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MARYLAND COAST SMART COUNCIL

2016 ANNUAL REPORT

Prepared for the members of the
Maryland Coast Smart Council



*Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor
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TABLE OF CONTENTS

MAKING MARYLAND RESILIENT: A SUMMARY OF FISCAL YEAR 2016 ACTIONS TO REDUCE RISK	3
INTRODUCTION	4
SECTION I: INSTITUTIONALIZING COAST SMART SITING AND DESIGN CRITERIA INTO STATE PROGRAMS	5
SECTION II. STATE AGENCY PROJECTS AND GRANTS AND LOANS ADMINISTERED BY STATE AGENCIES	13
SECTION III. CATEGORICAL EXCEPTIONS AND CRITERIA WAIVERS	16
SECTION IV. STATE AGENCY ACTIONS AND INITIATIVES	18
SECTION V. RECOMMENDATIONS FOR FISCAL YEAR 2017	26
SECTION VI. APPENDICES	27



Larry Hogan, Governor



Mark Belton, Secretary

The Maryland Coast Smart Council is chaired by the secretary of the Maryland Department of Natural Resources and supported by department staff through funding from the National Oceanic and Atmospheric Administration. Other state agencies represented on the council include the Maryland departments of Budget and Management, Commerce, Environment, Legislative Services, Planning, and Transportation, the Maryland Emergency Management Administration, the Critical Areas Commission, and the University System of Maryland.



Financial assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration (NOAA). A publication (or report) of the Maryland Coastal Zone Management Program, Department of Natural Resources pursuant to NOAA Award No. NA17NOS4190170.

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MAKING MARYLAND RESILIENT

A Summary of FY 2016 Actions to Reduce Risk

- The Maryland Departments of Natural Resources and the Environment, Maryland Emergency Management Agency, Maryland Historical Trust, and the Maryland Environmental Service are working together to leverage funding, personnel and projects to integrate floodplain management (preventive and corrective measures to reduce the risk of current and future flooding), hazard mitigation and coastal resiliency efforts through the Maryland Resiliency Partnership.
- The Critical Area Commission completed a Coastal Resilience Planning Guide for Municipalities. Commission staff worked with the Town of Oxford as a pilot community to evaluate its local critical area program and identify opportunities for enhancing coastal resiliency.
- The Maryland Department of Planning's regional planners assisted local governments in developing applications for state and federal grants in support of local climate change adaptation plans, plan elements and projects, and provided planning and other assistance to ensure success with development and implementation of the plans and projects.
- The Maryland Emergency Management Agency administered the federal Hazard Mitigation Assistance Program offering three grant programs that are available to eligible applicants throughout the state: Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program and Flood Mitigation Assistance.
- The Maryland Historical Trust has awarded seven grants throughout the state to help protect historic places and archeological sites from future storms. These grants are supported by the Trust's Cultural Resources Hazard Mitigation Planning Program, which was created to assist local governments to better plan and prepare for the effects of coastal storms and other hazards that impact historic places and properties.
- The Maryland Department of Planning joined the Eastern Shore Land Conservancy in creating a model Comprehensive Plan Element specifically focusing on coastal resiliency for local governments. The coastal resiliency element was designed to allow each jurisdiction to select from various coastal resiliency actions, to incorporate recommendations and policies into the comprehensive plan.
- Through federal grant funds, the Maryland Historical Trust provided financial and technical assistance to local governments seeking to reduce their vulnerability to the effects of coastal hazards, sea level rise and localized flooding caused by increased precipitation events.
- The Maryland Department of Natural Resources worked with The Nature Conservancy and other state, federal and non-governmental partners to complete a Coastal Resiliency Assessment. The assessment identified statewide priorities for conservation and restoration where coastal habitats provide risk-reduction to vulnerable communities.
- The Maryland Department of Natural Resources continued efforts to build resilience through restoration with the completion of restoration projects at Bishopville, Kent Narrows, Annapolis Maritime Museum and Pocomoke River.
- The Maryland Department of Natural Resources issued the first awards under the new Coastal Resiliency Grants Program, developed to help Maryland communities become more resilient to the changing climate. Six projects have been selected for funding, which will help communities respond to coastal hazards and pursue the use of green infrastructure to address flooding.
- The Maryland Department of Natural Resources partnered with the University of Maryland, Sea Grant Extension; resource managers and academia; the Eastern Shore GIS Cooperative and community members to conduct an Integrated Community Resilience Assessment of the Deal Island Peninsula using both quantitative and qualitative methods to understand and plan for the impacts of flooding now and in the future.
- The Maryland Department of Natural Resources' Coastal Atlas underwent a number of improvements including a new mapping platform allowing planners and the public to view, query, and download data on physical characteristics, human uses, and ecological resources, all of which can be used to understand vulnerabilities to flooding and other coastal hazards.

INTRODUCTION

Chapter 415 of the 2014 Laws of Maryland (HB 615), established the Coast Smart Council (the council) in the Department of Natural Resources (DNR). One of the primary tasks of the council, staffed by DNR and comprised of private sector and state agency membership, was to establish Coast Smart Siting and Design Criteria (criteria) to address sea level rise and coastal flood impacts on state funded capital projects.

The 2014 legislation also required state capital projects that include the construction of a new structure or the reconstruction of a structure with substantial damage to be constructed or reconstructed in compliance with the criteria approved by the council. The criteria, summarized below provides guidelines and directives applicable to the preliminary planning and construction of a proposed capital project; requires the lowest floor elevation of each structure located within a Special Flood Hazard Area is built at an elevation of at least 2 feet above the base flood elevation; and establishes a process to allow a unit of state government to obtain a waiver from complying with the requirements.

COAST SMART CONSTRUCTION PROGRAM	
<i>Siting Guidelines</i>	<i>Design Guidelines</i>
New State structures, the reconstruction of substantially damaged State structures, and/or the other new major infrastructure projects shall be avoided within areas likely to be inundated by sea level rise within the next 50 years.	New State structures, the reconstruction of substantially damaged State structures, and/or other new major infrastructure projects shall be designed to avoid or minimize future impacts over the anticipated design life of a project.
New State “critical or essential facilities” shall not be located within Special Flood Hazard Areas designated under the NFIP and should be protected from damage and loss of access as a result of a 500-year flood.	New State structures and the reconstruction or rehabilitation of substantially damaged State structures located in Special Flood Hazard Areas shall be constructed with a minimum of two (2) feet of freeboard above the 100-year base flood elevation defined by the NFIP.
Ecological features that may serve to buffer a project from the impacts of future sea level rise, coastal flooding or storm surge or that support general climate adaptation practices, shall be identified, protected and maintained.	State structures serving transportation purposes that are not water dependent or dependent on integral infrastructure shall be constructed with a minimum of two (2) feet of freeboard above the 100-year base flood elevation, as defined by NFIP.
<i>Exceptions to these guidelines may be considered, provided that is can be demonstrated that projects have been designed to increase resiliency to future impacts.</i>	Flooding potential shall be considered when choosing building materials for all structural projects, including minor improvements or maintenance and repair.
	Structures and infrastructure proposed within a Limit of Moderate Wave Action boundary as mapped under the NFIP, shall be designed in compliance with construction standards applicable to areas subject to inundation by the 1-percent-annual-flood event and storm-inuced waves, called V Zones.
	<i>Exceptions to these guidelines may be warranted based on consideration of certain factors established by the council.</i>

Annual Reporting to the Council

The Coast Smart Construction Program (program), which became effective July 1, 2015, sets out the siting and design guidelines developed by the council and establishes the procedures and priorities for all state agencies that plan, budget, design or build facilities in areas vulnerable to coastal flooding and sea level rise.

Beginning on October 1, 2016, and for every year thereafter, all units of state government are to report to the council on individual state agency actions, which were undertaken within the previous fiscal year and related to

the implementation of the program, including Categorical Exceptions and Waiver determinations.

It is intended that the council will review the program on an annual or “as necessary” basis to address issues which may occur as the building of state facilities and knowledge of Coast Smart building practices evolve. The Annual Report (report) helps the council evaluate the program and supports further development or refinement of criteria, categorical exceptions, general standards and procedures for applying and obtaining a waiver.

SECTION I. INSTITUTIONALIZING COAST SMART SITING AND DESIGN CRITERIA INTO STATE PROGRAMS

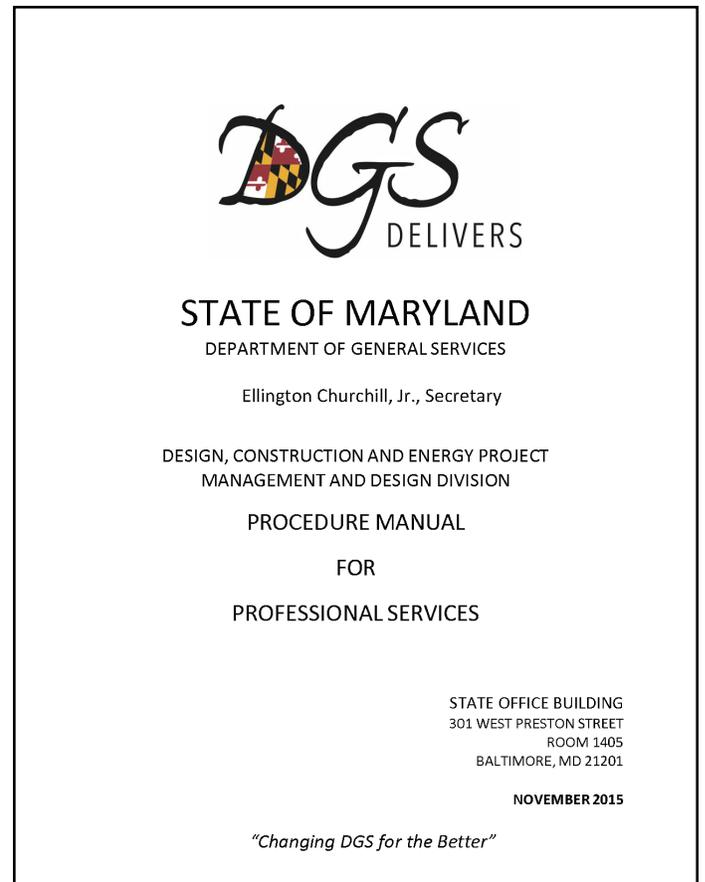
Since July 1, 2015 state agencies have been working to incorporate the siting and design guidelines into appropriate planning, design and construction processes as a means to institutionalize the Coast Smart practices approved by the council.

Procedural Manual for Professional Services ~ Department of General Services (DGS):

The manual serves as a guide for providing professional services during all phases of design and preparation of contract documents for capital projects involving the construction, alteration or renovation of state buildings with an estimated construction cost greater than \$2 million. In FY16, DGS incorporated the following language into the manual (Chapter II):

“A/Es shall be required to Comply with the Coast Smart Construction Program under Coast Smart Council in the department of Natural Resources, created by House Bill 615-Section 3-1001-3-1004, and enacted into law in 2014 to establish Coast Smart Infrastructure siting and design criteria to address sea level rise and coastal flood impacts on capital projects.”

The manual also includes Coast Smart Siting and Design Criteria in Appendix C – Floodplain Management Criteria for Flood-Prone Areas. The manual is accessible at the following link: dgs.maryland.gov/Documents/ofp/Manual.pdf



FACILITY PROGRAM MANUAL



STATE OF MARYLAND

Lawrence J. Hogan, Jr., Governor
Boyd K. Rutherford, Lt. Governor

DEPARTMENT OF BUDGET AND MANAGEMENT
David R. Brinkley, Secretary

DEPARTMENT OF GENERAL SERVICES
C. Gail Bassette, Secretary

May 2016

Facility Program Manual ~ Department of Budget and Management (DBM):

The DBM's Office of Capital Budgeting (OCB) has incorporated Coast Smart Siting and Design Criteria into Part II of the Facility Program Manual and the Facilities Master Plan Manual. The Facility Program Manual is used by state agencies as they submit their Part I/II programs to the OCB. Part I/II programs provide justification and a detailed description of each project's scope and purpose. Prior to receiving funds in the Governor's Capital Budget, the Part I/II Program must be reviewed and approved by OCB. The language DBM has incorporated into the Facility Program Manual, Part II, page 34, is as follows:

"All facility programs shall comply with the Coast Smart Construction Program under the Coast Smart Council in the Department of Natural Resources, created by House Bill 615-Section 3-1001-3-1004 (2014) to establish Coast Smart Infrastructure siting and design criteria to address sea level rise and coastal flood impacts on capital projects."

The Facilities Master Plan Manual is used by State Agencies as they submit their Facilities Master Plans to OCB.

Facilities Master Plans are submitted every five years and cover a 10-year period. The plan should evaluate current conditions and projected needs, develop proposals for addressing any deficiencies noted, and present a recommendation which will enable the state agency to meet its goals over the time frame of the plan. The language OCB has incorporated into the Facilities Master Plan Manual is as follows:

"The Maryland State Finance and Procurement Article, §3-602.3 requires that, beginning July 1, 2015, State capital projects will be constructed or renovated in compliance with Coast Smart siting and design criteria in order to address sea level rise and coastal flood impacts on projects. Explain how Coast Smart siting and design criteria will be incorporated in plan proposals. See the Coast Smart Construction Program for additional guidance."

Engineering and Capital Projects ~ Maryland Department of the Environment (MDE):

In addition to implementing Coast Smart guidelines for the construction of new state structures, or the reconstruction or rehabilitation of substantially damaged state structures, state agencies are also to consider incorporating these practices, whenever practicable, into other major infrastructure improvements in Maryland's coastal zone, including roads, bridges, sewer and water systems, drainage systems and essential public utilities.

In response to this aspect of the Coast Smart Construction Program, MDE's Engineering and Capital Projects Program has incorporated the siting and design guidelines into its application process for state loans and grants awarded to local jurisdictions throughout Maryland for the construction of water and wastewater projects.

This is accomplished by providing each applicant with a copy of the Coast Smart Construction Program and



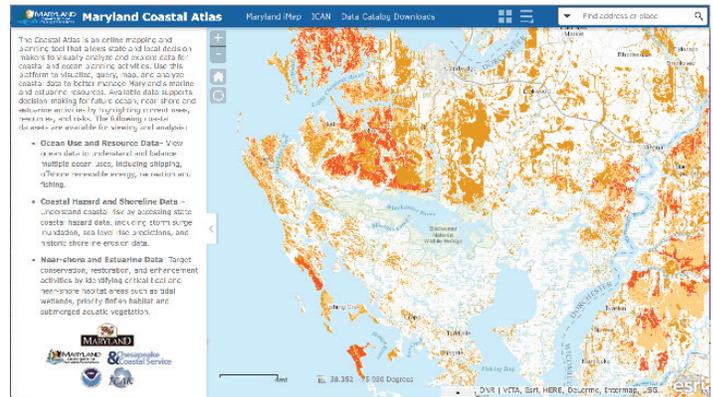
Photo Credit: Chesapeake Bay Program

instructing applicants to incorporate the criteria, as applicable, into their Preliminary Engineering Report. Then, state program managers use the Project Consistency Report (see Appendix C) to document compliance with the criteria.

State Land Conservation and Acquisition ~ Department of Natural Resources (DNR): Maryland's GreenPrint identifies important natural areas of the state, and defines those that are considered the "best of the best" as Targeted Ecological Areas (TEAs) important for conservation. DNR has recently updated GreenPrint, incorporating climate change considerations. To avoid spending limited funding in areas likely to be submerged, this update includes removal from the TEAs areas that will be subject to sea-level rise inundation by 2050. These vulnerable coastal areas can however include important wetland habitat. Wetlands provide a natural buffer against the impacts of coastal hazards such as sea-level rise and storm surge. They also provide ecological functions such as carbon sequestration, water filtration, critical wildlife habitat, as well as recreation. DNR utilized predictive models to determine priority "Wetland Adaptation Areas," or corridors where wetlands will migrate inland as sea level rises. A sample of the full (low, medium and high) priority Wetland Adaptation Areas can be visualized on Maryland's Coastal Atlas. (See image above.)

State Land Acquisitions. In accordance with the criteria, all potential land acquisitions through Program Open Space are reviewed for climate change impacts including sea-level rise, storm surge, shoreline erosion and wetland migration. Properties considered through Program Open Space's Community Connections Protocol will also be reviewed for climate change adaptation and mitigation opportunities. These properties may provide a public benefit such as storm surge protection to a community, carbon sequestration and urban tree canopy, or replacement of public access lost to sea-level rise.

Coastal Resilience Easements. DNR has incorporated climate change considerations into purchased coastal resilience conservation easements. Conservation easement provisions on properties located in the coastal zone may include development setbacks in areas subject to sea-level rise inundation by 2050, buffers to support high priority Wetland Adaptation Areas, impervious surface limits to reduce runoff and pollution due to increased storm events, and review of shoreline stabilization projects. Landowners may also request development of a Coastal Resilience Plan offering recommendations on land management practices to reduce vulnerability of their property to coastal hazards



Dorchester County as seen in the screen capture from the Coastal Atlas. Many of the coastal extents exclude extremely low-lying vulnerable areas that were projected to be open water or tidal flats by the year 2100. The high priority Wetland Adaptation Areas include a range from high to low. The implementation of this data into the TEAs will enable the GreenPrint targeting tool to incorporate climate change considerations that will influence how Maryland's Program Open Space, Coastal Estuarine and Land Conservation Program, Maryland Environmental Trust and other state and local land conservation programs prioritize and target lands in the coastal zone.

and improve the resilience of coastal habitats. The Coastal Resilience Plan may address wetland restoration, creation of living shorelines, invasive species management, environmental hazard management, and documentation of historic and cultural resources.

Transportation Facilities and Infrastructure ~ Department of Transportation (MDOT):

Many state capital projects pass through the Maryland Department of Transportation. Following is a description of how MDOT incorporates the Coast Smart Construction Program into project planning, review and implementation.

Transportation Coast Smart Review Process: All transportation projects are subject to review and approval by federal and state agencies responsible for regulating various aspects of the environment. These requirements begin in the earliest stages of planning and continue until a project is complete. If a project is paid for with federal funds or involves a major federal action significantly affecting the human environment (a federal action includes the issuing of a permit for construction or any approval process in which a federal agency can exercise discretion over the outcome), then the decision-making process and the assessment of the project's impacts on the environment must be documented by a National Environmental Policy Act (NEPA) process.

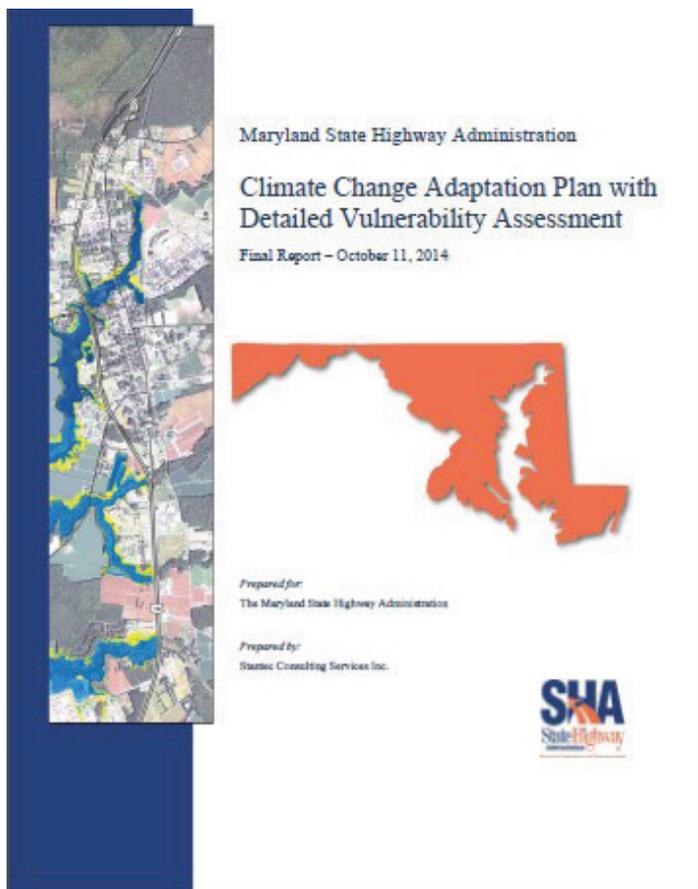
If a project is paid for entirely by state funds, does not require a permit from a federal agency, and requires no federal action to begin or continue, then impacts are assessed using the Maryland Environmental Policy Act

(MEPA) Environmental Assessment Form (EAF). In either case, there is documentation of the factors considered. There are several types of NEPA documents depending on likely level of impacts. Forms/checklists and processes are usually dictated by the federal sponsor (Federal Highway Administration, Federal Aviation Administration, U.S. Army Corps of Engineers, etc.). The EAF is a standardized form. Both processes begin by determining the “scope” of the project’s impacts immediately after the need for a project is established.

Initial project screening will require that projects that include structures be located using the MDOT State Highway Administration (SHA)’s e-GIS layers for 2050 and 2100 sea level change areas.

Structures that fall within one of those areas will be assessed in the scoping process to determine if the structure:

1. Can be sited outside the hazard area. (Flood hazard should be considered a significant factor in the alternatives analysis for NEPA projects.)
2. Can be constructed in accordance with the Coast Smart Construction Criteria.



Calvert County - Broomes Island and Vicinity



3. Falls under a Coast Smart categorical exception.
4. Will require a waiver of one or more elements of the Coast Smart Siting and Design Criteria.

Projects in category 3 must include mapping and exception justification in the NEPA/MEPA document and provide documentation to MDOT’s Secretary’s Office (TSO) and the Coast Smart Council regarding resiliency measures included.

Projects in category 4 must include mapping and justification for all elements requiring a waiver in the NEPA/MEPA document and provide documentation to TSO for submission of a waiver request to the Smart Growth Sub-Cabinet.

All MDOT transportation business units (TBUs)’ pre-NEPA screening checklists will include a specific section for Coast Smart requirements.

MDOT Coast Smart Implementation. The current Maryland Transportation Plan (MTP), the department’s policy framework, contains the following objectives:

- Institutionalize the consideration of future sea levels and storm conditions in prioritizing infrastructure investments in coastal areas; and
- Enhance preparedness and planning efforts to protect human health, safety and welfare in light of changing climate conditions.

The MDOT TBUs participated in the Coast Smart Construction Workgroup and each agency has moved forward with implementation of best practices for projects in areas affected by sea level changes.

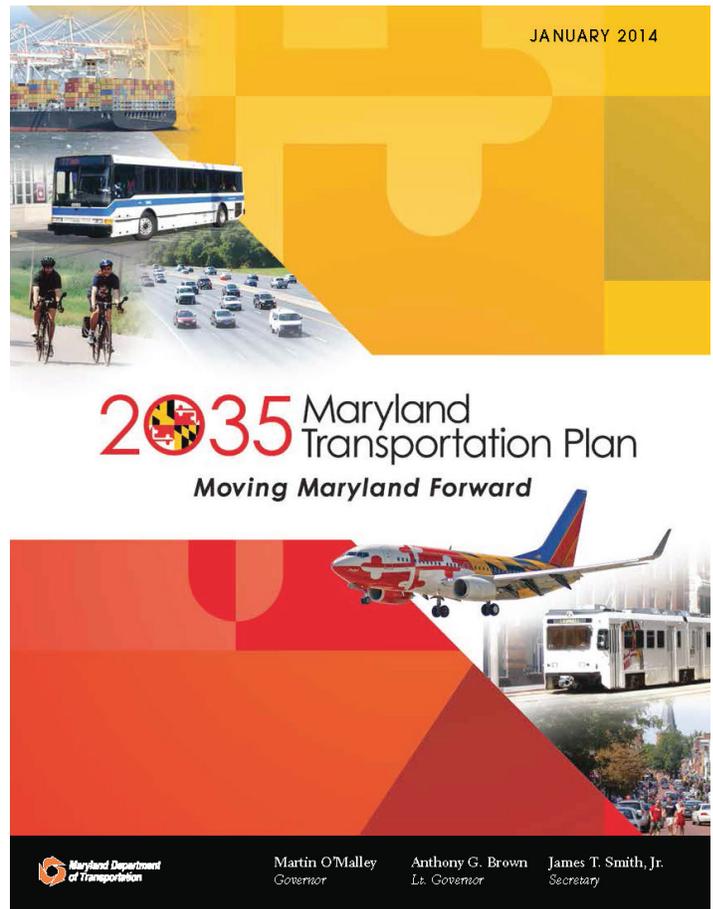
State Highway Administration (SHA):

- SHA has begun review of all owned facilities for elevation from the 100-year floodplain to ensure compliance with Coast Smart guidelines and will incorporate findings into the agency’s Asset Management Plan.
- SHA worked with the Eastern Shore Regional GIS Cooperative to develop 2050 and 2100 Sea Level Change (SLC) mapping based on the US Army Corps of Engineers 2013 guidance.
- SHA is incorporating the 2050 and 2100 SLC mapping into NEPA/MEPA review of projects to ensure the project design engineer is aware of the future conditions and considers SLC in design.
- SHA is incorporating Coast Smart guidelines in NEPA/MEPA review of projects to ensure two feet of freeboard from the 100-year floodplain is incorporated into any new or reconstructed structure.

Maryland Transportation Authority (MDTA): Using tools from the Federal Highways Administration’s Climate Change & Extreme Weather Vulnerability Assessment Framework, MDTA is developing a framework for adaptation for MDTA’s assets.

This includes:

- Ensuring that Coast Smart recommendations are considered and incorporated into design during drainage repair projects and new State projects, most recently the Nice Bridge.



- Floodplain and SLC layers are being added to MDTA GIS data.
- The 2050 and 2100 SLC mapping are being incorporated into NEPA/MEPA review of projects

Maryland Transit Administration (MTA): MTA Environmental Planning Division (EPD) is in the initial process of developing a climate change-focused vulnerability and adaptation plan. Once completed, implementation of that Plan will provide security and resilience for MTA assets identified as susceptible to sea level rise, flooding events and storm surge impacts. A GIS dataset has been developed which includes all MTA assets, current and planned, identified for the purposes of the project. Layers within the dataset outline the potential impacts of sea level rise at 2, 4 and 6 feet. In addition to depicting MTA assets, the layers outline core transit routes and locations where these routes will be impacted by each of the scenarios.

- MTA is incorporating SLC 2050 and 2100 mapping in its conceptual planning and preliminary design considerations for capital projects to ensure relevant design criteria as outlined in the Climate Change and Coast Smart Construction Infrastructure Siting and Design Guidelines.

- MTA EPD incorporates SLC 2050 and 2100 mapping and vulnerability analysis during NEPA/MEPA review of all capital projects.

Maryland Port Authority (MPA): Though many port structures are water dependent, MPA has nevertheless incorporated several coast smart Best Management Practices (BMPs) into design engineering for new terminals, structures and dredged material management facilities, such as:

- Adoption of a two-foot freeboard where feasible.
- Use of non-corrosive, weather resistant materials for future berth construction and repair.
- Installation of additional tie-downs for cranes.
- Additional protection from inundation for underground utilities.
- Annual review of emergency response plans to incorporate updated SLC data.

Maryland Aviation Administration (MAA): MAA compared available SLC/inundation mapping with Airport Layout Plans for Martin State Airport, Essex Skypark, Crisfield Airport, Bay Bridge Airport and Ocean City Municipal Airport. As owner/operator of Martin, MAA revised planned airport development plans to minimize activity in areas subject to future coastal impacts. General Aviation Airports have been advised of pending new requirements. The four public-use facilities must adhere to local codes, however, projects receiving MDOT/ MAA grant funds at non-state owned airports must comply with the Climate Change Executive Orders.

Targeted Growth and Conservation Areas ~ Maryland Department of Planning (MDP):

Climate Change Impact Areas were identified as one of the Local and State Targeted Growth and Conservation Areas that warrant special attention. Climate Change Impact Areas include: projected 50 and 100-year Sea Level Rise Inundation Zones, 50-Year Erosion Vulnerable Zones, Category 2 Storm Surge Inundation Zones, Marsh Transition Zones, Temperature Sensitive Streams, Drought Hazard and Wildfire Risk Areas.

The intent of identifying these areas is to ensure that the state and local governments make wise decisions about how to protect our natural resources, and where and how to develop and redevelop in light of climate change induced hazards and risks. State capital investments consider

Climate Impact Areas during the identification of potential sites and the scope of the work associated with the capital investment. Local governments also are educated on how to use the maps and encouraged to utilize them in capital improvement planning.

Guidelines for reducing climate change impacts within these areas include:



Martin State Airport Landside Development
 Maryland Aviation Administration
 2-foot Sea Level Rise (Inundation Area)
 5-foot Sea Level Rise (Inundation Area)
 10-foot Sea Level Rise (Inundation Area)
 Scale: 1" = 100'

- Promoting the safety and well-being of Maryland’s citizens by avoiding infrastructure capacity improvements that increase human exposure to natural disasters;
- Avoiding assumption of the financial risk of development and redevelopment in vulnerable or hazardous coastal areas;
- Ensuring wise and sound public investments in Maryland’s sea level rise inundation zone. However, appropriate conservation efforts along Maryland’s shorelines should not preclude important investment in the state’s water-dependent infrastructure, such as our seaports;
- Analyzing climate change impacts on historical and cultural resources and prioritizing necessary recovery, documentation, and protection efforts; and
- Protecting critical natural environments from impacts of climate change (i.e., sea-level rise, temperature increase, precipitation change) and climate-induced natural hazards.

State Hazard Mitigation Plan ~ Emergency Management Agency (MEMA):

The 2016 State of Maryland Hazard Mitigation Plan was developed in collaboration with mitigation and resiliency stakeholders. The Maryland Resiliency Partnership Group and the Mitigation Advisory Council assisted in the




STATE OF MARYLAND

2016 HAZARD MITIGATION PLAN

AUGUST 2016

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development and review of the plan. The plan culminated in a streamlined document that focuses on new data, mapping, analysis, and opportunities.

Overarching themes of the plan include:

- Integration with other planning initiatives at the local, state and federal government levels;
- Creation of a common data platform and Maryland centric guidance and technical assistance;
- Verification of critical facilities and state assets data;
- Generation of depth grids and preliminary data for Enhanced Hazus Coastal model;
- Emphasis on natural hazards that are most likely to impact Maryland now and in the future, providing an opportunity for a focused risk analysis and prioritization of mitigation strategies and resiliency efforts; and,
- Intense effort between all stakeholders to maximize opportunities for collaboration on future hazard mitigation opportunities to ensure the safety of Maryland's citizens, protection of property,

environmental sustainability, community resiliency, and the preservation of Maryland's cultural and historic resources for future generations.

As part of the planning process MEMA developed local hazard mitigation plan guidance to advise jurisdictions of available resources, coordination activities, and minimum elements that should be included within their next local hazard mitigation plan updates. Maryland-specific recommendations were presented as well as the introductions of ideas for plan integration, resiliency and climate change.

An Enhanced Hazus Coastal Model was created during the State's plan development process and will be distributed to local jurisdictions for use in hazard mitigation and disaster event planning. Hazus is a nationally applicable standardized methodology that estimates potential losses from earthquakes, hurricane winds, floods, and tsunamis. The Enhanced Hazus Coastal Model utilized user defined data, resulting in better analysis and results. Local jurisdictions will incorporate the Enhanced Hazus data into their Local Hazard Mitigation Plan updates. Information sharing and distribution will result in refined risk and vulnerability assessments within local plans, thereby resulting in more robust and specific local mitigation strategies.

State Disaster Recovery Operations Plan (SDROP) ~ MEMA: The Maryland SDROP has been developed by the Recovery Support Function Leadership Group in order to ensure the ability of the State of Maryland to recover from a catastrophic incident that overwhelms the State or any local jurisdictions by coordinating support and engaging all necessary state, local, federal, private sector, voluntary, faith-based, and nongovernmental agencies to address the needs of Maryland residents, visitors, and communities following a disaster.

The SDROP is an all-hazards, capabilities based, state-level plan that outlines how agencies will coordinate support to and interact with local and community constructs during the recovery process. A statewide tabletop exercise to test the plan was held in July 2014. The first draft was completed in June 2015.

Critical Area Regulations for State Agencies ~ All development projects by state agencies on state-owned lands in the Critical Area must comply with development standards specified under Code of Maryland Regulations 27.02.05. Those regulatory requirements require state agencies to evaluate early in the planning process the



State of Maryland Disaster Recovery Operations

Plan (SDROP)

FINAL DRAFT V.2
August 13, 2014



A CENTER FOR PREPAREDNESS EXCELLENCE

effects of the development standards on development projects. In December 2014, the Critical Area Commission approved changes to COMAR 27.02.05 in order to include provisions related to climate change and sea level rise. The purpose of the provisions is to support agency planning and decision-making in regards to development in vulnerable areas.

These provisions include the following requirements for state agencies:

- As soon as practicable in the planning process, consult with the commission regarding an assessment of climate resilient practices that address coastal hazards, extreme weather events, sea-level rise and other impacts. (COMAR 27.02.05.02.A(2))
- As a component of project design: preserve, protect and maintain a potential wetland migration area to the maximum extent practicable.
 - Requirements that as a component of project design, State agencies:
 - Preserve, protect and maintain a potential wetland migration area to the maximum extent practicable. (COMAR 27.02.05.03.B(3))

- Consider the likelihood of inundation by sea level rise over the course of the design life of the project and incorporate climate resilient practices in order to avoid, or in the alternative, minimize environmental and structural damage associated with a coastal hazard, an extreme weather event, sea-level rise, and other impacts. (COMAR 27.02.05.03.B(9))
- If a detrimental impact to a potential wetland migration area is unavoidable, state agencies demonstrate (1) why the impact is unavoidable; (2) provide an assessment of the ecological features on site that could be enhanced, restored, or created in order to maintain existing wetland functions and to provide additional protection against future sea level rise and coastal storm impacts; and (3) make recommendations regarding the most feasible methods to address the detrimental impact and the enhancement, restoration, and creation of natural features on site. (COMAR 27.02.05.03.C)
- When public access is proposed, the agency will demonstrate that impacts from coastal hazards and sea level rise have been minimized and that long-term access has been considered. (COMAR 27.02.05.03.D)

Commission staff is working with State agencies on a project by project basis to implement these provisions.

In September 2016 the Critical Area Commission approved a Memorandum of Understanding (MOU) for General Approval with the Department of Natural Resources. The MOU allows for staff level review of certain classes of small development projects, as opposed to requiring a vote before the full commission. The MOU requires the department to consider climate resilient practices. Further, any project that impacts a high or medium priority wetland adaptation area as shown on the department's Coastal Atlas GIS tool, may not be approved under the MOU and must reviewed by the full commission.

SECTION II. STATE AGENCY PROJECTS AND GRANTS AND LOANS ADMINISTERED BY STATE AGENCIES

The Department of Budget and Management annually produces the capital budget of the State of Maryland. The capital budget consists of state-owned capital projects, and grant and loan programs administered by state agencies and local capital projects. State capital projects are required to be constructed or renovated in compliance with Coast Smart siting and design criteria which address sea-level rise and coastal flood impacts on projects. In the event that a State-owned project is located in an area that is vulnerable to coastal flooding and sea level rise, the Office of Capital Budgeting (OCB), with the expertise of the Departments of Planning (MDP) and Natural Resources (DNR), verifies that Coast Smart siting and design criteria have been incorporated in project descriptions and facility program documents.

In order to comply with the Coast Smart siting and design requirements, OCB ascertains which projects are located in a Climate Change Impact Area and works with MDP and DNR to verify that the criteria have been incorporated into each project. In Fiscal Year 2016, only three projects were flagged in the Capital Budget using the Climate Change Impact Area overlay, all three of which were DNR projects. Below are short summaries describing these projects, their vulnerability and the actions taken to comply with the Coast Smart Construction Program. More detailed information is provided in Appendix B.

Point Lookout State Park - Rehabilitation of Lighthouse Complex ~ Department of Natural Resources (DNR):

This project involves the rehabilitation of four existing structures that comprise the Point Lookout Lighthouse Complex. The project will include interior and exterior renovations of the lighthouse, buoy shed, coal shed and smoke house. In addition, there are plans to construct Americans with Disabilities Act (ADA)-compliant restroom

facilities within one of either the coal or buoy sheds, and to convert an existing concrete platform, that was once part of the Navy's radar tracking station, into a viewing platform. Site work improvements will include gravel resurfacing of the existing access roads through the site, parking improvements, and upgraded utilities.

DNR's Engineering and Construction estimates that the project constitutes a medium term project (design life between 25-50 years). The project is located in an area that is likely to experience flooding within the design life of the project. It is not anticipated to be inundated by year 2050 but parts of the site may be inundated by 2100. The first floor of the lighthouse is above the predicted flood levels during this period. Several Coast Smart modifications are proposed for this historic facility, including:

- The rehabilitation of the lighthouse will be designed to waterproof the basement area in order to minimize the deleterious effects of flooding on the building substructure.
- In the past, the basement of the lighthouse housed the furnace, water heater, electrical service panel and



Photo credit: Dave Decker, Maryland Department of Natural Resources

miscellaneous utility wiring and piping. The rehabilitation of the lighthouse will be designed to relocate all utility infrastructure out of the basement to areas that are not susceptible to flooding.

- With respect to all the buildings, water resilient materials and coatings will be employed on those parts of the structures that are located within the storm surge zone.
- The coal and buoy sheds will be restored to the open air pavilion style structures of their 1883 era origins. The existing floors of the sheds will be replaced with concrete or brick paver style flooring that will be resistant to flood damage.

Point Lookout State Park - Charge Collection System ~ DNR:

The proposed project shall consist of the design and construction of a charge collection system with collection booths, automated currency and credit card collection stations, electronic gates, manual gates, video surveillance and utilities. The system will also require renovation of the existing paved parking area and entrance road which may include removal of existing paved sections, as well as re-surfacing of existing paved surfaces.

The project includes equipment and building components that have short and medium term design lives. For instance the collection booths and manual gates would have medium term design lives (25-50 years) while the electronic elements of the project (automatic gates, surveillance system) and paving improvements will have short term (< 25 year) design lives. However, the charge collection system, which is a permanent long-term feature of the park, is a critical function of the administration building complex.

The project is located in an area that may experience flooding within the design life of the project. The average elevation of the site where the charge collection booths will be located is +3.5 feet NAVD (North American Vertical Datum of 1988). Coast Smart considerations include:

- The site is located within the 2-5 foot inundation zone for future sea level rise.
- The project features are not likely to be inundated within the design life of those features.
- Most of the project site is located within the 100-year floodplain. The FIRM (Flood Insurance Rate Maps) (eff. Date 11/2014) base flood elevation in the project vicinity is 5 foot NAVD.
- This site is located within the Class I storm surge area. This category of flooding probably represents the



Photo credit: Dave Decker, Maryland Department of Natural Resources

greatest risk to the site.

- The site is surrounded by forested areas. There are no obvious mitigation features that might be added to provide additional protection to the site.
- The project site is fixed based on the location of the existing Administration Building complex and the existing site constraints do not provide flexibility to move project features to higher ground.
- The recommended design approach will be to utilize resilient building materials for those project features that are constructed in potential inundation areas up to an elevation of 2 feet above the 100-year flood elevation (7 feet NAVD), and to elevate electronic equipment (automatic gates, HVAC components, junction boxes, etc.) where possible.

New Southern Regional Multi-Unit Service Center ~ DNR:

As originally proposed, this project was vulnerable to coastal flooding, storm surge and sea level rise. The project is now sited outside of the projected 100-year sea-level rise inundation area.

State Funding Programs (Grants and Loans): The program guides the allocation of state funding, primarily in the form of grants and loans, for non-state structure and infrastructure projects. The use of state programs and resources for proposed structures and infrastructure projects located within areas vulnerable to future sea level rise and coastal flooding are subject to additional review and evaluation consistent with applicable law and policy, to ensure the most appropriate action and investment of resources. Investments in these areas are evaluated on a case-by-case basis considering: existing structures and investments; the need for the project; vulnerability of the project; long-term benefits; the extent of resiliency measures incorporated into state or local climate adaptation plans; and the project siting and design. Grant and loan programs, including but not limited to the following, are analyzed to determine whether additional executive, legislative or administrative requirements will be necessary to accomplish this task.

The following agencies administer grant and loan programs which are funded in the capital budget:

- Aging, Department of
- Agriculture, Department of
- Disabilities, Department of
- Education, State Department of
- Energy Administration, Maryland
- Environment, Department of the
- Health and Mental Hygiene, Department of
- Higher Education Commission, Maryland
- Natural Resources, Department of
- Planning, Department of
- Public Safety and Correctional Services, Department of
- Public School Construction Program
- Non-State Partners with capital grant programs
- University of Maryland Medical System
- Maryland Hospital Association
- Maryland Independent College and University Association

In the Fiscal Year 2016 project review under Grants and Loans, only two projects were flagged:

- DNR Community Parks and Playgrounds: Austin Park
- DNR Community Parks and Playgrounds: Crisfield Waterfront Park and City Dock

SECTION III. CATEGORICAL EXCEPTIONS AND CRITERIA WAIVERS

The Coast Smart Construction Program includes provisions for State agencies to apply for Categorical Exceptions for certain project types and uses as well as to request Waivers from one or more of the specific siting and design criteria.

Categorical Exceptions:

Under the Categorical Exception provision, Agencies may determine certain projects and uses to be exempt from strict application of Coast Smart Construction Criteria, provided that it can be demonstrated that those projects have been designed to increase resiliency to future impacts. Categorical Exceptions currently include the following project types and uses:

- **Water-dependent uses.** Projects that require continued direct access to the water as an integral part of the use, or facilities that directly support water dependent uses.
- **Existing transportation assets.** Projects that support the continued function of existing transportation systems assets.
- **Passive public access.** Projects that provide either recreational or scenic access to water bodies or shoreline areas which, need to be within a flood zone for their purpose.
- **Historic structures.** The necessity of continued investment of state resources in properties individually listed or determined eligible for listing in the National Register of Historic Places or a contributing resource within a historic district listed or determined eligible for listing in the National Register.
- **Temporary structures or uses.** Structures intended to be in place for less than 180 consecutive days in any given calendar year or will be removed at the end of a construction project.
- **Stabilization projects.** Actions to secure and maintain assets, structures, and natural and cultural resources to prevent additional damage and to prevent future resource/facility damage; efforts to mitigate a safety

or environmental hazard; mold remediation; facility weatherization; silt fencing; and minor repairs and restorations.

- **Emergency uses.** Structures essential to save lives and protect property, public health and safety.

While excepted projects are exempt from strict application of Coast Smart Construction Criteria, they are required to employ Coast Smart principles and practices, wherever practicable. Agencies using a categorical exemption are also required to submit documentation and reporting materials on an annual basis. Reporting documents will be used by the council for the purposes of further development and/or refinement of Coast Smart Siting and Design Criteria, Categorical Exceptions, or general standards and procedures for applying and obtaining a waiver.

If needed, agencies may request a formal consultation with the Coast Smart Council for the purposes of reviewing a proposed project or seek a determination of compliance with the Categorical Exception provision listed above.

In FY16, no agencies have reported project types or uses as Categorical Exceptions. In addition, no agencies have requested formal consultation with the council for projects funded in fiscal year 2016.

Coast Smart Criteria Waivers:

Any unit of state government may request a waiver from one or more of the specific Coast Smart Siting or Design Criteria. Waiver requests are reviewed for approval by the Smart Growth Coordinating Committee in consultation with the council. Agencies seeking Criteria Waivers are to use the Waiver Request and the Project Screening Checklist

forms developed by the council. On an annual basis, the waiver requests and reviews will be included in the Smart Growth Subcabinet report in a section documenting any coordinating committee decision regarding Coast Smart Construction Policy. Similarly, waiver requests and decisions will be reported annually to the council in this report. In FY16, only one project applied for consideration:

Brendan Iribe Center for Computer Science and Innovation ~ UMCP:



Photo credit: University of Maryland, <https://iribe.cs.umd.edu>

The project consists of the construction of a new computer science building on “Lot XX” at the intersection of Campus Drive and U.S. Rte. 1, adjacent to Paint Branch, a tributary to the Anacostia River. The building will be adjacent to (but outside) the 100-year floodplain and inside the 500-year floodplain. After screening this project, it was determined a waiver from the siting and design criteria was not required. Because the new structure will be constructed outside of a tidally influenced coastal flooding area, strict compliance with all of the siting and design criteria is not required.

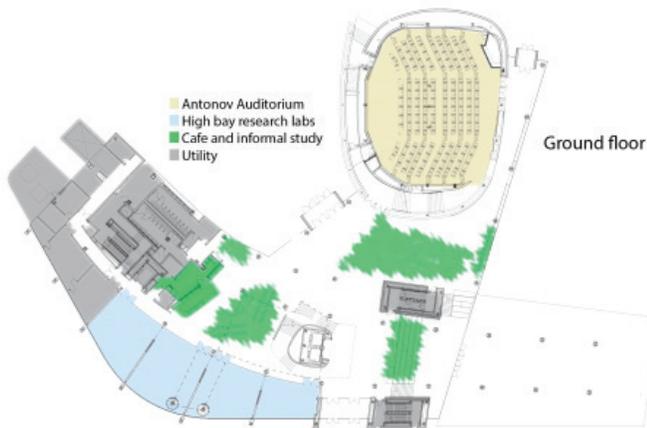


Photo credit: University of Maryland, <https://iribe.cs.umd.edu>

Nonetheless, it is also important to note that the proposed facility includes several features to decrease its susceptibility to flood hazards and increase its resilience, including:

- The building is expected to have a First Floor Elevation (FFE) of 74.0’ and include a basement. This is at least 2 feet above the 100-year flood elevation and in compliance with a 2012 Executive Order.
- The basement will contain chiller pumps for the building mechanical system and will not include any of the building electrical systems.
- Waterproofing of building and structural design to withstand hydrostatic pressure.
- Automatic shut-offs for any electrical service below the 500-year flood elevation.
- Pumps in basement with discharge at elevations at least 2’ above the 100-year flood elevation.

SECTION IV. STATE AGENCY ACTIONS AND INITIATIVES

In addition to implementing Coast Smart guidelines for the construction of new State structures, or the reconstruction or rehabilitation of substantially damaged State structures, State agencies provide multiple technical and financial assistance programs to help communities assess their vulnerability to coastal flood hazards, identify natural and nature-based features that improve coastal resiliency, and adopt Coast Smart practices into project planning and infrastructure improvements to mitigate coastal



Maryland Resiliency Partnership members at the 10th Annual MAFSM Conference. Photo from the Maryland Historical Trust Blog.

The Maryland Resiliency Partnership ~ State Partnership: Maryland's Resiliency Partnership is comprised of the Department of Natural Resources, the Department of the Environment, the Maryland Emergency Management Agency, the Maryland Historical Trust and the Maryland Environmental Service. All five agencies are working together to leverage funding, personnel, and projects to support efforts that integrate floodplain management, hazard mitigation, and coastal resiliency. One of the focuses for 2016 was to inform and provide implementation strategies for the 2016 update to the Maryland State Hazard Mitigation Plan. This included hosting meetings throughout the state for local government and community groups entitled, "Beyond the Map, A Path Toward Resiliency, A Multi-Hazard Approach." At these meetings, agencies from the partnership provided information on projects, products, and ongoing programs related to community resiliency.

In September, the Resiliency Partnership participated in a meeting with the Federal Emergency Management Agency (FEMA) region III and other federal partners (U.S Army

Corps of Engineers, United States Geological Survey, National Oceanic and Atmospheric Administration) to provide details about Maryland's efforts on flood risk reduction in 2016 and discuss upcoming efforts in 2017.

Critical Area Commission. With funding from the National Oceanic and Atmospheric Administration (NOAA), through the Department of Natural Resources, the Critical Area Commission developed a Coastal Resiliency Planning Guide for Municipalities. Staff worked with the Town of Oxford as a pilot community to evaluate its local critical area program and identify opportunities for enhancing coastal resiliency. In the fall of 2016, the town amended its critical area program in order to enhance shorelines and improve stormwater management in the face of coastal impacts due to climate change. The commission will be making the guide available for use by other municipalities.

Assistance Provided by Regional Planners ~ MDP: MDP regional planners assisted local governments in developing applications for state and federal grants in support of local climate change adaptation plans, plan elements and projects, and provided planning and other assistance to ensure success with development and implementation of the plans and projects. For example, to help implement the Smith Island Vision Plan, regional planners, on behalf of Somerset County, applied for and received a \$50,000 Green Infrastructure Resiliency Grant from DNR to hire a professional contractor to perform a comprehensive drainage assessment of Smith Island and to recommend drainage improvements, such as green infrastructure techniques. The assessment will be completed by July 1, 2017. Planning's regional



Smith Island residents at the final community visioning workshop.
Photo credit: Chris Cortina

planners also make local governments aware of state and national adaptation planning resources as they update their comprehensive plans, as early in the process as possible, such as during the 10-year comprehensive plan review.

Planning also works with DBM and other agencies to ensure that State capital investments consider Climate Change Impact Areas during the identification of potential sites and the scope of the work associated with the capital investment. Climate Change Impact Areas include: projected 50-year and 100-year Sea Level Rise Inundation Zones, 50-year Erosion Vulnerable Zones, Category 2 Storm Surge Inundation Zones, Marsh Transition Zones, Temperature Sensitive Streams, Drought Hazard and Wildfire Risk Areas. The intent of identifying these areas is to ensure that the state and local governments make wise decisions about how to protect our natural resources, and where and how to develop and redevelop in light of climate change induced hazards and risks. Local governments also are educated on how to use the maps and are encouraged to use them in capital improvement planning.

Hazard Mitigation Assistance (HMA) ~ MEMA: The Maryland Emergency Management Agency administers FEMA's hazard mitigation assistance (HMA). There are three grant programs that are available to eligible applicants throughout the state:

- Hazard Mitigation Grant Program (HMGP) assists in implementing long term hazard mitigation measures following a major declaration.
- Pre-Disaster Mitigation (PDM) grant program provides funds for hazard mitigation planning and projects on an annual basis.

- Flood Mitigation Assistance (FMA) provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis.

Cultural Resources Hazard Mitigation Planning

~ MHT: With funding from the National Park Service Hurricane Sandy Disaster Relief Fund, the Maryland Historical Trust awarded seven grants throughout the state to help protect historic places and archeological sites from future storms. These grants will be supported by the Trust's Cultural Resources Hazard Mitigation Planning Program, which was created to assist local governments to better plan and prepare for the effects of coastal storms and other hazards that impact historic places and properties. The grant projects – that total nearly \$250,000 – are described below:

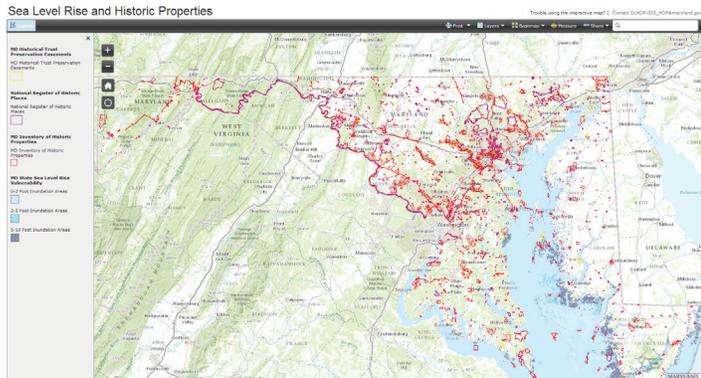
- Heart of Chesapeake Country Heritage Area, Hazard Mitigation Planning Project, Dorchester County
- Integrating Historic and Cultural Considerations into Baltimore's All Hazards Plan, City of Baltimore
- Archeological Society of Maryland, Inc., Sustainable Models for Sites Endangered by Natural Hazards
- Trust for Preservation, Inc., Phase I Hazard Mitigation Planning for Anne Arundel's Cultural Resources, Anne Arundel County
- Cultural Resources Inventory and Risk Assessment for Cecil Towns, Town of Port Deposit
- Smith Island United, Inc., Cultural Resources Hazard Mitigation Planning Initiative, Smith Island
- Documentation and Assessment of Historic Resources in Western Water-Oriented Villages, Talbot County

As these projects are completed, the Maryland Historical Trust will develop case studies so that other jurisdictions can benefit from lessons learned.

Building Local Capacity and Regional Collaboration on the Eastern Shore ~ State Partnership:

The Maryland Department of Planning joined the Eastern Shore Land Conservancy (ESLC) in creating a model Comprehensive Plan Element specifically focusing on coastal resiliency for local governments. The coastal resiliency element was designed to allow each jurisdiction to select from various coastal resiliency

actions, to incorporate recommendations and policies into the comprehensive plan. Since development of the model element, DNR has provided a grant to the City of Cambridge that will adopt a Cambridge-specific coastal resiliency element, based on the model element created from the Planning/ESLC collaborative project.

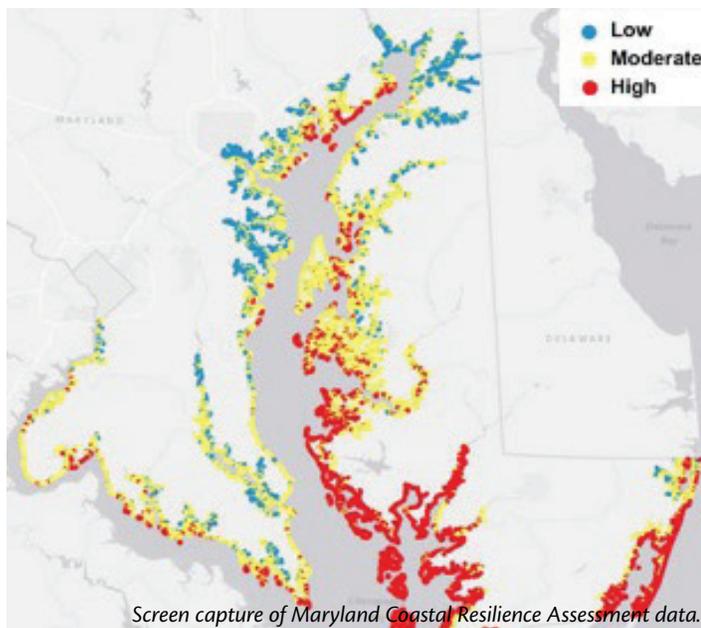


Screen capture of map data on Sea Level Rise and Historic Properties, Maryland Historical Trust, http://mht.maryland.gov/Sea-Level_rise.shtml

Community Resilience Grants ~ MHT: Through federal grant funds, financial and technical assistance is provided to local governments seeking to reduce their vulnerability to the effects of coastal hazards, sea-level rise and localized flooding caused by increased precipitation events.

As these projects are completed, the Maryland Historical Trust will develop case studies so that other jurisdictions can benefit from lessons learned.

Maryland's Coastal Resiliency Assessment ~ DNR: In support of DNR's 2010 climate change policy and the 2014 Chesapeake Bay Agreement Climate



Screen capture of Maryland Coastal Resiliency Assessment data.

Resiliency Goal (Adaptation Outcome), DNR worked with The Nature Conservancy and other state, federal and non-governmental partners from April 2015–March 2016 to complete a Coastal Resiliency Assessment. The Assessment identified statewide priorities for conservation and restoration where coastal habitats provide risk-reduction to communities vulnerable to flooding and other coastal hazard impacts. Program Open Space's GreenPrint Ecological Scorecard has been updated to increase the scores of parcels that are enhancing coastal community resiliency (i.e. parcels that occur along Tier I priority shorelines, or where moderate to highly protective marshes are present). Sensitivity testing is currently underway to ensure scorecard changes do not artificially elevate coastal property scores. DNR is conducting outreach to internal programs and external partners to explore other data applications. Additionally, resiliency data was integrated into the State Hazard Mitigation Plan and the Greater Baltimore Wilderness Coalition coastal defense targeting maps to inform future green infrastructure project implementation at a multi-county and state scale.

Building Resiliency through Restoration ~ DNR: Bishopville, Worcester County. The Bishopville Dam Removal and Floodplain Restoration Project is the result of a decade long partnership between the state, the Maryland Coastal Bays Program and Worcester County. The project was developed to address a fish blockage, improve water quality and to alleviate potential risks to MD Route 367 from flooding and high impact storms.

By replacing the existing dam with a series of pools, runs, and weirs the project created a more natural waterway with improved ecosystem functions. In addition to the reduction of excess nutrient flow to the coastal bays and opening up approximately 7 miles of previously unavailable upstream habitat for many aquatic animals - the innovative design included the restoration of approximately 600 linear feet of coastal plain stream. Reconnecting the stream to its surrounding floodplain has improved the ability of the stream to respond and adapt to storm events.

The first test of this innovative design came in October 2016, when the region was inundated with two large rain events which raised the flood stage to the highest level since 1989. Unlike in 1989 when MD Route 367 was



*Bishopville restoration project (after).
Photo credit: Maryland Department of Natural Resources.*

overtopped by the stream, the improved storage abilities of the restored floodplain successfully managed the increased volume of water during the October 2016 storms and protected the road and surrounding properties.

Kent Narrows/Ferry Point, Queen Anne’s County. On the north end of Kent Island the deteriorating coast along a stretch known as Ferry Point threatened a large area of marsh and wetland habitat that sat precariously unprotected behind the thinning shoreline. This marsh was crucial for providing storm protection to the over \$79 million in infrastructure associated with the marinas, commercial businesses and residences directly behind it. Through a partnership between the state and Queen Anne’s County, Ferry Point has been fully transformed to a resilient living shoreline and a 41-acre parcel of marshland that provides habitat for a variety of wildlife, such as horseshoe crabs, terrapins, bald eagles and osprey.

In addition, the project will reduce the dredging frequency of Kent Narrows boat channel (estimated at \$1.5 million) and



*Ferry Point restoration project (after).
Photo credit: Maryland Department of Natural Resources.*

provides a showcase to coastal communities on how to protect coastal economies and become more resilient to coastal hazards through natural features.

Conquest Beach, Queen Anne’s County. The Conquest Preserve Living Shoreline project is situated on a 750-acre property owned by the Queen Anne’s County Department of Parks and Recreation in Centreville, MD. This living shoreline project is based on a new and innovative design, a ‘next generation’ living shoreline design, known as a shingle beach. Queen Anne’s County worked with DNR to design, manage and implement the project as a part of a large-scale restoration and enhancement effort for the Conquest Preserve property. The design incorporates sea-level rise project data, wave modeling and elements of the area’s natural features to control shoreline erosion while minimizing disturbance and creating diverse habitat area. By strategically placing layers of sand and cobble along this naturally cobble rich sandy shoreline, the design is able to work with nature to dissipate wave energy and control erosion without the need for large (and expensive) stone breakwater structures.



*Conquest Beach restoration project (after).
Photo credit: Maryland Department of Natural Resources.*

Annapolis Maritime Museum Living Shoreline Project. Through a partnership with Department of Natural Resources, Maryland Conservation Corps, the Chesapeake Bay Trust and Chesapeake Bay Foundation, the museum partnered on a coastal risk reduction project.

The Department and Chesapeake Bay Trust provided technical and funding support for the new shore, which included 2,000 plants, 300 tons of sand and 500 tons of rock. The Chesapeake Bay Foundation donated 145,000 oyster spat on shell.

Alice Estrada, executive director of the museum, said that the project has helped both the museum and the bay

as it provides a habitat for crabs and other wildlife, and guards against erosion. The project will also provide hands-on learning for 6,000 area students who participate in the museum's environmental education program every year.

Pocomoke River Restoration Project, Worcester County.

The Pocomoke River Restoration project is a partnership between the Natural Resources Conservation Service, U.S. Fish and Wildlife Service, Department of Natural Resources, U.S. Geological Survey (USGS), and The Nature Conservancy.



Pocomoke River restoration site. Photo credit: Maryland Department of Natural Resources.

The priority area is located along 9 miles of the channelized Pocomoke River mainstem between Route 50 and Porters Crossing Road. This area encompasses about 4,000 acres of floodplain forest and associated buffer, and 17 miles of spoil levee created during channelization in the 1930's and 40's. The main objective of this project is to restore the hydrology of the floodplain by creating breaches in the spoil levees to allow increased movement of water between the channel and the floodplain, improving water quality, increasing storage capacity in the floodplain, and enhancing resiliency to climate variability.

When the Pocomoke River was disconnected from its floodplain by the spoil levees, its flood storage capacity was greatly reduced, further exacerbating flooding downstream of the channelized mainstem. Climate predictions include more intense storms in the near future, with more sporadic events and greater precipitation amounts per storm. By breaching the spoil berms, Pocomoke River can again fill its forested floodplain wetlands, reducing the overall flood stage (approximately 4,000 acres of storage potential) and increasing nutrient and sediment removal.

The most recent projections of restored acreage greatly exceed the original estimates, due in large part to The Nature Conservancy hiring a local field biologist that has both the time to focus on outreach with local landowners, and the ability to work with these landowners to find the best restoration program to match the landowner's interests. As of December 2015, one floodplain reconnection project was completed, restoring 227 acres of floodplain forested wetlands in Pocomoke State Forest, Wicomico County. Nine more projects were constructed in summer 2016, with an additional five projects scheduled for construction in summer 2017. The total wetland acreage restored by this initiative is estimated to be 2,850 acres.

The CoastSmart Communities Scorecard ~ DNR:

The Department of Natural Resources works regularly with local governments to address short- and long-term coastal hazards, such as coastal flooding, storm surge and sea level rise. One tool that is used is the CoastSmart Scorecard which provided a method for assessing the risk and vulnerability of a local community to coastal hazards by using a ground-up and community-based approach.

The scorecard provides:

- Facilitated, in-person discussion among local government departments
- Shared information on vulnerabilities and risks to relevant coastal hazards
- Awareness of strengths and weaknesses of hazard preparedness and planning
- Next steps for increasing resilience to short and long-term coastal hazards.

The Scorecard is designed to be completed by local officials in a group setting to prompt discussion on risk, planning, and response strategies and opportunities through a series of yes or no questions. The results will help direct officials to recommendations, tools and resources, and to inform future project proposals for grants and other funding programs.

Community Resiliency Grants Program ~ DNR:

The Department of Natural Resources issued the first awards under the new Coastal Resiliency Grants Program in 2016. This program is supported by funding from the National Oceanic and Atmospheric Administration and the Environmental Protection Agency and was developed to help Maryland communities become more resilient to impacts from the changing climate. Six projects have been selected for funding, which will help communities respond to coastal hazards and pursue the use of green infrastructure to address nuisance flooding.

Community Resilience in Deal Island ~ DNR:

Alongside a network of more than 50 community members and organizations, a team of partners (The University of Maryland, Sea Grant Extension; DNR; resource managers and academia; and the Eastern Shore GIS Cooperative) are conducting an Integrated Community Resilience Assessment of the Deal Island Peninsula using both quantitative and qualitative methods to understand and plan for the impacts of flooding now and into the future. This a phased approach that includes:

- using a flood vulnerability index model that assesses potential flooding now through 2050;
- selection of five focus areas for a more in-depth look at vulnerability to flood events;
- groundtruthing and community discussions about options for flood risk reduction.

Ultimately, the community and partners will develop realistic options that can be implemented on both the parcel and community scale and identify ways for implementation.

The Flood Vulnerability Index has been completed for the years 2015, 2020, 2030, 2040 and 2050 and the impact of rising sea level and storm events on roads, property and primary structures has been assessed. The maps have been presented to the community stakeholders through facilitated workshops. Staff is currently working on a StoryMap and refining the maps to be presented on the Deal Island Peninsula Project website. Ethnographic data has been collected for 4-5 focus areas to better understand past and current flood events and response.

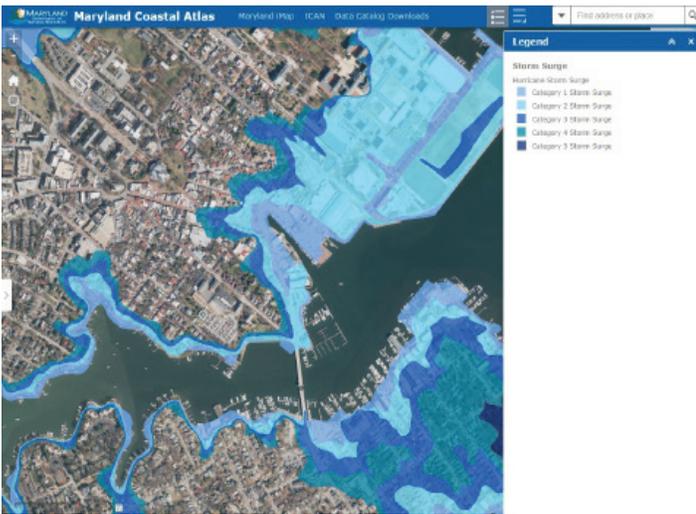


Deal Island flooding. Photo credit: Maryland Department of Natural Resources.

Assessing Vulnerability to Storms and Flooding Using Maryland's Coastal Atlas ~ DNR:

Maryland's Coastal Atlas is an online mapping and planning tool created to allow users to explore and analyze data for coastal and ocean planning activities. Originally launched in 2008, the Coastal Atlas has undergone a number of improvements over the years. A new mapping platform allows planners and the public to view, query, and download data on physical characteristics, human uses, and ecological resources, which can be used to explore their vulnerability to flooding and other coastal hazards.

The Hurricane Storm Surge dataset added to the Coastal Atlas was created in partnership with the United States Army Corps of Engineers and is based on the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model. The SLOSH model is a computer model developed by the National Weather Service for coastal inundation risk assessment and the prediction of storm surge. It estimates storm surge heights resulting from historical, hypothetical,



Screen capture of storm surge data on Maryland's Coastal Atlas.

or predicted hurricanes. SLOSH computes storm surge by taking into account a storm's atmospheric pressure, size, forward speed, track, and winds. The calculations are applied to a specific locale's shoreline, incorporating the unique bay and river configurations, water depths, bridges, roads, levees, and other features.

Maryland coastal property owners can use the Coastal Atlas to search their address, zoom to the location, turn on the storm surge data, adjust the transparency, and explore their vulnerability to different categories of hurricane storm surge. This data allows property owners, coastal planners, and emergency responders to understand where the most vulnerable areas exist and attempt to minimize the impacts of the next big hurricane. For more information, visit <http://dnr.maryland.gov/ccs/coastalatlus/Pages/default.aspx>.

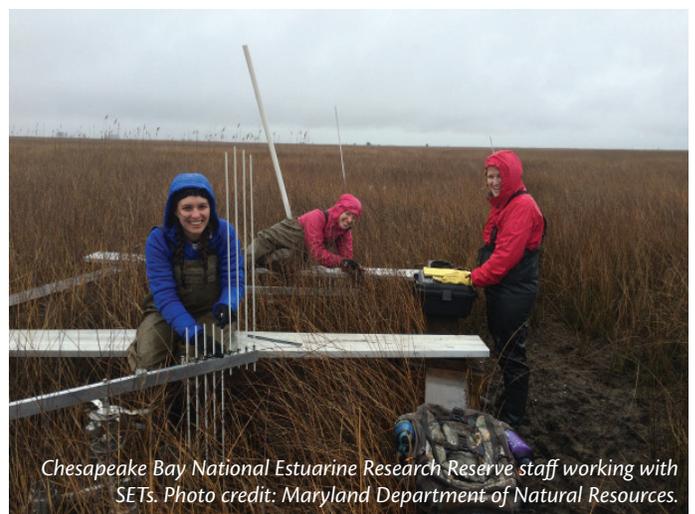
Monie Bay Sentinel Site ~ DNR: Maryland's Chesapeake Bay National Estuarine Research Reserve is a sentinel site for climate change and contributes information that informs coastal management issues at the local, regional, and national scale.

The program expanded its capacity as a sentinel site and is building out its Monie Bay component, located in Somerset County, as a fully functioning sentinel site. On-the-ground data collected here will complement the reserve's other sentinel site in Jug Bay (Patuxent River) and contribute through data-to-management efforts of the Chesapeake Bay Sentinel Site Cooperative.

Sentinel sites signal risks and changes to our coastal wetlands under a changing climate. These discrete

locations have the operational capacity for intensive study and sustained observations to detect and understand changes in the ecosystems they represent. Currently, the Jug Bay component on the Patuxent River is a fully operational sentinel site. Over the next two years, with additional support from NOAA, the Reserve will be establishing its Monie Bay component as a sentinel site. Monie Bay is located in Somerset County which is one of Maryland's most vulnerable counties to sea level rise. This additional site will provide valuable data on how local marshes are changing over time and if they are resilient to environmental stressors such as sea level rise. Sentinel sites measure a variety of parameters including vegetation, water quality and meteorological data. Regular surveying is also conducted as well as the installation of Surface Elevation Tables (SETs) which measure how marshes are rising or sinking.

SETs are an important component to a sentinel site and over time provide valuable information on the health of the marsh. SETs measure elevation change in the marsh both above ground (sediment deposition or erosion) and below ground (root growth, decomposition, compaction). These structures are installed and measured multiple times a year to better understand seasonal influences on the marsh system. SETs are often surrounded by boardwalks to prevent humans from disturbing the surface which would skew the data. Over time, SETs provide data to compare how the marshes are keeping pace with the rate of sea level rise to understand if our marshes will survive, migrate, or disappear.



Chesapeake Bay National Estuarine Research Reserve staff working with SETs. Photo credit: Maryland Department of Natural Resources.

Mid-Atlantic Regional Council on the Ocean (MARCO) Regional Resiliency Efforts ~ DNR

The MARCO Climate Change Action Team (CCAT) is a work group established “to prepare the region’s coastal communities for the impacts of climate change on ocean and coastal resources” as expressed in the Mid-Atlantic Governor’s Agreement on Ocean Conservation. The CCAT is a network of state agency representatives (Virginia, Maryland, Delaware, New Jersey, and New York) tasked with promoting regional collaboration across the Mid-Atlantic to address regionally relevant climate change adaptation issues.

In 2015, the CCAT performed an assessment of regional assets within MARCO’s geographic boundaries in order to gauge how these may be affected by climate change. The four assets – beaches, nearshore habitat, offshore habitat and marine terminals – were selected based on an analysis of MARCO’s mission priorities, geographic scope of governance and potential transboundary impacts.

The resulting report provides the results of the assessment and serves as a guiding document as MARCO continues to develop its climate change adaptation priorities and strategic approach.

Through further discussion, the CCAT identified the following key focus areas: advancing natural and nature-based solutions; improving understanding of changing ocean conditions and associated impacts; pursuing opportunities for beneficial reuse of dredge material; generating economic information; and developing a research agenda.



SECTION V. RECOMMENDATIONS FOR FY 2017

1. Evaluating New Sea Level Rise Science ~ Scientific understanding of the causes and rates of sea-level rise is rapidly evolving. In 2013, the Maryland Climate Change Commission updated its projections of sea-level rise for Maryland over the rest of the 21st century in order to provide reference points for planning state facilities under the Coast Smart Program. The Coast Smart Council will coordinate with the Maryland Climate Change Commission, federal agencies and other research partners to understand, evaluate and assess how best to account for new sea-level projections in coastal resilience planning.

2. Waterway Construction Regulatory Program ~ The Maryland Department of the Environment (MDE) is now discussing ways to incorporate Coast Smart construction and resiliency guidelines into its waterway construction regulatory program. One idea is to promulgate regulations similar to those adopted by the Critical Area Commission in December 2014. This strategy would:

- Limit any additional burden on state agencies, because any agency that has proposed a project in the critical area since December of 2014 is already familiar with the requirements and
- Create a consistent process for state agencies working in either coastal or riverine areas.

Once it has completed its internal discussion and developed a proposal, MDE will broaden the discussion by meeting with staff supporting both the Coast Smart Council and the Adaptation and Response Working Group.

3. Coast Smart “Checkoff” for State Projects at the Board of Public Works ~ Investigate developing a Coast Smart Certification for state projects reviewed and approved by the Board of Public Works. The council will investigate the merits of developing a checkoff or certification document that provides the Board of Public Works an understanding of how the project meets Coast Smart siting and design principles.

4. Possible Future Changes to Coast Smart Construction Guidelines for Consistency with Federal Regulations and Guidelines ~ The Coast Smart Council will continue to assess the Siting and Design Criteria to determine if any changes are needed. In addition, the Coast Smart Council may incorporate certain Federal Emergency Management Agency (FEMA) requirements into the Coast Smart Construction Program to ensure that Maryland’s requirements are at least as stringent as relevant federal requirements. Consistency with federal requirements will help protect Maryland’s resources and State investments. These considerations may include incorporating:

- New definitions related to climate change;
- FEMA’s Federal Flood Risk Management Standard (FFRMS) requires two feet of freeboard in non-critical areas and a minimum of three feet of freeboard in critical areas above the base flood elevation. In both cases, the additional freeboard also includes the horizontal land area that would be flooded;
- The Limit of Moderate Wave Action (LiMWA), which is the inland limit of the area affected by waves greater than 1.5 feet during the base flood.

SECTION VI. APPENDICES

APPENDIX A - COAST SMART COUNCIL MEMBERS	28
APPENDIX B – DNR PROJECTS SUBJECT TO COAST SMART CONSTRUCTION PROGRAM	30
Point Lookout State Park - Rehabilitation of Lighthouse Complex	30
Point Lookout State Park - Charge Collection System	34
New Southern Regional Multi-Unit Service Center	36
APPENDIX C – MDE’s PROJECT CONSISTENCY REPORT	37

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Appendix B – DNR Projects Subject to *Coast Smart* Construction Program

Point Lookout State Park: Lighthouse Restoration Project and Charge Station Project

Below are comments provided on the Office of Capital Budgets Spreadsheet:

Two projects on this list should be given additional consideration due to location within projected sea level rise inundation areas: The Pt. Lookout SP lighthouse restoration project and the Pt. Lookout SP charge collection station. Both projects should be screened to assess benefit/cost given proposed location within vulnerable areas. A project screening checklist can be found within the report (See Appendix D):

http://www.dnr.state.md.us/climatechange/pdfs/ClimateChange_CoastSmartReport013114.pdf

Historical/cultural issues will likely come into play on the lighthouse restoration project given that is registered. Eligibility on the national register may affect design and construction components of the project. One factor to consider would be the benefit/cost of reconstructing structure in place versus relocation of structure within the next 50 years due to potential for sea level inundation.

Below are two evaluations of the Point Lookout State Park projects using the *Coast Smart* Construction Project Screening Checklist developed by the Coast Smart Council:

Point Lookout State Park - Rehabilitation of Lighthouse Complex

1. Project Scope

This project involves the rehabilitation of four (4) existing structures that comprise the Point Lookout Lighthouse Complex. The project will include interior and exterior renovations of the Lighthouse, Buoy Shed, Coal Shed and Smoke House. In addition, there are plans to construct ADA restroom facilities within one of either the coal or buoy sheds, and to convert an existing concrete platform, that was once part of the Navy's radar tracking station, into a viewing platform. Site work improvements will include gravel resurfacing of the existing access roads through the site, parking improvements, and upgraded utilities.

E&C estimates that the project constitutes a medium term project (design life between 25-50 years).



2. Project Location

The project is located in an area that is likely to experience flooding within the design life of the project. Although a topographic survey of the site has not been completed in recent years, DNR has obtained first floor spot elevations for all the buildings at Point Lookout State Park.

- a. The site is located within the 2 – 5 foot inundation zone for future sea level rise.

The project site is not anticipated to be inundated by year 2050 but parts of the site may be inundated by 2100.

- b. Portions of the site are located within the 100-year floodplain. The FIRM (eff. Date 10/19/2004) base flood elevation in the project vicinity is 4 ft NAVD. However, the areas in the vicinity of the armor stone revetment that protects the lighthouse peninsula are shown within a VE zone that has base flood elevations of 6 feet NAVD.

F.F of Lighthouse is 10.22 ft. NAVD.

FF of Buoy Shed is 3.45 ft NAVD.

FF of Coal Shed is 6.02 ft NAVD

FF of smokehouse is 6.15 ft NAVD

- c. This site is located within the Class I storm surge area (5 – 7 feet). This category of flooding probably represents the greatest risk to the site.

3. Ecosystem Resiliency

The shoreline of the peninsula upon which the lighthouse complex is situated is protected by well-constructed armor stone revetments, however, there are no other natural obstructions in the vicinity of the site which would act to mitigate flood conditions.



4. Resiliency Measures

a. Siting considerations

The site is fixed in that this project includes the maintenance or redevelopment of existing buildings and site features.

b. Design Considerations

Wetproofing of the lighthouse basement. The rehabilitation of the lighthouse will be designed to waterproof the basement area in order to minimize the deleterious effects of flooding on the building substructure.

Utility relocation – In the past, the basement of the lighthouse housed the furnace, water heater, electrical service panel and miscellaneous utility wiring and piping. The rehabilitation of the lighthouse will be designed to relocate all utility infrastructure out of the basement to areas that are not susceptible to flooding.

Waterproof materials & Coatings – With respect to all the buildings, resilient materials and coatings will be employed on those parts of the structures that are located within the storm surge zone.

The coal and buoy sheds will be restored to the open air pavilion style structures of their 1883 era origins. The existing floors of the sheds will be replaced with concrete or brick paver style flooring that will be resistant to flood damage.

- c. Type of Construction - NA
- d. Functional use restrictions - NA

5. Cost/Benefit Analysis

- a. Risk v. Time

The greatest risk to the project is probably related to storm surge. The damage incurred would most likely include undermining of the gravel access roads, and water borne debris damage to buoy and coal sheds.

- b. Risk tolerance

Medium. The lighthouse complex is a valuable historic resource to the MPS but damage to, or loss of, parts of the lighthouse complex does not affect the critical operational aspects of the Park.

- c. Socio-economic considerations

The ramifications would be with respect to the budgeting, and acquisition of funding for any storm related damages.

- d. Environmental Impacts - None

Point Lookout State Park - Charge Collection System

1. Project Scope

The proposed project shall consist of the design and construction of a charge collection system with collection booths, automated currency and credit card collection stations, electronic gates, manual gates, video surveillance, and utilities. The system will also require renovation of the existing paved parking area and entrance road which may include addition and removal of existing paved sections, as well as re-surfacing of existing paved surfaces.

The project includes equipment and building components that have short and medium term design lives. For instance the collection booths and manual gates would have medium term design lives (25 – 50 years) while the electronic elements of the project (automatic gates, surveillance system) and paving improvements will have short term (< 25 year) design lives. However, the charge collection system is critical function of the administration building complex which is a permanent long term feature of the Park.

2. Project Location

The project is located in an area that may experience flooding within the design life of the project. The average elevation of the site where the charge collection booths will be located is + 3.5 feet (NAVD).

- a. The site is located within the 2 – 5 foot inundation zone for future sea level rise. The project features are not likely to be inundated within the design life of those features.
- b. Most of the project site is located within the 100-year floodplain. The FIRM (eff. Date 10/19/2004) base flood elevation in the project vicinity is 4 foot NAVD.
- c. This site is located within the Class I storm surge area. This category of flooding probably represents the greatest risk to the site.

3. Ecosystem Resiliency

The site is surrounded by forested areas. There are no obvious mitigation features that might be added to provide additional protection to the site.

4. Resiliency Measures

- a. Siting considerations

The project site is fixed based on the location of the existing Administration Building complex at Point Lookout State Park and the existing site constraints do not provide flexibility to move project features to higher ground.

b. Design considerations

The recommended design approach will be to utilize resilient building materials for those project features that are constructed in potential inundation areas up to an elevation of 2 feet above the 100 year flood elevation (6 feet NAVD), and to elevate electronic equipment (automatic gates, HVAC components, junction boxes, etc.) where possible.

5. Cost/Benefit Analysis

a. Risk v. Time

The greatest risk to the project is probably related to storm surge. The damage incurred would most likely be to the electrical components of the project components, undermining of the asphalt pavement, and debris damage to site features such as signage, gates, etc.

b. Risk tolerance

High. Although the charge collection system is an important component to the efficient operation of the complex, the complex can continue to function by employing alternate charge collection methodologies if the charge collection system was offline.

c. Socio-economic considerations

The cost ramifications are with respect to the equipment that would need to be replaced.

d. Environmental Impacts

None

Finally, the third DNR project, the **New Southern Regional Multi-Unit Service Center**, had the following comment in the OCB spreadsheet:

Project is to be sited outside of the project 100-year sea level rise inundation area.

**PROJECT CONSISTENCY REPORT
(File with Maryland Department of Planning)**

This review is undertaken by the State of Maryland pursuant to §5-7A-02 of the State Finance and Procurement Article. Projects or actions are evaluated for consistency with the State's Economic Growth, Resource Protection, and Planning Policy in accordance with Executive Order 01.01.1992.27, Maryland's Smart Growth and Neighborhood Conservation Policy, in accordance with Executive Order 01.01.1998.04, and Maryland Coast Smart Construction Program in accordance to House Bill 615 of 2014.

Project Title:
Project Location:
Project Description:

Approximate Funding Share

STATE	LOCAL	FEDERAL	OTHER
\$	\$	\$	\$

Determination: _____ Consistent
 _____ Inconsistent with extraordinary circumstances

Brief description of extraordinary circumstances:

Sponsor Agency: Maryland Department of the Environment

By:
 Engineering and Capital Projects Program

By: _____
 Program Administrator

Date: _____

Return to: State Clearinghouse
 Maryland Department of Planning
 301 West Preston Street
 Baltimore MD 21201-2365
 (410) 767-4500; FAX (410) 767-4480

Date _____

#

(OSPPC Use Only)

MDE GROWTH MANAGEMENT AND SMART GROWTH CONSISTENCY REVIEW INTERNAL MANAGEMENT CHECKLIST¹

Project Name: _____

Program : _____ County: _____

Location: _____

Description: _____

Funding: State \$ _____, Local \$ _____, Federal \$ _____, Other \$ _____, Total \$ _____

Yes No

- 1. Does the project provide additional capacity to support population growth?
2. If the project provides additional capacity for population growth, will that growth be concentrated in suitable areas...
3. Can sensitive areas, including floodplains, critical habitat for endangered species, streams and their buffers, and steep slopes, be adequately protected...

(Please explain NO answers to questions 2 or 3 on the next page.)

- 4. Is the project consistent with the applicable local comprehensive plan?
5. Is the project consistent with the following State Economic Growth, Resource Protection and Planning, and Smart Growth Policies:
(1) development shall be concentrated in suitable areas;
(2) sensitive areas shall be protected;
(3) in rural areas, growth shall be directed to existing population centers...
(4) stewardship of the Chesapeake Bay and the land shall be a universal ethic;
(5) conservation of resources, including a reduction in resource consumption...
(6) to encourage the achievement of paragraphs (1) through (5) of this subsection...
(7) funding mechanisms shall be addressed to achieve this policy; and
(8) the project is located within a Priority Funding Area (PFA).

(If the answer to question 4, or 5 is NO, (i) questions 6 and 7 below are to be answered, and (ii) the project may only be funded if the answers to questions 6 and 7 are both yes.)

1 This checklist is intended to facilitate consistency reviews by summarizing the recommendation made to the MDE Secretary or her/his designee. MDE may choose to use alternative review procedures, in lieu of this checklist. The Secretary or designee, not the initial reviewer, is responsible for making MDE's final decision on consistency. This checklist concerns only the internal management of MDE.

Yes No

- 6. Do extraordinary circumstances exist? (Extraordinary circumstances may include, but are not limited to, remedying a public health problem, such as failing septic systems, or a critical environmental problem.)
- 7. Have you ascertained that no reasonably feasible alternative exists?

(Please explain YES answers to questions 6 or 7 briefly)

Recommended Finding:

- Consistent (answers to questions 4 and 5 are YES)
- Inconsistent with Extraordinary Circumstances (one or both answers to questions 4 and 5 is NO, but answers to questions 6 and 7 are both YES.)
- Inconsistent without Extraordinary Circumstances (one or both answers to questions 4 and 5 is NO, and one or both answers to questions 6 and 7 is NO.)

MDE COAST SMART CONSISTENCY REVIEW INTERNAL MANAGEMENT CHECKLIST

- 1. Does the project include new or replacement structure (walled or roofed building that is principally above ground) located within area likely to be inundated by sea level rise? Yes No
- 2. The structure cannot be relocated and must be at this location due to a design issue, right-of-way or any other justifiable reason. Yes No N/A (#1 is "No")

Note: If it is feasible to relocate a structure (answer is "No" to question 2), funding cannot be provided at the present location.

If the answer is "Yes" to both questions 1 and 2 above, the project qualifies for:

- Categorical exception OR Waiver

If the answer is "No" to question 1:

- Project is consistent with Maryland Coast Smart Construction Program with no further action required.

Project Engineer: _____

Date: _____

Project Management Services, Chief (Region I or II): _____

Date: _____

Engineering and Capital Projects Program Administrator: _____

Date: _____

Explanation