technique for the State's coastal waters.

### Fiscal and Technical Needs

Funding and technical assistance are needed to support this mapping and planning effort. The predominant use of funds will be for the mapping phase of the exercise. Mapping of aquatic and near shore resources, based on existing information, has been initiated and in some areas compiled for the purposes of developing prioritization and targeting tools for select areas around the State. §309 funds would be used to continue these efforts. They would also be used to develop educational and outreach materials; pursue research and effectiveness evaluations; and, to ensure agency coordination and stakeholder participation in the planning process.

### Budget

**Table 19.**

<b>Task</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Data Collection and Analysis	\$40,000	\$30,000	\$20,000	\$10,000	\$10,000
Management and Gap Analysis	\$10,000	\$10,000	\$20,000	\$20,000	\$10,000
Stakeholder Participation	\$5,000	\$5,000	\$5,000	\$10,000	\$10,000
Education and Outreach	\$5,000	\$5,000	\$5,000	\$10,000	\$20,000
<b>Totals</b>	<b>\$60,000</b>	<b>\$50,000</b>	<b>\$50,000</b>	<b>\$50,000</b>	<b>\$50,000</b>

### Workplan

Phase 1: The methodology developed during Coastal Bays Sensitive Areas Initiative planning process provides an excellent framework for expanding aquatic resource mapping and planning throughout the State's coastal waters. The framework already exists and is guiding the environmental sensitive area mapping for the SSEA. The first phase of this project will be to continue the data gathering and mapping exercise used in the Coastal Bays, state-wide. This exercise will entail the following:

- Creation of GIS boundaries that allow for a clear picture of the location and spatial relationship between aquatic resource areas.
- Analysis of resources to determine representative habitat types.

- Conduct gap analysis to determine missing or incorrect data.
- Prioritization of habitat complexes for protection, restoration and preservation.

Phase 2: The second phase of the project will be to conduct an assessment of the threats and gaps in level of protection currently afforded to aquatic and near shore resources. Identifying gaps and threats will assist the State with determining options for remedying existing conflicts.

Phase 3: The third phase of the project will be to develop a framework for integrating aquatic resource management objectives into land-use planning practices (i.e., linking terrestrial and aquatic resource management). This phase of the project will require collaboration with local land use authorities. Mechanisms for balancing resource development and habitat conservation will be explored and priority lists for critical land acquisition to protect aquatic resource habitats will be developed.

Phase 4: The final phase of this project is to examine opportunities for designating new or expanded marine managed areas, marine protected areas, and/or no discharge zones. This phase will include an analysis of Maryland's legal authority to designate marine protected areas and the procedures and limitations for new or expanded marine managed areas.

#### Likelihood of Success

There is a strong likelihood of success for this initiative. Momentum is already building within State resource agencies, as well as among federal program partners, such as the Chesapeake Bay Program. Exploratory workshops and stakeholder meetings have been conducted and the Coastal Program has been an active participant. In order to achieve success, the Coastal Program will need to continue to commit staff and technical resources to the project.

## Ocean Resources: Vision for Our Ocean

### Issue Summary

The State of Maryland has, to date, largely focused its coastal management efforts on the important resources found in and around the Chesapeake Bay, and, more recently, in the Maryland Coastal Bays. As in many other states, citizens and public officials have paid less attention to the ocean lying offshore Maryland's beaches and bays, and to the issues that are posed in the management of valuable offshore resources and uses such as: marine fisheries; marine mammals; offshore oil, gas, and other minerals; transportation; and recreation. Management of ocean resources is a high priority for Maryland and one that is need of further understanding.

Now is a key time for the State of Maryland to gain a better understanding of the major ocean resources and uses that take place offshore Maryland. As Maryland considers management issues in the ocean area under State jurisdiction (out to 3 miles offshore), it is also important for the State to consider ocean use and protection issues posed in the wider Mid-Atlantic region and especially ocean issues occurring in the 3-200 mile zone under the control of Federal agencies, since these issues may well affect the interests of Maryland, in State waters, at the shoreline, and on land.

### Proposed Program Changes

CZMA §309 funds are being sought to support the State in ocean resource mapping and planning efforts. This is a new area of interest for Maryland's Coastal Program and one that will take time to evolve. Therefore, program changes will not be immediately forthcoming. At this stage, given a general lack of ocean planning efforts, Maryland is proposing to develop a framework for future ocean planning efforts. This framework will serve as the foundation for future ocean policy initiatives. However, it is premature to detail the scope of anticipated policy initiatives at this time.

### Anticipated Effects of Change

By developing a framework for future ocean planning efforts, the State will be able to identify and ultimately move forward on ocean policy initiatives. Maryland's role in regional ocean governance will be established and opportunities for strengthening coordination between Federal, State and local coastal and ocean management programs will be identified. This planning process is compulsory to the State's ability to some day establish an ocean resource management plan.

### Appropriateness of Program Change

The recently completed report of the U.S. Commission on Ocean Policy, *An Ocean Blueprint for the 21<sup>st</sup> Century* (2004), as well as the report prepared by the Pew Oceans Commission, *America's Living Oceans: Charting a Course for Sea Change* (2003), highlight the economic and social importance of ocean uses in the U.S. 200-mile Exclusive Economic Zone, and call for new integrated approaches to governance of ocean areas through collaboration among states, federal agencies, and stakeholders. In particular, both Commissions call for a system of regional ocean governance involving new processes of collaboration among states and federal agencies in a marine region, the identification of major issues and conflicts in the region, the identification of policy options, the building of consensus around policy solutions, and the preparation of regional plans to harmonize multiple use conflicts and to plan for future ocean protection and use. Similarly, the President's Ocean Action Plan, delivered in December 2004 in response to the report of

the U.S. Commission on Ocean Policy, details specific directions on regional ocean governance. The proposed §309 Strategy will help Maryland begin to respond to these identified needs and issues.

Fiscal and Technical Needs

Due to State budget constraints and the fact that this is a new issue area for the Coastal Program, it is anticipated that §309 funds will be necessary to accomplish the proposed ocean resource mapping and planning efforts. Funds will be allocated as set forth in the budget below.

Budget

**Table 20.**

<b>Task</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Data Collection and Analysis	\$46,841	\$30,000	\$20,000	\$10,000	\$10,000
Legal Analysis	\$0	\$10,000	\$20,000	\$20,000	\$10,000
Stakeholder Participation	\$0	\$5,000	\$5,000	\$10,000	\$10,000
Education and Outreach	\$0	\$5,000	\$5,000	\$10,000	\$20,000
<b>Totals</b>	<b>\$46,841</b>	<b>\$50,000</b>	<b>\$50,000</b>	<b>\$50,000</b>	<b>\$50,000</b>

Work Plan

Task 1: The University of Delaware, Center for Marine Policy, is currently conducting a scoping and review of Maryland’s interests in ocean resource management. Findings will be detailed in the final report (expected in October 2006). Project tasks include: (1) an assessment of the current status and issues pertaining to management of ocean resources; (2) the examination of interactions among coastal issues, conflict identification and resolution; (3) assessment of other coastal issues; and, (4) the examination of regional ocean governance issues and role recommendations. The first task under this work plan is to actively work with the University of Delaware to provide information and access to materials necessary to complete their analysis.

Task 2: Building on the findings of the University of Delaware, the Coastal Program will begin working one-on-one with state and regional partners and stakeholders to fully initiate the planning process. Group meetings and workshops will be used to accomplish this task.

Task 3: Inventory ocean resources. This task will require both the collection of new data as well as the compilation of existing map and data resources. Data to be collected may include: an underwater archeology survey; location of cable corridors/pathways and navigational channels; and mapping of essential fish habitat.

Task 4: Analyze existing laws, regulations and programs with regard to Maryland’s ocean resources. The purpose of this analysis is to determine the State’s ocean resources legal authority as well as its legal geographic boundaries.

Task 5: Examine both instate and regional ocean management issues and assess Maryland’s role in regional ocean governance. A component of this task will be to identify opportunities for: (1) strengthening coordination between Federal, State and local coastal and ocean management programs; and, (2) sharing of scientific data and research.

Task 6: Develop a framework for future ocean planning efforts. The framework will set the stage for the State to move forward with ocean resource policy initiatives.



### Likelihood of Success

The success of this strategy is dependent on several factors. First, State and regional partners and stakeholders must be willing to actively participate in the planning process. The process must also maintain public support. This will require a fair degree of outreach to educate the public of the benefits of sound ocean resource management. Additionally, the Coastal Program must maintain adequate staff to support the effort. This is a new issue area for the Program and one that will require dedicated personnel committed to the project over time. The State is confident that it will be able to satisfy these needs and the project will succeed.

## **Cumulative and Secondary Impacts: Coastal Communities Initiative**

### Issue Summary

Maryland's coastal zone, home to approximately 70% of the State's population, is comprised of numerous coastal communities. Many of these communities are increasingly experiencing growth and development pressure, but wish to maintain their coastal and rural characteristics. Others are looking to new economic growth opportunities as the local landscape and culture change. Each community is unique, both in terms of its character as well as its ability to plan and accommodate for growth and development.

Maryland's Coastal Program has a long history of working with its local coastal communities. In the course of providing technical assistance to local governments over the years, through such efforts as the development of Watershed Restoration Action Strategies, the Coastal Program has identified several planning hurdles. Despite the creation of both general and issue specific plans (e.g., forestry and watershed) at the local level, changes are only realized if these plans are subsequently adopted and codes/ordinances are modified. Land use planning in the State of Maryland is delegated to local governments with few State mandates. Land use decisions are at the discretion of local elected officials, who are often in need of additional information and training in order to understand the impacts of their decisions.

Through the *Coastal Communities Initiative* (CCI), the Coastal Program is proposing to work with local communities to overcome some of these obstacles. The Initiative is designed to provide a means for the State to work one-on-one with local governments to: (1) identify potential changes to local codes, ordinances, policies, etc. that will enhance natural resource protections; and, (2) to provide the technical and financial resources necessary to ensure the adoption of associated program changes at the local level.

### Proposed Program Changes

Through CCI, the Coastal Program and other State agencies will develop cooperative agreements to work with local communities to identify potential code changes that will enhance natural resource protections. The CCI will, ultimately, lead to incorporation of natural resource and/or coastal management issues (e.g., public access, water-use activities, coastal hazards, etc.) into local planning and permitting activities. Potential program changes include:

- Modified ordinances, codes, plans, and programs supporting the goals of local watershed plans, Priority Places designation, the Tributary Strategies, as well as other existing natural resource management plans.
- Updated existing regulations to allow for low impact development.
- Shoreline management plans and review and permitting processes that strategically look at where non-structural shore protection methods can be used.
- Streamlined project review processes to better assess the impacts of various shoreline management options, or improved coordination and sequencing of permitting between agencies.
- Revised Critical Area Programs to meet current needs.
- Protection mechanisms to preserve agricultural and forestland resources using zoning mechanisms including TDRs, minimum lot sizes, etc.
- Standard permit review systems that comprehensively considers a consistent suite of natural resource and coastal issues.
- Urban forest canopy plans.
- Public riparian access plans.

### Anticipated Effects of Change

The long-term goal of CCI is to improve coastal and natural resource management throughout the coastal zone. As local governments lead efforts to address natural resource protection in their communities, outcomes could include: incorporation of natural resource element and coastal hazard planning into local comprehensive plans, adoption of zoning ordinances or environmental codes, streamlined project review processes or improved coordination between permitting agencies, or revised Critical Area Programs. The CCI provides a new mechanism for state agencies to reach out to local communities and provide the financial and technical assistance that is needed to move these changes forward.

### Appropriateness of Program Change

In the coming year, local governments will be required to meet several new state guidelines regarding growth and planning. In July 2004, the Governor's Development Capacity Task Force released its Final Report. Following its release, local governments committed themselves to conducting a development capacity analysis as part of their comprehensive plans. Additionally, in the Fall of 2006, local governments, in conjunction with their respective Tributary Strategy Teams, will begin to develop local tributary strategy implementation plans in accordance with new State Tributary Strategy Goals. The CCI will complement both of these planning efforts. It is a timely opportunity and the financial and technical assistance provided through the Initiative will give local communities the data and support necessary to ensure that natural resource protection goals can be achieved while accommodating growth and development at the local level.

### Fiscal and Technical Needs

A key to the success of this Initiative will be accurate natural resource information to incorporate into community planning efforts. DNR and its partners will be called upon to provide GIS maps, environmental design assistance, build-out analyses, natural resource protection BMPs, coordination assistance, and more. In addition, the communities will need financial assistance to develop local plans as well as code and ordinance changes. Funding will also be necessary to prepare educational and outreach materials, and conduct local elected official training and workshops.

### Budget

**Table 21.**

<b>Task</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Grants to local governments	\$155,000	\$155,000	\$155,000	\$195,000	\$195,000
Data collection and analysis	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
Outreach	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
<b>Totals</b>	<b>\$180,000</b>	<b>\$180,000</b>	<b>\$180,000</b>	<b>\$220,000</b>	<b>\$220,000</b>

### Work Plan

The CCI will span five years (2006 – 2010). It is envisioned that community projects will be selected each year through a Request for Proposal (RFP) process. Depending on funding allocation, a pre-determined number of projects will be selected each funding cycle. Using \$306 funding, the Coastal Program is currently working with five pilot communities to undertake CCI efforts.

Implementation of these pilot projects will help solidify the setup for additional years. The funding allocation for each project is to last one year, however, it is envisioned that the partnership will continue beyond the one-year time frame depending on the needs of each community.

The CCI builds on the coordination of multiple agencies and programs. MD Sea Grant and several CB NEMO partners are working with the Maryland Coastal Program to implement the pilot phase of the CCI. The Coastal Program recognizes the valuable role they serve and will continue to engage both in future CCI implementation. An interagency committee, made up of State and Federal agency representatives, has already been established to review Requests for Proposals (RFP) from local communities and to determine the feasibility of providing technical assistance. Members of the committee will be facilitating the assistance requested by the local communities from their individual agencies. The interagency committee will be involved throughout the five-year time frame to provide oversight and guidance. Implementation of the *Coastal Communities Initiative* will be a five-stage process.

**Phase One:** Request for Proposals, Interagency Committee Review, and Project Selection.

**Phase Two:** It is anticipated that many communities will need technical assistance in the form of data and/or data analysis in order to effect positive changes. The Coastal Program and other State Agency Partners will work one-on-one with local communities, providing technical assistance and access to State data and mapping resources. Phase Two is devoted to meeting information needs and supporting innovative analysis tools and management techniques.

**Phase Three:** Technical and/or financial assistance for the analysis of existing codes and regulations in order to identify opportunities and barriers to cultural and natural resource protection. Program partners and communities will identify best management practices, education opportunities of both municipal officials and the public, potential code and ordinance changes, economic development relationships, and any relevant restoration and protection opportunities.

**Phase Four:** For each community selected, outreach materials will be developed and fact sheets, brochures will be prepared. Education materials for elected official training will also be prepared and trainings/workshops conducted. It is expected that issues of common concern will become evident as the Coastal Program begins working with local communities. For this reason, workshops geared towards addressing common issues may be conducted.

**Phase Five:** Conduct an overall evaluation of the process and project outcomes. Outcomes of the evaluation will guide the Coastal Program as it continues to work with local communities to ensure the adoption of new or modified codes, ordinances and/or management plans.

### Likelihood of Success

There is high likelihood of success for this strategy, for the following reasons. Implementation of the strategy relies on a bottom-up approach. During the design phase, meeting discussions indicated that a key to making this locally-based program a success would be the provision of financial and technical resources to local governments. By providing local governments with funding to address natural resource management issues in their local plans, codes, and ordinances, Maryland is getting local buy-in to the process. This is critical to a successful initiative.

Another reason is that many of the tools (i.e., data and mapping resources) already exist. This strategy does not rely heavily of the development of new tools and/or technologies but on streamlining the delivery of existing data resources from the State to the local level. Additionally, the need for local communities to address growth and development is a specific and timely local issue. This Initiative will build on the efforts of other programs and continue momentum among the public, interest groups and local governments who strive to bring about both program changes to Maryland's Coastal Program, as well as changes in land-use decision-making at all levels of government to protect Maryland's coastal resources.

## Coastal Hazards

### Issue Summary

Maryland's coast is particularly vulnerable to both episodic and chronic hazards associated with shore erosion, coastal flooding, storm surge, and inundation. These hazards are both driven by and exacerbated by sea level rise, occurring in the mid-Atlantic region at a rate nearly double the global average. Coastal hazards are a significant threat to resources and infrastructure in Maryland's coastal zone. As growth and development continue, especially within low-lying Eastern Shore communities, these impacts are likely to escalate.

Significant advances in the State's understanding of coastal hazard vulnerability have been made over the past five years. A detailed discussion of these advances is contained in the Summary of Past §309 Efforts: 2001-2005. Despite great strides made with regard to shore erosion planning, sea level rise response, and local hazard mitigation, the desired incorporation of coastal hazard planning measures into State and local level decision-making processes is yet to be fully realized.

Maryland's §309 Coastal Hazard Strategy for 2006 – 2010 is designed to remedy this planning obstacle by: (1) building the capacity to integrate data and mapping efforts into State and local planning efforts; (2) working with local governments to identify specific opportunities (i.e., code changes, comprehensive plan amendments) for advancing coastal hazard mitigation planning; and, (3) improving State agency coordination of coastal hazard planning and response activities.

### Proposed Program Changes

The goal of the Coastal Hazards Strategy is to integrate coastal hazard planning measures into State and local level decision-making processes. These measures will take several forms and will be accomplished at varying stages over a five-year time frame. The Coastal Program will expand upon the planning framework established during implementation of its 2001-2005 §309 Coastal Hazard Strategy to accomplish the anticipated program changes detailed below.

*New and/or revised State Agency Memorandums of Understanding (MOU's).* To improve State agency coordination of coastal hazard planning and response activities, the Coastal Program is proposing to revise existing MOU's with the Maryland Department of Planning (MDP) and Department of Environment (MDE). It is expected that the revised MOU's will help clarify roles with regard to coastal hazard planning and technical assistance to coastal communities; utilizing technology and mapping products; and communicating on these issues between agency staff. Additionally, the Coastal Program will explore the creation of a new MOU with the Maryland Emergency Management Agency (MEMA). An MOU between the Coastal Program and MEMA will prove fruitful to increase opportunities to apply improved data and mapping products to the State and local hazard mitigation plans and coordination between the agencies.

*Chesapeake Bay Shore Erosion Control Master Plan.* As part of the §309 Strategy, the Coastal Program is planning to continue actively participating in the development of the *Chesapeake Bay Shore Erosion Control Master Plan* along with the U.S. Army Corps of Engineers (USACE) and MDE. The Plan, being developed as a component of Chesapeake Bay Coastal Management Feasibility Study, will result in outreach material for contractors and homeowners as well as a Master Plan that uses modeling tools to evaluate stretches of shoreline and prioritizes these areas for erosion control activities. The Master Plan will serve as a guide for potential shore erosion management strategies and assist the agencies in being consistent with promoting strategies along tidal shorelines. These strategies will likely include: structural and non-structural erosion control devices, designation of natural erosion areas, land acquisition, and establishment of local erosion-based setback requirements.

*Changes and/or Amendments to Local Comprehensive Plans, Codes and Ordinances.* Recent advances in technology and data have significantly improved the State's ability to identify coastal hazards. The 2006 – 2010, §309 Coastal Hazard Strategy will focus on integrating the maps and data products into State and local government planning and management activities. In particular, opportunities to institutionalize mechanisms for the delivery of products and services to coastal communities will be a priority as well as formalizing relationships with agencies when conducting these types of activities. These data products will ultimately provide the foundation to allow for defensible changes to local ordinances that mitigate hazards and redirect growth and development out of harms way.

*Revised State Programmatic Processes.* New data and web technology is moving the State forward towards developing a comprehensive approach to determining applicability of living shorelines and non-structural erosion control measures. However, deficiencies continue to exist in Maryland's management of shorelines and relate to: a continued lack of coordination between the State and local governments in the permitting of shoreline structures; the inability to apply the new data consistently to State level programmatic processes; and a lack of public outreach to homeowners and contractors on the benefits of living shoreline approaches. A component of this §309 Strategy will be addressing these deficiencies through revised State programmatic processes in order to move shoreline management efforts forward.

#### Anticipated Effects of Program Change

The short-term outcome of the Coastal Hazard Strategy will be the improved use of hazard data and mapping technology and the application of this new data in land use and comprehensive planning efforts at the State and local level. The long term goal, however, is to see a reduction in the amount of coastal storm damage to public and private infrastructure, as well as to the State's natural coastal resources.

#### Appropriateness of Program Change

The proposed program changes were developed based on the results of implementing several past plans and strategies, including: (1) *The Shore Erosion Task Force Final Report* (DNR 2000); (2) *A Sea Level Response Strategy for the State of Maryland* (DNR 2000); (3) *Lessons Learned from Hurricane Isabel* (MDP 2004); and, (4) *The Coastal Bay Hazard Initiative Work Group Findings* (DNR 2004). Continuing efforts outlined in these documents lends continuity to the process and provides an excellent framework for advancing coastal hazard management in the State of Maryland.

The §309 Strategy for Coastal Hazards has been designed to build upon momentum that already exists at the State and local level to improve coastal hazards management. Hurricane Isabel in 2003 and Hurricane Katrina in 2005 heightened awareness of coastal hazard issues in Maryland. The State, along with coastal communities, are now primed to partner and use the improved hazard delineation and mapping products acquired and supported by the 2001-2005 §309 Strategy. However, many of the coastal counties that recently completed local hazard mitigation plans, lack the resources or expertise to integrate the findings of the plans into land use and comprehensive planning documents. The same can be said for the Worcester County Sea Level Rise Inundation Model; translating the findings of the model into existing decision-making processes (i.e., comprehensive plans, development codes) is a difficult task for a local government to tackle. The program changes discussed above are the appropriate means to attempt to remedy these planning obstacles.

## Fiscal and Technical Needs

Continued §309 funding is needed to ensure improvements in State and local coastal hazard management efforts. Over the next five years, §309 funds are necessary to complete technical tools and mapping efforts; assist local governments with identifying opportunities for integrating data and technology and coastal hazard planning measures into local plans and ordinances; improving coordination between State agencies; and developing public outreach and training materials and workshops.

## Budget

**Table 22.**

<b>Task</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Data Development	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000
Spatial Decision Support Tools	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000
Web Portal Maintenance and Enhancements	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
Grants to local governments*	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000
Education & Outreach	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000
<b>Totals</b>	<b>\$200,000</b>	<b>\$200,000</b>	<b>\$200,000</b>	<b>\$200,000</b>	<b>\$200,000</b>

\*Additional funds may be available to local governments through the Coastal Communities Initiative. See Cumulative and Secondary Impacts Strategy.

## Work Plan

Given the range of planning efforts, data and mapping products, and technical services, the work plan set forth below is organized by task and respective activities. Tasks will be accomplished at varying and overlapping stages throughout the five-year time frame.

*Task One: Build the capacity to integrate data and mapping efforts into State and local planning efforts.*

- Develop a set of products and services for coastal communities seeking technical assistance with determining hazard vulnerability and alternative growth and development scenarios to better mitigate coastal hazards. These services will provide a mechanism to further State planning for shore erosion, coastal flooding, and sea level rise mitigation and will work to reduce future local impacts associated with flooding and erosion.
- Continue to use and enhance *Maryland's Shorelines Online*. This effort will require maintenance of the current website and production of new mapping products from existing data sets. Improvements to the web portal will potentially include (1) acquiring better imagery (2) further delineating and uploading flood/inundation risks from surge and sea level rise; (3) expanding the interactive GIS based decision support tools available online; and (4) further developing public outreach and education efforts.
- Complete the Strategic Shore Erosion Assessment (SSEA). This project will occur in the following three phases: (1) generation of fetch exposure tool, community risk assessment, and environmental risk assessment; (2) application and validation of GIS tools through development of the Corps Feasibility Study Master Plan; (3) incorporation into the interactive mapping application; and (4) workshop development and training of State and local coastal managers and planners.
- Continue efforts to assess the potential impacts of sea level rise on coastal communities. The Worcester County Sea Level Rise Inundation Model will serve as a template for future modeling efforts. In

addition, efforts will be made to consider how to better manage coastal habitats, such as wetlands, as they respond to sea level changes.

*Task Two: Work with local governments to identify opportunities for advancing coastal hazard mitigation planning.*

- The Coastal Program and other State Partners will provide technical and financial resources to assist coastal communities with identifying specific opportunities (i.e., code changes, comprehensive plan amendments opportunities) for incorporating coastal hazard data into local decision-making processes.
- The Coastal Program is proposing to work with Worcester County to evaluate opportunities for integrating use of the Sea Level Rise Inundation Model into local decision-making processes. Additional County partners will be identified as future inundation modeling efforts occur.

*Task Three: Improving State agency coordination of coastal hazard planning and response activities.*

- Work with State Agency partners to examine and explore opportunities for improving the coordination of coastal hazard planning and response activities at the State level.
- Partner with the Maryland Department of Planning to facilitate the inclusion of data and mapping resources into local and regional comprehensive planning processes, including the Priority Places Initiative, the Eastern Shore Initiative and during agency review of revised local comprehensive plans.

*Task Four: Increase coastal hazard education and outreach efforts.*

- Conduct public outreach efforts as a component of the overall Coastal Hazard Strategy. The visibility of information on sea level rise, shore erosion and coastal flooding has increased significantly through past public outreach efforts and increased coverage by both local and national press. Coastal Program outreach products (conferences, workshops, websites, and signage) are working to keep coastal hazard issues in the minds of citizens even after the storm and recovery has occurred.
- Target education efforts to local elected officials as well as local emergency responders and comprehensive planners. Bring together these respective groups to facilitate discussion and collaborative planning opportunities.
- Provide training on the use of the Maryland coastal hazard web portal and the interactive mapping application, *Shoreline Changes Online*. Work has been initiated to develop a training manual, which will be included in a series of workshops for an array of stakeholders, including but not limited to: State and local planners, natural resources and soil conservationists, marine contractors, and the general public.

#### Likelihood of Success

Heightened awareness and concern for coastal storms and flooding, sea level rise, coastal erosion and other coastal hazard issues are increasing both nationally and locally. In Maryland, ongoing dialogues between the Legislature and State agencies after Hurricane Isabel and again after Hurricane Katrina have increased the emphasis on the State's need for better mitigation and anticipatory solutions. Due to the significant financial and emotional burdens incurred from the recent disaster relief efforts, policy makers, coastal managers and the public are in agreement for the need to better plan for coastal hazards. At the local level, Maryland has also made significant progress in establishing a proactive approach in planning for coastal hazards by moving



beyond an evacuation and disaster response focus. A number of state agencies and local partners are poised to maintain the momentum to include coastal hazard issues in local plans and ordinances.

## Indicator/Performance Measure Assessment Needs

NOAA has established the National Coastal Management Performance Measures System (NCMPMS) to serve as a mechanism for quantifying the national impact of the Coastal Zone Management Act. The system consists of performance indicators to track how well the National Coastal Management Program and the National Estuarine Research Reserve System are achieving CZMA objectives. The NCMPMS will be implemented over a 3-phase schedule. Beginning in 2006, state Coastal Zone Programs will be required to report on performance indicators for the categories of Public Access and Government Coordination. In 2007, reporting for Coastal Habitat and Coastal Water Quality categories will begin. The final two categories, Coastal Hazards and Community Development & Coastal Dependent Uses, will be added in 2008. Throughout the three-year time frame, States will also need to provide information regarding contextual indicators to track environmental and socioeconomic factors influencing program activities.

Although Maryland's Coastal Program is able to gather information and report on most of six indicator categories, it may be necessary to fund additional tracking efforts to fully report on Public Access and Coastal Habitat performance measures. The Coastal Program has identified an initial need to broaden tracking efforts related to establishing a baseline number and total acreage for different public access sites (state and county land, beach land, etc.).

*Public Access.* The State of Maryland has already established tracking mechanisms that relate to public access in the coastal zone. Almost all of the land purchased by DNR in Maryland over the last 30 years has been partially funded through Program Open Space (POS). POS maintains a database on more than 4,700 individual county and municipal parks and conservation areas partially funded through the program. In addition to the POS database, DNR's Resource Planning Division maintains a database of DNR owned lands.

Public access is also tracked through local and state Land Preservation, Parks and Recreation Plans. The State of Maryland requires that counties update Land Preservation, Parks and Recreation Plans (LPPRP) every six years effective July 1, 2005. A Statewide plan incorporating all County plans is to be prepared within one year after local plans are due. The 2005 round of LPPRPs is intended to provide a common benchmark to assist the State's evaluation of each county's land preservation and recreation programs. The LPPRPs qualify local governments for State Program Open Space (POS) grants and other programs related to the plan's objectives for three land resource elements: Recreation and Parks, Agricultural Land Preservation; and Natural Resource Conservation. Upon adoption by county executives and commissioners, the LPPRPs become an amendment to county comprehensive plans. The LPPRP serve as a guide for park acquisition and land preservation in each county.

In the LPPRPs, local counties have indicated that their inventory of recreation, open land and facilities, will be provided to the MDP to be included in their MEIRS database. The MDP and DNR recently (2003) developed MEIRS to serve as an electronic inventory of recreation sites. However, both the MEIRS inventory and the POS database need to be updated. Coastal Program funds may be directed toward refining these and other tracking systems. The Coastal Program has also identified a potential need to further measure public attitudes toward public access. A previous survey has been completed to measure public attitudes toward waterway access. The Program has initiated contacts with NOAA's Coastal Services Center regarding the development of a public access survey. This is one of several possibilities that may be pursued to measure public attitudes toward coastal access.

*Coastal Habitat.* Coastal Habitat performance measures include tracking habitat restoration plans by different categories and tracking acreage changes for different coastal habitats (tidal/non-tidal wetlands, beaches, shorelines, etc.). MDE's Wetlands and Waterways Division is responsible for implementing the Tidal and Nontidal Wetland Acts. The Wetland and Waterways Division may need some assistance to fully develop tracking mechanisms of acres protected and restored through mitigation and non-mitigation activities. There may also be a need to fund tracking of acreage changes in beaches.