HAMPTON ROADS COASTAL RESOURCES TECHNICAL ASSISTANCE PROGRAM

FISCAL YEAR 2014 – 2015
FINAL REPORT

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Preparation of this report was included in the HRPDC Unified Planning Work Program for FY 2014 – 2015, approved by the Commission at its Quarterly Commission Meeting of June 19, 2014, and in the HRPDC Unified Planning Work Program for FY 2015 – 2016, approved by the Commission at its Executive Committee Meeting of June 18, 2015.

Prepared by the staff of the Hampton Roads Planning District Commission

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ABSTRACT

This report describes the environmental technical assistance program conducted by the Hampton Roads Planning District Commission during FY 2014 – 2015 through its Coastal Resources Management Program. This program encompasses environmental impact review, participation in state and federal programs, coordination of regional environmental programs addressing environmental issues, such as the Chesapeake Bay and wetlands, public information and education, and technical assistance to Hampton Roads localities. It contains representative examples of the technical work, comment letters, outreach materials, and associated materials generated and used in assisting the region's seventeen local governments, supporting the Virginia Coastal Zone Management Program, and working with the other Planning District Commissions in the Coastal Zone.

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INTRODUCTION

In March 2014, the Hampton Roads Planning District Commission submitted a proposal to the Virginia Coastal Zone Management Program (VCZMP) for funding to continue the HRPDC's Technical Assistance Program. Through this program, the HRPDC provides technical assistance on a variety of environmental and coastal resources management issues to its seventeen member local governments and to coordinate their response to those issues.[1] It also provides assistance to the incorporated towns in the region as well as to a wide variety of non-governmental stakeholders. This Program has operated successfully with financial assistance from the Virginia Coastal Zone Management Program since the VCZMP's inception in 1986. In October 2014, the HRPDC was awarded financial assistance to maintain its Technical Assistance Program through September 2015. This report provides an overview of the activities and accomplishments of the Hampton Roads Technical Assistance (Regional Coastal Resources Management) Program during that period.

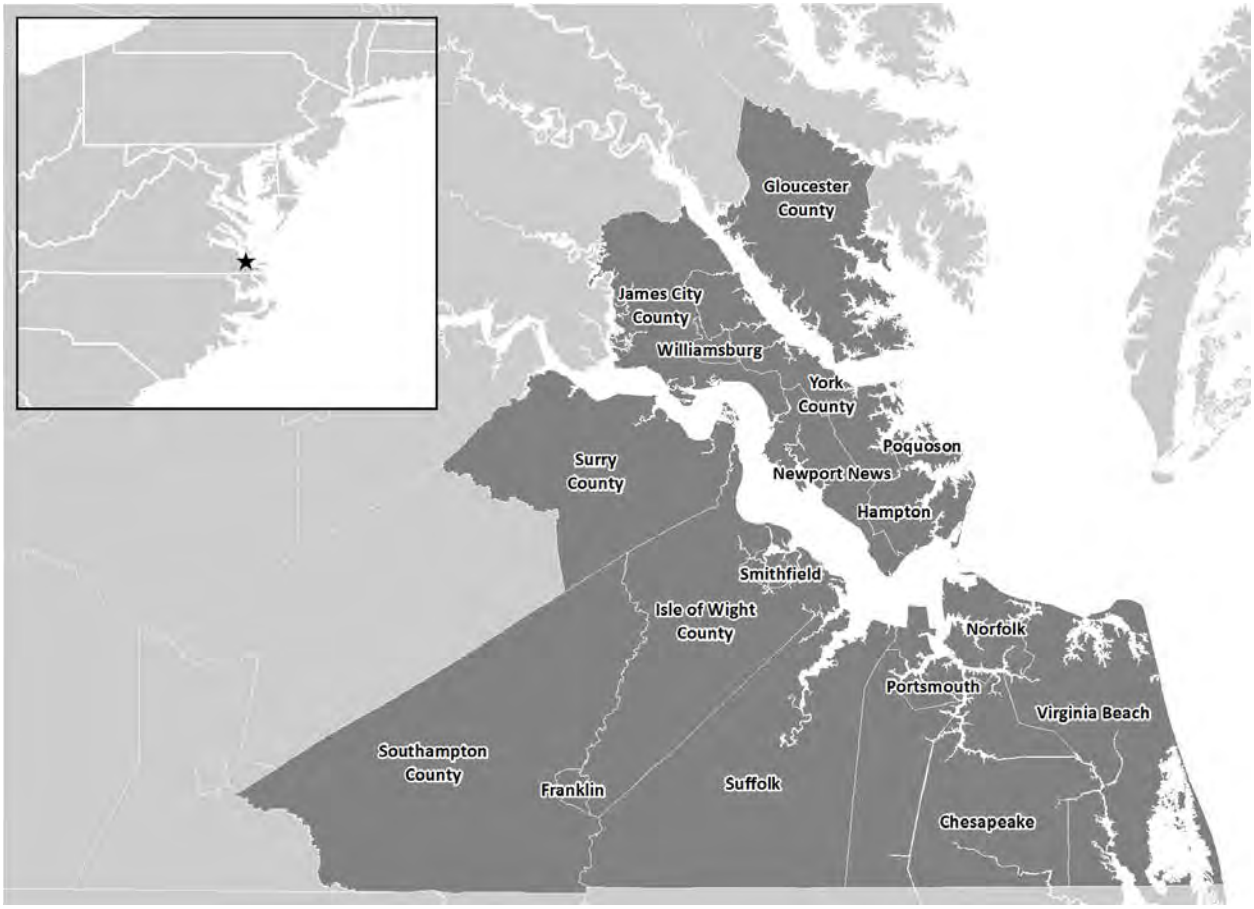
The Hampton Roads Technical Assistance Program is a comprehensive, interrelated initiative, providing on-call staff capability, a regional coordination mechanism, and related technical studies. It assists the region's localities on short-term local issues, ensures a collective response to regional, state and federal issues as they arise, and facilitates cooperation and coordination among the localities. The Technical Assistance Program provides the resources to begin many efforts which are later funded through specific grants or local assessments, while in other cases, the program allows for the continuation of efforts after initial funding. Examples of these programs include the HRPDC's work on the Chesapeake Bay Program, planning for green infrastructure, and planning for climate change.

Of particular significance, VCZMP funding for this program has provided seed money allowing the region to undertake new environmental initiatives, such as the Regional Water Supply, Groundwater, Wastewater and Stormwater Management Programs, including the public information and education components of each. These regional initiatives, which continue to evolve, are now institutionalized and have been enhanced through dedicated local funding. These regional programs are unique examples of intergovernmental cooperation in management of coastal resources in the Commonwealth.

The Hampton Roads Technical Assistance Program also enables the HRPDC to participate in and support a number of core elements of the Virginia Coastal Zone Management Program, such as the environmental impact review and federal consistency determination process, wetlands and dune regulations, the Chesapeake Bay Preservation Act (CBPA) regulations, air quality regulations, and several state water quality programs. This

[1] The Hampton Roads Planning District Commission consists of the Cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, the Counties of Gloucester, Isle of Wight, James City, Southampton, Surry, and York, and the Town of Smithfield.

participation results in cost savings to the state by educating localities collectively about state and federal initiatives and coordinating local government input to these efforts. Over the past twenty-eight (29) years, several hundred local government staff members from the region's sixteen local governments have received technical training in wetlands regulations and delineation, CBPA implementation, erosion and sediment control, stormwater management, low impact development and environmental site design, flood hazard mitigation, geographic information systems, land conservation, sea level rise, watershed management, and comprehensive coastal resources management plans. Local government board members, staff from other PDCs, and representatives of the private sector have also participated. As a result, the effectiveness of local government implementation has increased.



Local Government Members of the Hampton Roads Planning District Commission

Through review of environmental impact documents and coastal zone consistency determinations, the regional program has also facilitated rapid resolution of local government concerns with the impacts of state projects proposed by the Virginia Department of Transportation (VDOT), the Virginia Community College System, state supported colleges and universities, and others, as well as federal projects such as port security and inspection systems, harbor dredging, military facility construction and operations, Base Realignment and Closure decisions, encroachment issues, Coast Guard

permits for marine events and operations, Outer Continental Shelf Energy Development, and related resource management programs.

The Technical Assistance Program allows the HRPDC to serve as a central source of environmental data and information, including water and wastewater data, soil surveys, historic aerial photographs, and regional land use data. HRPDC also houses and collects a wide variety of GIS datasets from various federal, state, and local partners, including LiDAR elevation data, as well as datasets developed by HRPDC staff.

The FY 2014 – 2015 Hampton Roads Technical Assistance Program enabled the region's localities to continue to address, in a comprehensive and integrated fashion, many aspects of coastal resources management - the Chesapeake Bay Program, implementation of the Albemarle-Pamlico National Estuary Program with North Carolina, environmental impact review, local comprehensive planning, CBPA and Chesapeake Bay TMDL implementation, wetlands protection, shoreline management, climate change/sea level rise and energy initiatives, public access, and environmental database development and analysis through the HRPDC's Geographic Information System (GIS). The program has allowed the continuation of regional support for and participation in the VCZMP, regional participation in other state and federal initiatives, completion of necessary technical studies, technical assistance to the region's localities, and conduct of public information and education activities.

PROGRAM OBJECTIVES

At the outset of the FY 2014 – 2015 Hampton Roads Technical Assistance Program, the HRPDC, in cooperation with staff from its member local governments, established six (6) objectives for the Program. These overall objectives, while expanded in scope, have remained largely the same since program inception. They are:

1. To assist Hampton Roads localities in implementing the recommendations of the Virginia Coastal Zone Management Program, related state and federal environmental management programs as well as the Chesapeake Bay Program, and related state legislation and regulations.

2. To support the Commonwealth of Virginia in implementing the VCZMP through coordination of local and regional review of environmental impact assessments/statements and applications for state and federal environmental permits and related environmental documents and by serving as an information conduit between the state and localities on coastal resource management issues.

3. To complete regional environmental studies, necessary to support local government consideration of the Chesapeake Bay Agreement priorities, including development and implementation of the Chesapeake Bay Total Maximum Daily Load (TMDL).

4. To enable the Hampton Roads region to continue to play an active role in the development, implementation and refinement of the Virginia Coastal Zone Management Program, the Chesapeake Bay Agreement, the Chesapeake Bay Preservation Act, and related environmental initiatives.

5. To improve the coordination and quality of local and regional decision-making concerning coastal and related environmental resources.

6. To increase public awareness of the value of coastal resources and of the local and regional efforts to manage them.

To accomplish these objectives, a comprehensive program was structured involving a range of activities in the following categories: VCZMP Program Support, Technical Studies, Local Assistance and Coordination, and Public Information and Education.

PROGRAM ACCOMPLISHMENTS

VIRGINIA COASTAL ZONE MANAGEMENT PROGRAM SUPPORT

Environmental Impact Review

The HRPDC staff reviews and comments on all applications for state and federal regulatory permits and the associated Environmental Impact Assessments/Statements or federal consistency determinations. Local staff representatives are regularly contacted to identify any concerns individual local governments may have with specific projects. On occasion, the Hampton Roads Planning District Commission may be informed on particular projects with significant regional or local impacts. Generally, no formal action is taken by the Commission as a result of this notification; however, historically, the Commission has requested more extensive HRPDC staff and local government review of particular issues. HRPDC staff responds to nearly all requests for comments from the Department of Environmental Quality (DEQ).

From October 1, 2014 through September 30, 2015, the HRPDC staff reviewed and commented on forty-five (45) environmental impact assessments and statements for both state and federal projects. Projects reviewed in FY 2014 – 2015 ranged widely in complexity. The HRPDC, in cooperation with the localities, worked to ensure that these projects were coordinated and met local government requirements. HRPDC's responses are combined with any others from state agencies when DEQ makes its final determinations. While these determinations (and the collected comments) are conveyed back to HRPDC, DEQ staff does not generally identify any specific impacts to projects based on HRPDC staff comments. However, in several cases DEQ staff or staff from other state agencies has followed up with HRPDC staff to have comments clarified.

In addition to environmental impact reviews and assessments, HRPDC staff also reviews grant proposals for federal and state funding. These proposals are reviewed for local and regional impacts and significance, as well as to ensure that tasks are not duplicated. From October 1, 2014 through September 30, 2015, the HRPDC staff reviewed and commented on seven (7) grant proposals.

Appendix A contains a listing of all projects and proposals reviewed through this program component during the period from October 1, 2014, through September 30, 2015, as well as sample comment letters on notable and representative projects. To improve the information available for consideration by the Commission and to facilitate tracking of local and state actions on environmental documents, the HRPDC staff developed a database and reporting system during a previous grant year. All environmental documents reviewed since July 2001 have been entered into the database. HRPDC comment letters for the following projects are included in Appendix A:

1) DEQ#15-001F – Freeman Drive Apartments
2) DEQ#15-035F – Bellwood Cay
3) DEQ#15-038F – Todd Lied Pier
4) DEQ#15-041S – Franklin AHQ Office Building
5) DEQ#15-044S –Virginia International Gateway Construction – Container and Intermodal Yard Expansion
6) DEQ#15-046F – Tranquility at the Lakes Senior Housing Project

Coordination of review and comment on environmental documents with the region's localities is frequently problematic, because of time constraints placed on the review process by the state and, in some cases, by project applicants who request expedited review from the state. Historically, environmental documents were distributed by the state to the Chief Administrative Officers in the localities. Internal distribution did not always go to the same local government staff person and frequently prevented the locality and the HRPDC from commenting within the state's time constraints. In May 2003, local government and HRPDC staff recommended that the region's Chief Administrative Officers designate specific staff persons to coordinate internal review of environmental documents. Following the internal designation of contact points, the DEQ was formally requested to distribute all documents to the designated staff contact/coordinator. After more than nine years of experience with the modified review system, it appears that the review process works much more efficiently.

Based on legislation enacted during the 1996 Session of the General Assembly, all public notices for Virginia Pollutant Discharge Elimination System, Ground Water Withdrawal, Virginia Water Protection, Hazardous Waste, and Air Emissions Permits are provided to local governments and PDCs for review. To facilitate this effort, the staff developed and maintains a tracking system and database for all five types of permits.

Participation in State and Federal Programs

Several state and federal environmental programs encourage use of PDCs as a cost effective mechanism for informing local governments and seeking their input for state and federal program development and accomplishment. For example, the Chesapeake Bay Program in both its 1996 and 2002 Local Government Participation Action Plans recommended better use of technical assistance providers, such as PDCs, to serve as vehicles to distribute information and outreach on Chesapeake Bay-related issues. It also suggested development of a network of local officials and staff with expertise in dealing with resource protection issues. Virginia's Regional Cooperation Act strongly recommends this type of role for PDCs. Several programs, including the Virginia Coastal Zone Management Program, do use the PDCs in this manner. Historically, NOAA's Section 312 evaluation of the Virginia Coastal Zone Management Program has recognized the benefits and cost-effectiveness of the network of PDCs in supporting the VCZMP and in assisting their member local governments. During the 2006 NOAA evaluation of the Virginia Coastal Zone Management

Program, the Evaluation Team provided favorable comments on the role and activities of PDCs. Those comments were formalized in the final Section 312 Evaluation Report.

In the Hampton Roads region, the Hampton Roads Technical Assistance Program and its associated committees provide such a network. Both HRPDC staff and local government members of the HRPDC Advisory Committees (including the Regional Environmental Committee, Directors of Utilities Committee, and Sea Level Rise Advisory Committee) frequently serve on state and federal advisory groups. On a regular basis, the participating localities request that the HRPDC staff serve as their representative to these advisory groups. Alternatively, the Committees may select a local government member to represent the region. In both cases, the HRPDC Committees provide all seventeen member localities with a mechanism to participate, at least indirectly, in the state or federal program(s). Also, data and information on Hampton Roads conditions are provided by the Hampton Roads representative (HRPDC or local government staff) to state and federal agencies on behalf of the localities, thus minimizing state and federal agency data collection and input costs. During FY 2014-2015, this program included regional participation on state panels addressing stormwater management, the Chesapeake Bay Program, and climate change.

The HRPDC staff works closely with state and federal agencies on coordination of programs as they affect the Hampton Roads region. This work involves follow-up to previous studies conducted by the HRPDC with VCZMP-funding, serving on advisory committees supporting plan and regulatory development, and development of new cooperative initiatives involving state, local, federal and private entities. In the past year, HRPDC staff served on several advisory groups, including the Stakeholder Advisory Group addressing stormwater management laws and the Governor's Climate Change and Resiliency Update Commission.

Virginia Coastal Zone Management Program

During the grant period, the HRPDC staff continued to participate in Coastal Zone PDC meetings, contributing to the ongoing refinement of the Virginia Coastal Zone Management Program. The HRPDC staff participated in Coastal Policy Team meetings on February 3, 2015 and September 29, 2015. HRPDC also attended two Coastal PDC meetings during the term of the grant in March 2015 (hosted by the Crater PDC) and August 2015 (hosted by the Accomack-Northampton PDC). HRPDC staff also participated in the 2014 Virginia Coastal Zone Management Program Coastal Partners Workshop on December 10 and 11, 2014, in the VCZMP's Section 312 Evaluation on May 13, 2015, and in discussions to plan the VCZMP's Section 309 strategies for 2016-2020.

The Coastal PDCs provide a network linking all regional agencies and localities in the Coastal Zone to address environmental issues. Although somewhat more limited in scope, similar networks exist among the Coastal PDCs and their non-coastal counterparts in the southern watersheds insofar as interstate environmental issues with the State of North Carolina are concerned, and with their counterparts throughout the Chesapeake Bay Watershed on Chesapeake Bay related issues. The HRPDC staff has played an integral role in the development and enhancement of these larger networks as well.

Efforts to coordinate activities with the other Coastal PDCs in all facets of environmental planning continued throughout the year. Representative activities in 2014 and 2015 focused on exchanging information among the PDCs on issues such as promoting native plants, planning for sea level rise, and the Chesapeake Bay TMDL.

Chesapeake Bay Program

The Hampton Roads Technical Assistance Program continues to support the HRPDC's participation, on behalf of its member localities, in the Chesapeake Bay Program. Beginning in FY 1998-1999, this element of the Program received greatly increased emphasis through several initiatives, including the renewal of the Chesapeake Bay Local Government Advisory Committee, establishment of a Metropolitan Areas Work Group, development of the Chesapeake Bay Agreement 2000 and development of new and revised Chesapeake Bay Program Implementation Strategies. The Commission's involvement with the Chesapeake Bay Program continued with the development of the Tributary Strategies and the Chesapeake Bay Watershed Model. Implementation of the Chesapeake Bay TMDL continues to be a major focus of HRPDC's environmental work.

In addition, both HRPDC and Hampton Roads local government staff maintain involvement on various federal and state advisory and regulatory committees. While this participation is often funded by other programs, the HRPDC provides a forum, through the Regional Environmental Committee, for those representatives to gather information and responses from other local governments in the region, and to convey information from these advisory groups back to the region.

SPECIAL PROJECTS AND TECHNICAL STUDIES

The HRPDC staff regularly coordinates with local and regional partners to identify timely and appropriate special projects or technical studies that address important regional issues. The HRPDC staff and regional advisory committees identify potential topics for special projects or technical studies during the grant application process, but often there are important issues that arise during the grant year, and this grant allows HRPDC staff to respond to those needs as they occur. Throughout the course of this grant, the HRPDC staff identified and completed work on three special projects. These projects were:

1) Assessment of Research Options for Analyzing the Economic Impacts of Sea Level Rise and Flooding on Hampton Roads Communities
2) Survey of Local Floodplain Management Programs

Since 2008, the HRPDC staff has completed several studies related to climate change and sea level rise. GIS analyses that identify which areas are likely to be affected by sea level rise and flooding and estimate the quantity and value of resources at risk are important tools for decision makers. Understanding the potential economic impacts of sea level rise

can help decision makers determine the relative costs and benefits of various adaptation strategies. However, the utility economic analyses can vary greatly depending on data availability and quality, assumptions, and methods. The HRPDC staff, which includes two staff economists, undertook an assessment of different analysis options to begin developing a strategic plan for future research on these impacts. This assessment covers four different types of analysis:

1) Direct Damage Estimation
2) Property Value Analysis
3) Economic Impacts from Adaptation
4) Economic Drag Created by Sea Level Rise

Each section includes a description of the analysis, a list of data requirements, potential uses, an assessment of the quality of the results, an estimate of the time and effort required to conduct the analysis, and a summary of the positive and negative arguments for conducting the analysis. The assessment recommends that the HRPDC staff continue with the direct damage estimation analysis and assess the availability of data for the property value analysis. The assessment is included in Appendix B.

In 2005 and 2006, the HRPDC published pamphlets summarizing local government efforts to develop and adopt new ordinances in accordance with the Chesapeake Bay Preservation Act. These pamphlets provided basic information and a table summarizing several key ordinance components (such as definitions of Resources Protection Areas and Resource Management Areas and how appeals are handled), which made it simple for local planners to compare each community's choices. In recent years, local floodplain management ordinances have been the subject of much discussion as a result of new federal regulations and the development of new Flood Insurance Rate Maps for much of the region. To provide a baseline summary for regional discussions, the HRPDC staff developed a pamphlet summarizing these ordinances and some key terms within them, with a focus on those ordinance elements that are to some extent left to the discretion each locality. The summary table in this pamphlet includes information such as the location of each community's ordinance, the program administrator, freeboard requirements, whether or not the locality includes the Limit of Moderate Wave Action (LiMWA) in the ordinance, and whether or not the locality participates in the Community Rating System. The pamphlet is included in Appendix C.

LOCAL ASSISTANCE AND COORDINATION

Technical Assistance

This element of the Hampton Roads Technical Assistance Program entails staff support and assistance to local governments and private entities as they address key coastal resources and other environmental issues such as TMDLs, habitat restoration, riparian buffer creation and protection, energy, climate change, aspects of the Chesapeake Bay Program, wetlands and dune protection, and nonpoint source pollution in their comprehensive planning process and related activities. Specific local projects or issues to be addressed through this element are identified by the localities throughout the grant year. These requests encompass assistance on grant proposals, assistance on permit issues, identification of state or federal agencies that may be of assistance for local projects, information about legislation or regulations, identification of technical resources that may be useful to a locality in developing a study, and responding to an elected official's request for information. The localities and others frequently turn to the HRPDC for assistance on GIS mapping and analysis projects. Through this element of the program, the HRPDC staff also assists private or non-profit entities, such as the Back Bay Restoration Foundation, Elizabeth River Project, Friends of Powhatan Creek, Hoffler Creek Wildlife Foundation, Lynnhaven River NOW, and others in their environmental planning and restoration initiatives. Aerial photographs and additional technical information on wetlands, hazardous waste sites, and soils are provided to private consultants upon request. A specific example of local technical assistance is the support the HRPDC staff provided for the Dutch Dialogues workshop held in Norfolk from June 19-23. Prior to the workshop the HRPDC staff collected and organized GIS data that would be of use to workshop participants, and during the workshop the HRPDC produced over a dozen thematic maps illustrating elevation, land cover, soil data, and other information. A list of these maps and representative samples are included in Appendix D.

The HRPDC staff continued to work with representatives of the affected local governments in their review, evaluation, and use of recent PDC environmental management reports. The focus of this effort has been on the review and use of the region’s green infrastructure plan, regional climate change research and analysis, and various stormwater and water resource management studies. Discussions have also taken place regarding the need for additional data, such as regional land use/land cover, elevation, and subsidence trends, to be collected for use in various technical analyses.

The HRPDC staff continued to advise the region's seventeen localities on environmental issues in conjunction with development of and revisions to local comprehensive plans, development regulations, and related issues. The primary issues addressed through this program continue to be state and federal wetlands regulatory programs, stormwater management programs, groundwater issues, the Chesapeake Bay Program, and sea level rise/recurrent flooding. Most of the region’s member localities have received individual assistance through this program during the past year. An increasing emphasis of local government support on environmental issues has been in the legislative and regulatory

arena. During FY 2014 – 2015, the areas of emphasis included stormwater management, groundwater issues, the Chesapeake Bay TMDL, and sea level rise.

The HRPDC staff continued development and enhancement of the region's geographic information system (GIS). The HRPDC staff continued to work with the localities, other PDCs, and state agencies in both Virginia and North Carolina in coordination of GIS planning and implementation. With the HRPDC system now fully functional, a concerted effort is being made to take advantage of this technology in all HRPDC technical studies. GIS development activities have focused on support for ongoing grant-funded technical studies, comprehensive planning services, local government requests, and other ongoing HRPDC programs. A specific example is the organization and distribution of LiDAR data and derived products, such as sea level rise inundation layers, to individual local governments.

Regional Coordination Process

The Hampton Roads Technical Assistance Program enables the HRPDC to maintain a regional coordination process on environmental issues while also providing links to other ongoing regional environmental programs. Historically, this has been achieved through the Hampton Roads Joint Environmental Committee, which was comprised of the Chesapeake Bay Committee and the Regional Stormwater Management Committee. In August 2013, the Joint Environmental Committee voted to dissolve and adopt new by-laws as the Hampton Roads Regional Environmental Committee, which held its first meeting in September 2013. Through the Regional Environmental Committee, HRPDC staff support local governments in implementing legal requirements regulatory programs, such as the Chesapeake Bay Preservation Act, Chesapeake Bay TMDL, and Comprehensive Coastal Resource Management Plans. This process also helps the region by providing support for coastal resources management an environmental education.

During the course of the grant year, the HRPDC staff continued coordination of the ongoing consideration by the region's localities of various watershed issues. Because of issues associated with stormwater regulations and the Chesapeake Bay TMDL, the HRPDC staff and Committee continued to focus on them during the year. Sea level rise and flooding were also discussed several times during the course of the grant. The meetings usually include several main presentations by HRPDC staff, local committee members, or state agency representatives and often include discussion of potential project ideas or responses to regulatory developments. Each meeting also closes with an opportunity for regional and local staff to provide status reports or ask questions on issues relevant to the committee.

The following points summarize the activities of the Hampton Roads Regional Environmental Committee during the year.

- October 2, 2014 –The major focus of this meeting was a presentation by the HRPDC staff on a VCZMP-funded Section 309 project, "Land and Water Quality Preservation in Hampton Roads." The presentation included discussions on the project's policy and GIS analysis components. The meeting also included updates and briefings from

the HRPDC staff on the regional legislative agenda, sea level rise planning, VCZM program matters, and the regional stormwater program.

- November 6, 2014 –This meeting featured a presentation from Gary Foley of the U.S. Environmental Protection Agency's Office of Research and Development. The presentation highlighted the office's tools that can be used to better inform decision makers of system dynamics. The meeting also included a presentation from Shereen Hughes of Wetlands Watch on an effort to create a Chesapeake Bay Landscape Professional Certification. The meeting also included updates on the Chesapeake Bay Program, Phase III Watershed Implementation Plan, land water quality protection project, legislative agenda, native plants project, and coastal program.

- December 4, 2014 –This meeting featured a presentation from Chris Burkett of the Virginia Department of Game and Inland Fisheries on the next Virginia Wildlife Action Plan, which was currently in development. The meeting also included presentation and updates on impaired waters in Virginia, Chesapeake Bay TMDL implementation progress, the state of recycling in Hampton Roads, land subsidence, sea level rise, and the coastal program.

- January 8, 2015 –This meeting featured a presentation from Chris Moore of the Chesapeake Bay Foundation on an analysis calculating the economic benefits of cleaning up the Chesapeake Bay. The meeting also included a briefing from James Davis-Martin of the Department of Environmental Quality on a funding opportunity for collecting data on historic stormwater management BMPs. The meeting also included updates and briefings on sea level rise, the coastal program, nutrient trading regulations, and land subsidence.

- February 5, 2015 – This meeting featured a presentation from Russell Lotspeich of the U.S. Geological Survey on efforts by the USGS to improve the state's coastal tide gauge network through Hurricane Sandy supplemental funding. The meeting also included a presentation from Shannon Jarbeau and Mary-Carson Stiff of Wetlands Watch on a report describing Community Rating System credit localities can review for existing programs. The meeting also included briefings, updates, and discussions on nutrient trading regulations, environmental legislation, and the coastal program.

- March 5, 2015 – This meeting featured a presentation from Mark Bennett of the U.S. Geological Survey on the Chesapeake Bay Program's new Climate Change Workgroup. The meeting also included a presentation from Chris Thompson of the Virginia Department of Housing and Community Development on the National Disaster Resilience Competition, through which Virginia would be applying for funding to improve the resilience of qualifying communities in Hampton Roads. The meeting also included updates, briefings, and discussions on landscape professional certification, federal flood risk standards, the coastal program, nutrient trading regulations, and the status of state legislation.

- May 7, 2015 – This meeting featured a presentation on the Chesapeake Bay Program's expert panel on oyster practices. The meeting also included updates on the regional source water protection plan, the native plants project, the coastal program, sea level rise, and state legislation.

- June 4, 2015 – This meeting featured a presentation from Fran Geissler, Stormwater Director for James City County, on the county's use of regenerative stormwater conveyance projects to address water quality and flood mitigation needs. The meeting also included a presentation from Jeremy Sharp, Senior Planner for the City of Norfolk, on the city's zoning ordinance revision. The meeting also included updates, briefings, and discussions of proprietary stormwater management BMPs, the coastal program, and sea level rise.

- July 2, 2015 – This meeting featured a presentation from Ron Williams, Deputy City Manager for the City of Norfolk, on the city's RE:Invest project with the Rockefeller Foundation, which included developing strategies to address flooding and stormwater management in two areas of the city. The meeting also included a presentation from Dave Mergen from the Chesapeake Public Works Department on the final Waters of the U.S. rule from the U.S. EPA. Mr. Mergen also briefed the Committee on the potential fallout from the recent listing of the Northern Long-eared Bat as a threatened species. The meeting also included discussion of coastal resiliency grant proposals from ODU and VIMS and an update on the coastal program.

- August 6, 2015 – This meeting featured a presentation from Clay Bernick, Environment and Sustainability Administrator for the City of Virginia Beach on the city's Green Sea Blueway and Greenway Management Plan. The meeting also included a presentation from Ed Heide, City of Suffolk Public Works, on a stormwater BMP retrofit project. The meeting also included a briefing on a green infrastructure planning grant proposal from the HRPDC staff, a briefing on the outcomes from the Dutch Dialogues workshop held in Norfolk, and discussion of the regional stormwater program budget.

- September 3, 2015 –This meeting featured updates and briefings from the HRPDC staff on the askHRgreen program's annual report, the native plants project, sate land cover data development, and sea level rise.

Through the regional coordination process, the HRPDC works to ensure that local government planning and implementation activities in the areas of stormwater management, water supply and groundwater management, wastewater, Chesapeake Bay Preservation Act and Virginia Coastal Zone Management Program are coordinated and mutually supportive. The synergy inherent in this coordination process provides opportunities for local government innovation and enhancement of activities in each of these areas.

PUBLIC INFORMATION, EDUCATION AND TRAINING

An integral component of the Hampton Roads Technical Assistance Program is the provision of public information and education on environmental issues in the Hampton Roads region. Provision of public information and education was identified by the participating localities at the outset of the program in 1986 as a critical need that could be met cooperatively through the HRPDC. Since that time, the HRPDC staff has provided written communications and briefings to the Commission and a wide range of interest groups on environmental issues and has provided regular briefings to many of those groups. These efforts continued during the grant year.

To ensure that the members of the HRPDC are kept informed about the status of ongoing HRPDC environmental program activities and pending environmental issues that may affect the Hampton Roads region, the HRPDC staff routinely briefs the Commission on environmental issues of importance. During the year, briefings were given to the HRPDC on the following topics: the Chesapeake Bay TMDL, groundwater regulations, stormwater regulations, land subsidence, floodplain management regulations, sea level rise, solid waste management, and environmental education.

The HRPDC staff has provided briefings on regional environmental programs, environmental issues and state and federal regulations to a variety of groups. They include civic leagues, business and professional organizations, service clubs, schools and interest groups. The HRPDC staff has presented papers on related HRPDC technical studies and programs at several state, regional, and national conferences. A number of briefings were also provided to state agency Boards, Legislative Commissions, local government Planning Commissions, City Councils/County Boards, and Town Councils on regional environmental projects and issues.

During the grant period, HRPDC staff represented the region in several major panels and presentations on environmental issues. These include stormwater management, the Chesapeake Bay TMDL, groundwater, climate change and sea level rise, water supply, and pesticides. A number of these presentations addressed multiple programs. Programs and activities covered included water supply planning, green infrastructure, TMDL regulations, pollution prevention, the overall HRPDC water resources program, watershed modeling, wetlands regulations, regional environmental education initiatives, and the regional stormwater management program. These meetings and presentations included:

- Presentation at LIDAR Training Workshop at Old Dominion University, “Regional Efforts to Map Sea Level Rise Inundation” – December 12, 2014

- Presentation to Pruden Center Class (Suffolk), “What’s Planning Got To Do With Me?” – February 11, 2015

- Presentation at NOAA Roundtable for Virginia Congressional Staff on Supporting Virginia's Maritime Commerce , "Regional Planning for Sea Level Rise in Hampton Roads" – February 12, 2015

- Presentation to Hampton Roads GIS User Group, "Regional Efforts to Map Sea Level Rise Inundation" – February 13, 2015

- Presentation at NOAA Coastal GeoTools Conference 2015, "Planning for Sea Level Rise at the Local Level" – April 1, 2015

- Presentation at MATS UTC Blue and Green Infrastructure Workshop (with Sam Belfield, HRTPO), "Climate Change Impacts and Resiliency of Regional Roadway Infrastructure" – May 6, 2015

- Presentation to Joint Subcommittee to Formulate Recommendations to Address Recurrent Flooding, "Regional Planning for Sea Level Rise in Hampton Roads" – September 21, 2015

A copy of the presentation given at the Coastal GeoTools Conference on April 1, 2015 is included in Appendix E.

In August 2010, HRPDC replaced a quarterly newsletter with an online publication an e-mailed "HRPDC Weekly Update," which was distributed to nearly 4,000 individuals. In July 2011, the "HRPDC Weekly Update" was moved to a bi-weekly schedule and renamed the "Hampton Roads Update" and later renamed the "Hampton Roads e-Newsletter" in April 2012. The online publication was shifted to a list of news articles and reports from HRPDC staff directly accessible from the HRPDC website's homepage (www.hrpdcva.gov). To enhance the effectiveness of all HRPDC public information materials, HRPDC Special Reports on specific topics are also developed and distributed to supplement the regular newsletter. All newsletters and special reports are now distributed electronically. During this grant, HRPDC planning staff posted thirteen (13) entries related to coastal management issues. Examples of these articles are included in Appendix F.

The HRPDC staff has devoted considerable attention and effort over the past year to the continued refinement of the Commission's web page (www.hrpdcva.gov). The website contains copies of all newsletters, complete copies of HRPDC technical reports and an overview of Commission activities. All Commission and most committee meeting agenda materials are now posted and available on the HRPDC website. It contains an extensive section devoted to the HRPDC's regional planning and water resources programs, including links to a number of other federal, state, local, and private sector sites. Efforts to further enhance the website remain ongoing. A Commission Action Summary is posted after each meeting, and the meetings can be viewed on YouTube in their entirety.[2]

[2] https://www.youtube.com/user/HRPDC

Through the Regional Environmental Committee, HRPDC staff has provided, facilitated, or hosted training on a variety of topics to localities. HRPDC also subscribes to and hosts a series a webinars provided by the American Planning Association (APA) and American Institute of Certified Planners (AICP). These webinars cover a variety of planning issues and provide Certification Maintenance (CM) credits to AICP planners. The HRPDC also has continued to partner with Old Dominion University and Virginia Sea Grant to hold meetings of the Hampton Roads Sea Level Rise/Recurrent Flooding Adaptation Forum. These meetings often provide Continuing Education Credits (CECs) to Certified Floodplain Managers. HRPDC staff publicizes and coordinates these training webinars and opportunities. In total, these training opportunities provided local staff with up to 26.5 AICP Certification Maintenance credits and 28.0 CFM Continuing Education Credits. The specific training opportunities are listed below.

Educational and Training Opportunities Provided in FY14-15

Program Title	Content Provider	Date	Host	Credits
'You Said That?'	AICP	October 8, 2014	HRPDC	1.0 CM
Health Equity and Planning Ethics	AICP	November 5, 2014	HRPDC	1.5 CM Ethics
The Pro Forma	AICP	December 3, 2014	HRPDC	1.0 CM
LIDAR Training Workshop	VGIN/ODU/ Dewberry	December 12, 2014	Old Dominion University	
Safe Mobility Planning	AICP	January 21, 2015	HRPDC	1.5 CM
Storm Surge Modeling Tools for Planning and Response	HRPDC/ODU/ Virginia Sea Grant	January 23, 2015	Old Dominion University	4.0 CEC
Sustaining Places Through the Comprehensive Plan	AICP	February 18, 2015	HRPDC	1.5 CM
Big Chance Lecture	AICP	May 13, 2015	HRPDC	1.0 CM
Coastal Inundation Mapping	NOAA	May 13-14, 2015	Old Dominion University	16.0 CM 16.0 CEC
Megaprojects – Protective Structures for Hampton Roads	HRPDC/ODU/ Virginia Sea Grant	May 22, 2015	Old Dominion University	4.0 CEC
The Planning Office of the Future	AICP	June 3, 2015	HRPDC	1.5 CM
2015 Planning Law Review	AICP	July 1, 2015	HRPDC	1.5 CM Law
Communicating Frequent Flooding	HRPDC/ODU/ Virginia Sea Grant	July 24, 2015	Old Dominion University	4.0 CEC

CZM SUCCESS STORY: PLANNING FOR SEA LEVEL RISE IN HAMPTON ROADS

In October 2008, the HRPDC was awarded the first of four grants by the Virginia CZM Program to study the impacts of climate change on the Hampton Roads region and identify potential responses to those impacts (FY '08 Task 12.03). Additional grants were awarded in October 2009 (FY '09 Task 12.04), October 2010 (FY '10 Task 12.04), and October 2011 (FY '11 Task 51). This effort required considerable research and analysis, and resulted in four separate reports which are now available on the HRPDC's website. These reports included the results of significant GIS analyses and mapping efforts, and have formed part of the basis for an ongoing regional discussion of how local governments in Hampton Roads should respond to climate change impacts, particularly sea level rise, which was early on identified as one of the greatest concerns for this region. One of the most useful components of this effort has been the development of a set of maps showing the potential inundation impacts of various sea level rise scenarios; the latest published version of these maps was included in the HRPDC's July 2013 Coastal Resiliency Final Report, and new maps are currently in development. These new maps are based on LiDAR data that was acquired in a partnership between the HRPDC, the U.S. Geological Survey, the National Geospatial-Intelligence Agency, the Hampton Roads Sanitation District, Old Dominion University, and the Virginia Geographic Information Network.

Building on this work, the HRPDC has in the last year begun establishing a regional program to address sea level rise on a continual basis. The primary activity to date has been discussions on a work program and prioritization of tasks. In addition, the HRPDC has continued to partner with the U.S. Geological Survey to better understand the scale and extent of subsidence in the region, particularly as it relates to groundwater withdrawals and sea level rise. The USGS is currently developing recommendations on monitoring for the HRPDC and other stakeholders to consider.

CONCLUSIONS

Through the Hampton Roads Technical Assistance Program, the HRPDC has provided technical assistance to its member local governments and others; has delivered public information and education to the citizens and government officials of the region; has conducted important technical studies; and has coordinated a regional approach to participation in state and federal environmental programs, while also providing cost-effective support to the Virginia Coastal Zone Management Program.

The Hampton Roads Technical Assistance Program conducted through the VCZMP is a cost-effective solution to the need for environmental cooperation and coordination in the Hampton Roads region of 3,000 square miles and 1.7 million residents. It provides a vehicle for the ten cities, six counties, eleven towns, and a number of state and federal agencies and others to exchange information and develop coordinated approaches to environmental management issues, while concurrently providing technical support for routine local

government planning and management activities. Based on state and federal legislative and executive branch responses to comments and recommendations developed through this process, it is an effective means for the region's localities to communicate their views on environmental issues. It also provides a cost-effective means of ensuring that this region can participate in and support important environmental initiatives of the Commonwealth, such as the Virginia Coastal Zone Management Program and the Chesapeake Bay Program. It also appears to be a cost-effective mechanism for the Virginia Coastal Zone Management Program and related state environmental programs to use in communicating with and soliciting input from local government. Over the years, funding from the VCZMP through the Hampton Roads Technical Assistance Program has provided the region with the seed to establish a number of new regional programs in the areas of water supply planning and coordination, watershed management, stormwater management and environmental education. The HRPDC and its member local governments continue to believe that the Hampton Roads Technical Assistance Program is an extremely valuable and cost-effective approach to environmental planning and management in the Hampton Roads region.

APPENDIX A:
LISTING OF ENVIRONMENTAL IMPACT REVIEWS, PROPOSAL REVIEWS, AND REPRESENTATIVE COMMENT LETTERS

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2014 – 2015 Environmental Impact Reviews

Received	DEQ #	Name	Sponsor	Affected Localities	Sent
9/2/2014	14-141S	Basketball Practice Facility, 43rd Street and Monarch Way	Old Dominion University	Norfolk	10/2/2014
9/5/2014	14-150S	CNU Regattas Dining Center	Christopher Newport University	Newport News	10/15/2014
9/5/2014	14-151S	CNU James River Hall	Christopher Newport University	Newport News	10/15/2014
9/11/2014	14-154F	Eagle Harbor West Apartments	U.S. Department of Housing and Urban Development	Isle of Wight	10/15/2014
9/17/2014	14-158F	Taxiway Rehabilitation, Suffolk Executive Airport	USDOT/Federal Aviation Administration	Suffolk	10/27/2014
9/22/2014	14-161F	Western Branch Dam Safety Improvements	DOD/Army/Army Corps of Engineers	Suffolk; Norfolk	11/6/2014
10/8/2014	14-165F	Dominion Terminal Associates, LLC Berth and Approach Deepening	DOD/Dept. of the Army/Army Corps of Engineers	Newport News	11/6/2014
10/8/2014	14-166F	Southern Pines Apartments	U.S. Department of Housing and Urban Development	Virginia Beach	11/6/2014
10/24/2014	14-173F	Tylers Beach Federal Navigation Project	DOD/Dept. of the Army/Army Corps of Engineers	Isle of Wight; James City County	12/1/2014
10/31/2014	14-177F	York River Pump House Demolition	DHS/U.S. Coast Guard	York County	12/1/2014
11/20/2014	14-185S	Zable Stadium Improvements	College of William and Mary	Williamsburg	1/7/2015
11/24/2014	14-189F	Alicia Drive Project	DOD/Dept. of the Army/Army Corps of Engineers	Virginia Beach	1/7/2015
11/25/2014	14-190F	Route 337 Widening Project	DOD/Dept. of the Army/Army Corps of Engineers	Chesapeake; Suffolk	1/7/2015
12/5/2014	14-193F	Virginia Offshore Wind Technology Advancement Project on the Atlantic Outer Continental Shelf	DOI/Bureau of Ocean Energy Management	Virginia Beach	
1/6/2015	15-001F	Freeman Drive Apartments	U.S. Department of Housing and Urban Development	Hampton	2/25/2015
1/21/2015	15-010F	Installation and Operation of Three Stand-Alone Buoy- or Seabed-Mounted Metocean Measurement Systems	DOI/Bureau of Ocean Energy Management	HRPDC	2/25/2015

1/26/2015	15-011F	Modification to the Marketplace at Tech Center	DOD/Dept. of the Army/Army Corps of Engineers	Newport News	3/2/2015
1/26/2015	15-013F	Baker II Apartments	U.S. Department of Housing and Urban Development	Virginia Beach	2/25/2015
1/30/2015	15-015S	Norfolk International Terminals - North Gate Expansion Project	Virginia Port Authority	Norfolk	2/27/2015
2/3/2015	15-018F	NOAA Restoration Center	DOC/NOAA/National Marine Fisheries Service	HRPDC	2/25/2015
2/6/2015	15-024F	The Choices at Holland Windsor, Virginia Beach	U.S. Department of Housing & Urban Development	Virginia Beach	2/25/2015
3/3/2015	15-032F	Seagate Handling Facility, Chesapeake	DOD/Dept. of the Army/Army Corps of Engineers	Chesapeake	4/16/2015
3/6/2015	15-034F	Shipps Corner Roadway Improvements	U.S. DOD/Dept. of the Army/Army Corps of Engineers	Virginia Beach	4/13/2015
3/6/2015	15-035F	Bellwood Cay	DOD/Dept. of the Army/Army Corps of Engineers	Virginia Beach	4/13/2015
3/20/2015	15-038F	Todd Lied Pier	DOD/Dept. of the Army/Army Corps of Engineers	Hampton	4/13/2015
3/12/2015	15-040S	Smithfield AHQ Chemical Storage Facility	Virginia Department of Transportation	Isle of Wight	4/14/2015
3/12/2015	15-041S	Franklin AHQ Office Building	Virginia Department of Transportation	Southampton County	4/13/2015
3/19/2015	15-044S	Virginia International Gateway Construction - Container and Intermodal Yard Expansion	Virginia Port Authority	Portsmouth	5/1/2015
3/20/2015	15-046F	Tranquility at the Lakes Senior Housing Project	U.S. Department of Housing and Urban Development	Virginia Beach	4/16/2015
3/23/2015	15-047F	Virginia Beach Transit Extension Study	USDOT/Federal Transit Administration	Virginia Beach	
4/23/2015	15-068F	Menchville Marina Boat Slip Dredging Project	DOD/Dept. of the Army/Army Corps of Engineers	Newport News	6/16/2015
5/11/2015	15-078F	Harbour Point SSD Dredging Project	DOD/Dept. of the Army/Army Corps of Engineers	Virginia Beach	6/16/2015
5/11/2015	15-079F	Shadowlawn SSD Dredging Project	DOD/Dept. of the Army/Army Corps of Engineers	Virginia Beach	6/16/2015

6/1/2015	15-086F	Nimmo's Quay East and West	DOD/Dept. of the Army/Army Corps of Engineers	Virginia Beach	
6/9/2015	15-090F	Hillcrest Parkway, Chesapeake	DOD/Dept. of the Army/Army Corps of Engineers	Chesapeake	7/15/2015
6/11/2015	15-093F	I-564 Intermodal Connector Project	DOD/Dept. of the Army/Army Corps of Engineers	Norfolk	7/20/2015
6/15/2015	15-098F	Replacement Small Arms Range at USCG Training Center Yorktown	DHS/U.S. Coast Guard	York County	7/15/2015
7/10/2015	15-115F	Church Street Station Studios	U.S. Housing & Urban Development	Norfolk	9/25/2015
7/27/2015	15-121F	Fire Station #10 and Logistics Support Center	DOD/Dept. of the Army/Army Corps of Engineers	Chesapeake	9/4/2015
8/3/2015	15-125F	Kroger at Grassfield	DOD/Dept. of the Army/Army Corps of Engineers	Chesapeake	9/4/2015
8/3/2015	15-126F	Colonna Shipyard - Pescara Creek Dredging	DOD/Dept. of the Army/Army Corps of Engineers	Norfolk	9/4/2015
8/5/2015	15-128F	Managing Livestock Predation by Coyotes, Dogs, and Red Foxes in the Commonwealth of Virginia	USDA/Animal & Plant Health Inspection Service/Wild	HRPDC	9/4/2015
8/19/2015	15-131F	Colonna Shipyard - Spotico Creek - Drydock #3	DOD/Dept. of the Army/Army Corps of Engineers	Norfolk	9/25/2015
8/25/2015	15-136F	Water Level Monitoring Pier on Brick Kiln Creek	DOI/U.S. Geological Survey	Hampton	9/28/2015
8/31/2015	15-139F	Commonwealth at Heritage	U.S. Dept. of Housing and Urban Development	York County	9/25/2015

2014 – 2015 Proposal Reviews

Date	Number	Title	Applicant	Program	Impact
1/6/2015	VA151229-1123xxx	Chesapeake Bay Journal Publishing	Chesapeake Media Service, Inc.	EPA	Statewide
1/6/2015	VA151210-1023760	VADEQ Implementing Sustainable Shoreline Management in Virginia: Assessing the Need for an Enforceable Policy	Virginia Dept. of Environmental Quality	NOAA - CZM	Coastal Zone
4/27/2015	VA150310-1223760	FY2015 Section 319(h) Nonpoint Source Implementation Grant application	Virginia Dept. of Environmental Quality	EPA	Statewide
4/27/2015	VA150325-1323760	FY2015 State Revolving Loan Funds Capitalization Application	Virginia Dept. of Environmental Quality	EPA	Statewide
6/30/2015	VA150508-1523760	FY2016 – FY2020 Chesapeake Bay Monitoring Program	Virginia Dept. of Environmental Quality	Chesapeake Bay Program	Chesapeake Bay Watershed
7/6/2015	VA15-0508-1423760	30th Year VA CZM Implementation	Virginia Dept. of Environmental Quality	NOAA Coastal Zone	Coastal Zone
7/17/2015	VA160714-0123740	Restoring Resilience in Elizabeth River Using Living Shorelines	The Elizabeth River Project	NOAA	Norfolk

February 25, 2015

Ms. Janine L. Howard
Virginia Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, VA 23219

RE: DEQ#15-001F, Freeman Drive Apartments
(ENV:GEN)

Dear Ms. Howard,

Pursuant to your request, the staff of the Hampton Roads Planning District Commission has reviewed the Federal Consistency Determination for the following project, Freeman Drive Apartments, in the City of Hampton. We have consulted with local staff regarding this project.

Based on this review, the proposal appears to be consistent with local and regional plans and policies, as long as it complies with all applicable local codes and ordinances. However, while the consistency determination states that the project is "consistent to the maximum extent practicable" with the Virginia Coastal Zone Management Program's advisory policies, it is unclear from the determination how the project is consistent with the Coastal Natural Hazard Areas advisory policy. As stated on the Department of Environmental Quality's website, the Coastal Natural Hazard Areas Advisory Policy "covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm-related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion." Flood plains are specifically identified as areas of concern under this advisory policy. This advisory policy is relevant to this project for three reasons:

1) Although the consistency determination references the effective Flood Insurance Rate Maps (FIRMs) for the area, preliminary maps have been issued for the City of Hampton that will significantly alter the project site's flood hazard area designations (see Attachment). Specifically, the effective maps designate only the southern and eastern portions of the property as within Zone AE (an area with a one percent annual chance of flooding) and most of the remainder as within the 0.2% annual chance

flood hazard area; a small portion is located outside of either of these floodplains. However, the preliminary maps designate most of the site as within Zone AE and a small section within the 0.2% annual chance flood hazard area. The consistency determination does not indicate whether or not the project has been designed to account for this change, which may have a significant effect on both residents and the apartments themselves.

2) In addition to the expected change in the floodplain designation, the Obama Administration recently released Executive Order 13690, which establishes a Federal Flood Risk Management Standard and amends Executive Order 11988 ("Floodplain Management") by, among other things, changing the manner for establishing floodplains for purposes of federal agencies. The new requirement requires one of four methods to be used:

   i. A climate-informed science approach that integrates current and future changes in flooding
   ii. The addition of a two-foot freeboard to the existing base flood elevation for non-critical actions or a three-foot freeboard for critical actions
   iii. The 0.2 percent annual chance flood hazard area
   iv. Any other method identified in an update to the Federal Flood Risk Management Standard

   Neither the consistency determination nor the provided site plans appear to account for this change in federal policy; therefore, it is unclear whether the federal component of this project meets the new Federal Flood Risk Management Standard.

3) On September 10, 2014, the City of Hampton amended its floodplain management requirements (as found in Article V of Chapter 17.3 of the City's Zoning Ordinance). Relevant changes to this project include the addition of the 0.2 percent annual chance flood hazard area to the City's designated floodplain districts and official zoning map and the increase of the freeboard requirement to three (3) feet in Special Flood Hazard Areas and one and one-half (1.5) feet in 0.2 percent annual chance flood hazard areas. It is unclear from the consistency determination whether or not this requirement has been addressed.

We appreciate the opportunity to review this project. If you have any questions, please do not hesitate to call.

Sincerely,

Randy R. Keaton
Interim Executive Director

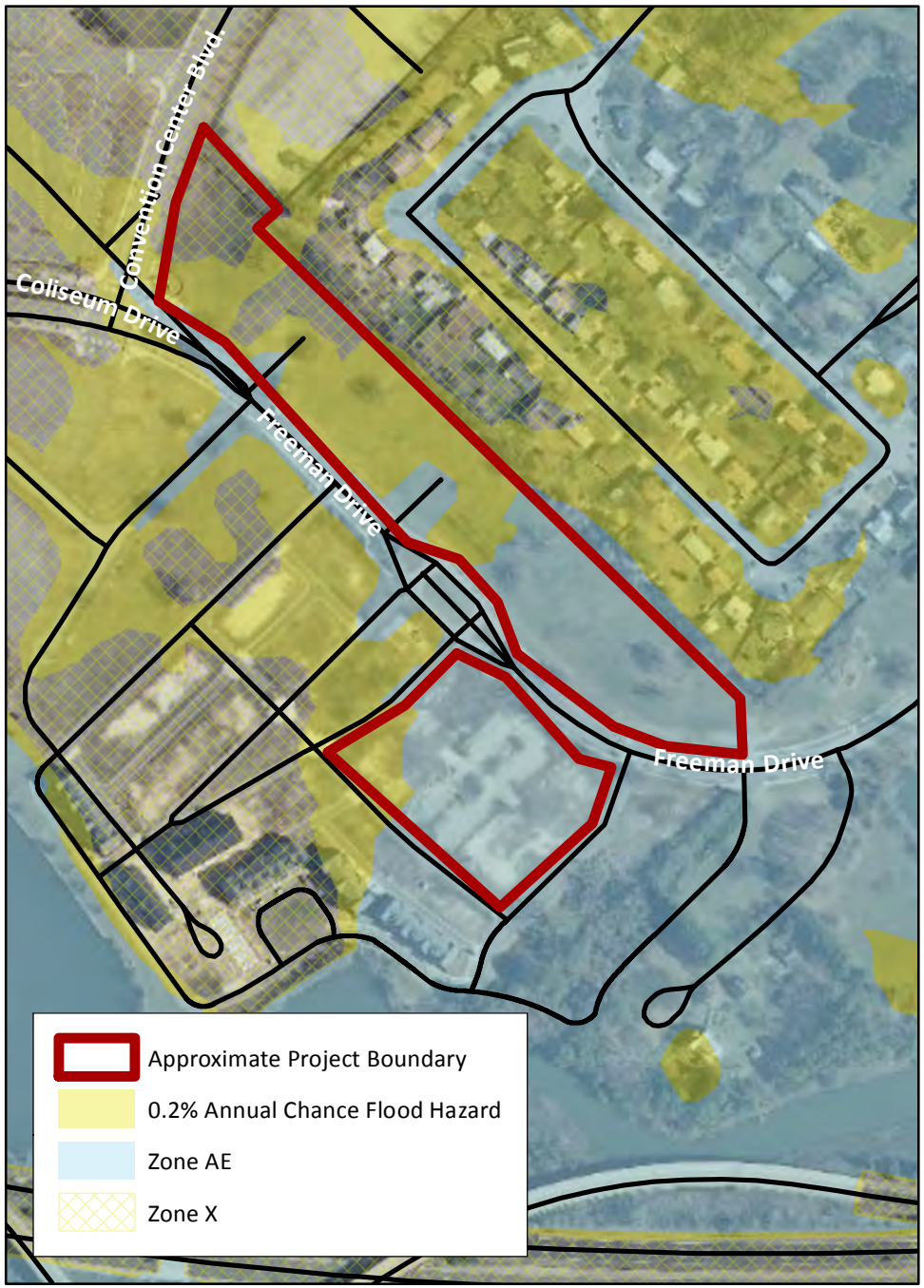
BJM/jc

Attachment

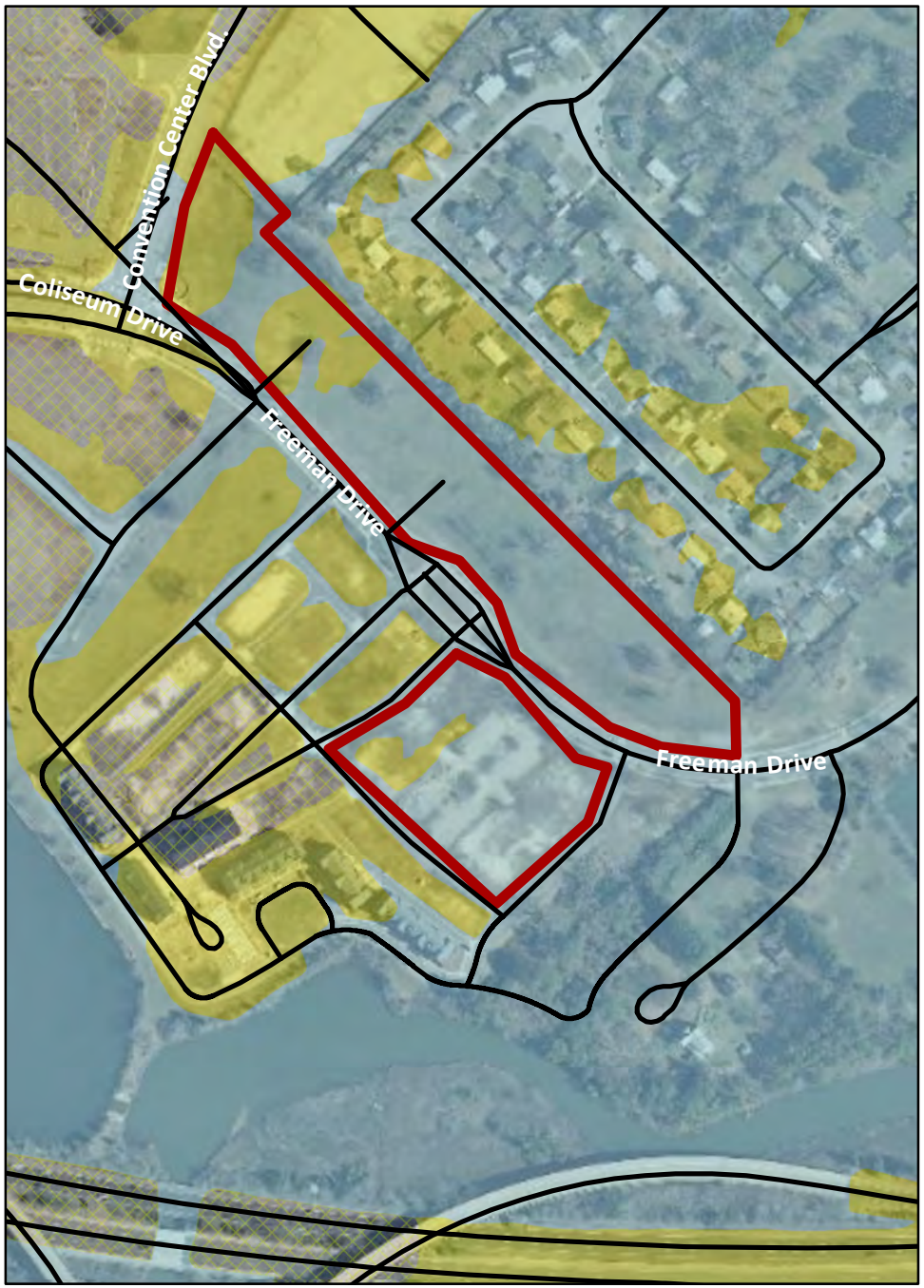
Copy: Gayle Hicks, HA
David Stromberg, HA

Attachment: Comparison of Effective and Preliminary Flood Insurance Rate Maps

Effective Floodplain Designations for Freeman Drive Apartments Site



Preliminary Floodplain Designations for Freeman Drive Apartments Site



Data Sources: Federal Emergency Management Agency, Virginia Geographic Information Network

Prepared by the Staff of the Hampton Roads Planning District Commission

Ben McFarlane

From: Ben McFarlane
Sent: Monday, April 13, 2015 5:55 PM
To: Fisher, John (DEQ) (John.Fisher@deq.virginia.gov)
Cc: Randy Keaton; Jennifer Coleman; Bernick, Clay
Subject: DEQ#15-035F - Bellwood Cay

Mr. Fisher,

The HRPDC staff has reviewed the federal consistency determination for this project (DEQ#15-035F – Bellwood Cay) and consulted with city staff. The proposal appears to be consistent with local and regional plans and policies, as long as it complies with all relevant city ordinance requirements. In addition to those policies included in the consistency determination (stormwater, erosion and sediment control, and coastal lands management), we note that project will also have to comply with the city's site planning ordinance, subdivision ordinance, floodplain ordinance, and Southern Rivers Watershed Management Ordinance, which applies to development in the non-Chesapeake Bay watershed portion of the city.

We appreciate the opportunity to review this project. If you have any questions, please let me know.

Benjamin J. McFarlane, AICP
Senior Regional Planner
Hampton Roads Planning District Commission
723 Woodlake Drive
Chesapeake, VA 23320
Phone: 757-420-8300 | Fax: 757-420-9300

Ben McFarlane

From: Ben McFarlane
Sent: Monday, April 13, 2015 5:08 PM
To: Fisher, John (DEQ) (John.Fisher@deq.virginia.gov)
Cc: Randy Keaton; Jennifer Coleman; Stromberg, David
Subject: DEQ#15-038F - Todd Lied Pier

Mr. Fisher,

The HRPDC staff has reviewed the federal consistency determination for this project (DEQ#15-038F – Todd Lied Pier). The proposal appears to be consistent with local and regional plans and policies. However, Section II.3.i incorrectly states that the landward start of the pier is not within the Resource Protection Area (RPA). By definition, the RPA includes areas between mean low water and mean high water. Therefore, the pier will be located at least partially inside the RPA. However, the pier is a water-dependent use and is therefore permitted within the RPA.

We appreciate the opportunity to review this project. If you have any questions, please let me know.

Benjamin J. McFarlane, AICP
Senior Regional Planner
Hampton Roads Planning District Commission
723 Woodlake Drive
Chesapeake, VA 23320
Phone: 757-420-8300 | Fax: 757-420-9300

Ben McFarlane

From: Ben McFarlane
Sent: Monday, April 13, 2015 5:38 PM
To: julia.wellman@deq.virginia.gov
Cc: Randy Keaton; Jennifer Coleman; Goodwin, Donald; Lewis, Beth
Subject: DEQ#15-041S

Ms. Wellman,

The HRPDC staff has reviewed the environmental impact report for this project (DEQ#15-041S – Franklin AHQ Office Building) and consulted with county staff. The proposal appears to be consistent with local and regional plans and policies. County staff has identified a possible traffic issue in August that may conflict with VDOT's construction schedule. We recommend that VDOT coordinate with Southampton County to address this issue directly.

We appreciate the opportunity to review this project. If you have any questions, please let me know.

Benjamin J. McFarlane, AICP
Senior Regional Planner
Hampton Roads Planning District Commission
723 Woodlake Drive
Chesapeake, VA 23320
Phone: 757-420-8300 | Fax: 757-420-9300

Ben McFarlane

From: Ben McFarlane
Sent: Friday, May 01, 2015 3:17 PM
To: Howard, Janine (DEQ) (Janine.Howard@deq.virginia.gov)
Cc: Randy Keaton; Jennifer Coleman; Brusso, Fred
Subject: DEQ#15-044S - Virginia International Gateway Construction - Container and Intermodal Yard Expansion

Ms. Howard,

The HRPDC staff has reviewed the federal consistency determination for this project (DEQ#15-044S – Virginia International Gateway Construction - Container and Intermodal Yard Expansion) and consulted with city staff. The proposal appears to be consistent with local and regional plans and policies, as long as it complies with all relevant city ordinance requirements, including stormwater management, erosion and sediment control, floodplain management, and Chesapeake Bay Preservation Act. We suggest that the Virginia Port Authority coordinate with the city directly to ensure that all necessary requirements are addressed.

We appreciate the opportunity to review this project. If you have any questions, please let me know.

Benjamin J. McFarlane, AICP
Senior Regional Planner
Hampton Roads Planning District Commission
723 Woodlake Drive
Chesapeake, VA 23320
Phone: 757-420-8300 | Fax: 757-420-9300

Ben McFarlane

From: Ben McFarlane
Sent: Thursday, April 16, 2015 12:11 PM
To: Howard, Janine (DEQ) (Janine.Howard@deq.virginia.gov)
Cc: Randy Keaton; Jennifer Coleman; Bernick, Clay
Subject: DEQ#15-046F - Tranquility at the Lakes Senior Housing Project

Ms. Howard,

The HRPDC staff has reviewed the federal consistency determination for this project (DEQ#15-046F – Tranquility at the Lakes Senior Housing Project) and consulted with city staff. The proposal appears to be consistent with local and regional plans and policies, as long as it complies with all relevant city ordinance requirements, including zoning, site planning, stormwater management, erosion and sediment control, and Chesapeake Bay Preservation Act. We suggest coordinating with the city directly to ensure that all necessary requirements are addressed.

We appreciate the opportunity to review this project. If you have any questions, please let me know.

Benjamin J. McFarlane, AICP
Senior Regional Planner
Hampton Roads Planning District Commission
723 Woodlake Drive
Chesapeake, VA 23320
Phone: 757-420-8300 | Fax: 757-420-9300

APPENDIX B:
ASSESSMENT OF RESEARCH OPTIONS FOR ANALYZING THE ECONOMIC IMPACTS OF SEA LEVEL RISE AND FLOODING ON HAMPTON ROADS COMMUNITIES

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Economic Impact of Sea Level Rise

Purpose: To evaluate options for an HRPDC study of economic impacts related to sea level rise.

1 Introduction

Measures of economic costs and benefits play an important role in public policy evaluation and adaptation resource allocation in response to sea level rise. A well done economic analysis can provide an organized and transparent assessment of potential damage to localities and the region as a whole, and assist in determining what stakeholders might be impacted by those costs.

A number of methodological and practical challenges have hindered the uptake of economic tools to support sea level rise adaptation assessments. Economic analysis of adaptation measures requires information on impacts, both physical and economic, that are distributed unevenly across time, location, and systems, and can potentially be non-marginal (such as the devastation many communities experienced in the wake of Hurricanes Katrina and Sandy) (Li, Mullan, and Helgeson 2014).

The Direct Damage Estimation Analysis for this region should be conducted, both because of the straightforward nature of the analysis, and because of the strength of the results. Additionally, the other analysis techniques would require the completion of such an analysis before they may be conducted. It should also be noted that estimating the Economic Drag Created by Sea Level Rise (also called a full damage estimate) would be extremely sensitive to the assumption used, and thus the results of even a rigorous analysis in this vein would be highly speculative.

Damage forecasts conducted by other agencies appears in the appendix of this document, and both categories the type of analysis featured in this forecast and asses the quality/strength of the final estimates produced.

2 Direct Damage Estimation Analysis

2.1 Description

The goal of this analysis would be to characterize the existing baseline potential damages associated with storm surge flooding, as well as characterizing the storm surge property damage associated with SLR.

The total impact of flooding (i.e., damage) in a community depends on the depth of the floodwater and the type and number of assets exposed to flooding. Defining assets at risk and assessing the cost of impact is a non-trivial exercise as there are many types of assets, each of which can differ as to their vulnerability. The most readily quantifiable assets included: residential, commercial and public properties. Further estimates might be made as to the at-risk contents of these properties, value of regional agricultural crops, and personal property that might be lost.

2.2 Data Requirements

Estimates of elevations throughout the geography of interest, which have already been produced for the Hampton Roads region from the LIDAR Data set

Avoiding the complications of judging different scenarios of SLR, the Hampton Roads PDC would use static measures of SLR (1 foot, 2 foot, 3 foot) coupled with storm surge of a 10-year and 100-year storm to develop inundation maps.

Graphical information system (GIS) data on assets-at-risk within the region, including:

- Parcel Type (Residential, Commercial, Industrial, Public, Agricultural)
- Building Type
- Assessed Value of Land and Buildings
- Adaptations on site including sea walls
- Placement of building within the parcel
- LIDAR data for elevations throughout the region
- First floor elevations

2.3 Potential Uses

To develop an estimate of the property damage under a variety of likely scenarios within the region, which would help to inform the level of adaptation that both government agencies and private property owners would consider.

2.4 Quality of Results

This analysis produces tangible results in terms of property values impacted by flooding/storm surge. Significant soft and indirect costs would be omitted from this analysis, potentially biasing this analysis resulting in cost estimates below. The final result would give a reliable order of magnitude for the potential property damage/loss from both storm surge and from recurrent flooding.

2.5 Length of Time for Analysis

This analysis would take approximately 160 hours, in addition to the efforts already in progress to improving the GIS modeling for the region using the recent LIDAR data .

2.6 Pros

- Straightforward analysis, focusing specifically on damage to buildings and property lost to recurrent flooding
- Coincides with work already in progress within the HRPDC to improve inundation mapping for the region

2.7 Cons

- Omits many of the direct costs a region would experience as a result of significant storm surge (infrastructure repair, overtime for emergcy personnel, debris removal, etc.). These costs may total as much as 50% to 75% of the property damage developed in the analysis.[1]
- Does not examine any distributional impacts that may result from SLR, including impacts specific to particular industries, social economic groups, or the resilience of particular neighborhoods within the region.
- Does not examine any potential economic drag that will be experienced as a result of lost employment, population, and/or capital investment.

3 Property Value Analysis

3.1 Description

While property damage is one cost of sea level rise, another result of the risk of flooding and storm surge results from lower home values. Decreases in real estate transactions and prices have been tied to increases in the cost of flood insurance by several news sources.[2]

This impact is important because of the role property values play in both individual wealth and on locality revenues, and thus developing accurate evaluations of this effect would be a useful for policy makers. One interesting result of previous research, is that the decrease in market value from living in a floodplain tends to be smaller than what a pure financial analysis would suggest. This effect persists until significant flooding within the floodplain. Once this happens, the price of housing quickly adjusts to the level that is more consistent with the Net Present Value cost of flood insurance.

[1] Gaddis et al. 2007, P208
[2] Appelgate 2014

This suggests that home owners do not appropriately evaluate the risk of flooding until an area has recently experienced a flooding event.

This analysis would use repeated sales of properties both within and outside of the floodplain to assess the effect of flood insurance on home price values. An additional part of this effort would be to measure the extent which home prices had fully accounted for the risk of flooding, and what potential impact would develop if behavior changes as result of flooding.

Additionally, this research would need to examine the differences in impact that may result from recurrent flooding versus a singular significant flood. These might have very different impacts on the impact on property values, as well as the permanence of any changes in behavior that resulted from a flooding event.

3.2 Data Requirements

The first key information requirement would be a complete data set of home transactions for the region over a significant period of time. This data set would need to include many identifying features of the properties, including number of bedrooms/bathrooms, square footage, school district, lot size, and construction materials.

Additional information would be required when looking at parcels that are waterfront/waterview, as they require a more detailed model to analyze the effects of sea level rise/flood risk on property values.

High quality information on flood insurance rates throughout the region would be required to analyze the extent that flood insurance rates have been fully incorporated into market prices. Areas where flood claims have occurred during the first data set would be another useful data point for analyzing how prices have incorporated flood insurance rates on either side of a flooding event.

3.3 Potential Uses

This information would answer an ongoing question about the impact that increasing flood insurance rates will have on regional property values. Additionally, this research would estimate the decrease in value of those properties that might occur after a major storm surge event, which would equate to potential savings from adaptation.

3.4 Quality of Results

These results would be very reliable assuming that full data sets are obtainable for both real estate transactions and flood insurance.

3.5 Length of Time for Analysis

This analysis would be extremely time intensive because of several issues

- Data collection would require reaching out to several different sources, including REIN (the region's multiple listing service), each city and counties assessor's offices/GIS, and several sources to determine accurate information on the extent/depth of flooding in the region.
- Data cleaning and matching would be time intensive
- Significant effort would be needed with GIS to create information for waterfront and waterview properties
- The regression analysis would be intensive

As a result, this analysis may require almost 960 hours to complete.

3.6 Pros

- A topic of interest for both real estate professionals and planners in the region
- This analysis has not been done for a significant metropolitan region, and thus might be useful to advocate for federal funds for adaptation.
- This information is important for policy makers, both in planning for adaptation and recovery after a significant flooding event.
- Estimates the projected change in revenue for localities.

3.7 Cons

- Extremely data intensive, and without large, complete data sets, this analysis will not be possible
- Labor intensive (and possibly computing intensive) analysis. This has not been done at a metropolitan area scale. A possible remedy issue would be to conduct analysis for a single school district in three or four of the localities within the region, to test the methodology and quantify the value added by this analysis.

4 Economic Impact from Adaptation

4.1 Description

Adaptation actions can be distinguished as being private or public, autonomous or planned, and stand-alone or integrated, and can vary in their timing, approach, and scale. In addition, adaptation can occur at different scales – from local, project-level measures, to sectoral or regional planning, and national policy.

For example, for infrastructure decisions, standard engineering-based methods can be used to estimate the cost of climate resilient design; the expected benefits of the

measure can be calculated based on projected probability of flooding occurrence and estimates of avoided repair cost, and direct and indirect economic losses from service interruptions (Li, Mullan, and Helgeson 2014).

While analyzing the cost of putting in any individual adaptation should result from straightforward engineering assessments, evaluating the benefits presents a more significant challenge from both an engineering and economic perspective. Adaptations occur not as a single decision, and a whole system of adaptions may either support or undermine the efforts within the region.

One example of this would be shoreline hardening, which would prevent erosion at one site, but exacerbate erosion to the shorelines in proximity to the adaptation. The greater the length of shoreline which is hardened/armored, the greater level of erosion experienced by those areas which are not armored. Thus evaluating adaptation has often assumed regional efforts or choices, or ignored every other adaptation effort other than the one considered.

The first step in this effort would be identifying the adaptations under consideration, and then the projected impact on flooding that result from those adaptations. The flood prevention/damage prevention would then be applied to maps developed while doing the first analysis (that of direct property damage), which would provide a dollar value of benefit. The cost of the adaptation plus the expected value of the benefit would allow for a net present value and an internal rate of return to be calculated for a variety of adaptations.

An additional step may consider the benefits outside of property protection. Beach nourishment provides a positive benefit by creating a tourism amenity, while a sea may potentially limit access to the water and views, which might lower property values impacted by the sea wall.

Lastly, the analysis may include the impact to the economy of paying for region wide adaptation measures. This would be modeled in two ways using the region's REMI software: treating the cost of adaptation as both a decline in investment resources (to quote Neumann and Strzpeck 2014 "a series of indirect effects of impacts on the diversion of resources from productive to defensive capital") in the region and as a decline in consumption expenditures in the region.

4.2 Data Requirements

The data requirements for this analysis involve significant information that would most likely need to be developed by an engineer consulting firm, regarding the most appropriate types of adaptation, the cost, and the potential protection provided by those adaptations. While some attempts have been made to apply standard costs of

adaptation strategies to the Hampton Roads coastline, there was no attempt to develop how these adaptations would work in concert with one another. Instead, the protection provided by these adaptations was treated as binary (shoreline was either protected fully or not protected at all). This oversimplification would lead to a weak analysis.

4.3 Potential Uses

This analysis would answer the most important question related to sea level rise: which adaptations to sea level rise pass the cost benefit analysis. This then allows policy makers to evaluate the potential return on investment of a particular adaptation strategy.

4.4 Quality of Results

The results of this analysis would match the quality of the engineering data/forecasting of the adaptations. If high quality analysis tailored to Hampton Roads is procured, then this could accurately map out the adaptations for the region moving forward.

If that data is not available, the analysis may proceed using a set of general estimates that have been developed for other regions, but the results would be comparatively weaker. In this case, analysis would likely still point to a path and give an order of magnitude for the benefits, while still leaving potential for future research to develop the path forward.

4.5 Length of Time for Analysis

This length of time required for this analysis would depend strongly on the quality of data procured. Higher level data including the cost of adaptations and their impact in lowering region wide flooding/property damage would limit the in-house research needs; would allow analysis to proceed rapidly (~160-320 hours). If instead, it is left to the HRPDC to determine cost and the degree to which particular adaptations protect the region, than this project would become a much more significant undertaking (~960 hours)

4.6 Pros

- This analysis would answer the cost-benefit question when it comes to various types of adaptation.

4.7 Cons

- It might be impossible to get the level of data required to produce actionable results. Lower quality data on the cost and appropriateness of various

adaptation techniques for the region would both lengthen the study and would require a future study to detail the appropriate policy responses.

5 Economic Drag Created by Sea Level Rise

5.1 Description

While the property damage estimates described in section 2 may be described as the 'Typical Analysis' of the economic impact from SLR, researchers admit that it does not capture the full economic cost of SLR. A broad class of indirect effects, however, is largely ignored, even in the better studied sectors. Effects of coastal storms, for example, include not just property value losses but also business interruption and long-term capital losses that are omitted in the current set of estimates.

Additionally, it is difficult to value the productive nature of infrastructure regionally, as typically public infrastructure aims at producing the greatest total benefit – without an effort to maximize revenues; without a market determined revenue stream the analyst would be required to estimate the productivity of regional infrastructure, which adds uncertainty to the analysis.

Lastly, as SLR impacts the region, there is the potential for population decline and interruption of employment, which would have long term impacts on the regional economy.

This analysis requires estimating a significant number of factors regarding the regional economy which is unobservable[3], and then using these estimates to forecast the impacts of flooding. The layers of estimates/forecasts lead to numbers that are highly sensitive to assumptions.

5.2 Data Requirements

It is impossible to fully outline the data required to develop this analysis.

One key piece of data would be a combination of interviews and surveys to see how SLR would affect investment decisions among the region's major industries and employers.

Secondly, information would need to be gathered from the HRTPO regarding the level of service provided by regional infrastructure that may be impaired by SLR, and to use this to develop an estimate of social return from this infrastructure.

[3] Unobservable data/numbers are which it is impossible to measure the true value no matter how sophisticated the survey or analysis conducted. Researchers attempt to minimize the use of unobservable data because it is impossible to check its veracity.

Lastly, a review of flooding impacts in developed countries would need to be conducted to estimate the potential impact on regional population created by SLR.

5.3 Potential Uses

A fuller accounting of the costs of SLR would be used with adaptation scenarios to produce new cost-benefit analyses. As the potential costs of storm surge or recurrent flooding would be higher, this would lead to a greater chance that any given adaptation would be more viable from an economic perspective.

5.4 Quality of Results

The reason that these analysis are rarely done, is that the results are both speculative and highly uncertain. While property damage is (relatively) easy to visualize and measure, declines in economic activity related to SLR will be significantly harder to justify. Furthermore, these estimates will be highly sensitive to the assumptions made while conducting this analysis.

Furthermore, it is likely that there would be inflection points within the range of flooding, weakening the applicability of these results to a variety of situations. As an example, localized recurrent flooding would have an impact within the region, but would not necessarily create significant drag for the entirety of the region.

5.5 Length of Time for Analysis

This analysis would be a significant undertaking, and would take at least 1000 hours to complete.

5.6 Pros

- Properly conducted, this study would do a more thorough job of capturing the complete costs of SLR, and thus would allow for the proper level of adaptation to be identified.

5.7 Cons

- This study would take a significant number of person hours.
- The results of this study would not be robust as it would be extremely sensitive to assumption.
- Given the quality of the results, and the length of time required to conduct a more complete analysis, it might not pass a cost-benefit analysis.

6 Conclusions and Recommendations

There are many different guidelines and attempts to measure the economic impact of climate change in general, and SLR in particular. This paper briefly examines the mechanics of several of those methodologies. When making recommendations on

research methodologies to pursue, the HRPDC uses a no-regrets framework, which requires both actionable results as well as minimal potential for underutilization of either time or money.

Currently, the economic department recommends moving forward with a direct damage estimation analysis. The HRPDC has already begun efforts that will allow that analysis to move forward, and there are several examples already conducted by other regions that can serve as a guide to conducting this analysis in Hampton Roads.

Additionally, this paper recommends that efforts are made to assess the availability of the data to conduct a property value analysis. This analysis would provide excellent value, and could serve as a model for other regions.

	DATA Availability/Quality	Labor Intensity Clear/Clear Methodology	Quality and Applicability of Results
Direct Damage Estimation			
Property Value Analysis			
Economic Impact of Adaptation			
Economic Drag from Sea Level Rise			

Table 1: Evaluation of Methods of Analysis

As a future step, this paper recommends that the HRPDC begin looking for grants to solicit for engineering analysis of adaptions that may be executed in the region, so that an analysis of adaptation methods may be conducted in the near future. The U.S. Army Corps of Engineers in the North Atlantic Coast Comprehensive Study both outlined current research into SLR adaptation strategies in Norfolk and outlined several strategy options that could be pursued. It also indicated what needed to be accomplished within the context of a preliminary financial analysis for adaptation in

Norfolk.[4] This analysis would allow staff to evaluate the viability and applicability of conducting an analysis of this type at the regional level.

Lastly, staff recommends against the HRPDC or other local government entities funding/attempting an study focused on estimating the full economic drag of Sea Level Rise. A project of this type combines high costs in terms of time and research dollars with an output that is sensitive to assumptions, and thus could create worse decision making if it were incorporated into planning. While it is an interesting and important question, there have been no rigorous estimates created for storms which have already occurred; much less attempts to produce credible estimates about future flooding events.

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[4] U.S. Army Corps of Engineers 2015. North Atlantic Coast Comprehensive Study, Norfolk Virginia Focus Area Analysis.

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I. Appendix: Examples of Research and Analysis

1. "North Atlantic Coast Comprehensive Study (NACCS)". Army Corps of Engineers, September 1, 2013.
   i. Government Document
   ii. Economic Analysis of Adaptation
   iii. This reviewed the City of Norfolk by Watershed, and evaluated the feasibility of a variety of adaptations for each independent watershed. This document did not provide the necessary information regarding the level of benefit provided by the adaptation or the cost of the various adaptations, though provided the information and planning for these efforts.
2. Neuman, James E. et al. "Joint effects of storm surge and sea-level rise on U.S. Coasts: new economic estimates of impacts, adaptation, and benefits of mitigation policy," Climatic Change. Vol 129: 337-349, December 2014.
   i. Academic
   ii. Direct Damage Estimation, Economic Analysis of Adaptation
   iii. Used the National Coast Property Model to estimate the damage from a variety of SLR scenarios; this model examines 150Mx150M blocks and includes elevation and property value data at that level. For adaptation, it would estimate the risk of flooding within each decade and damage relative to property values, then would either choose abandonment of the parcel, elevating building, or status quo based on relative costs.
3. "MID-ATLANTIC HURRICANE SCENARIO ANALYSIS REPORT" National Protection and Programs Directorate Office of Cyber and Infrastructure Analysis. September 2015.
   i. Government Document
   ii. Direct Damage Estimation, Economic Drag from Sea Level Rise
   iii. This study looked at the impact to critical infrastructure, industry, and industry from a significant storm. It also produced state level impacts to GDP from a storm, using the information developed in the report. Excellent guide for the variety of issues stemming form significant flooding which need to be examined in an Economic Drag Analysis.
4. Bin, Okmyund et al. "Effects of Flood Hazards on Property Values: Evidence Before and After Hurricane Floyd," Land Economics, University of Wisconsin Press, vol. 80(4).
   i. Academic
   ii. Property Value Analysis
   iii. Excellent example of a property value analysis where the parcels are do not have amenities associated with flood risk.

5 Okmyung Bin & Thomas W. Crawford & Jamie B. Kruse & Craig E. Landry, 2008. "Viewscapes and Flood Hazard: Coastal Housing Market Response to Amenities and Risk," Land Economics, University of Wisconsin Press, vol. 84(3), pages 434-448.

i. Academic
ii. Property Value Analysis
iii. Extends property values analysis method to situations where the risk of flooding are tightly connected to the value of the property (water access or beachfront properties).

6 Wilson, Jeff et al. "Forecasting Economic Damages from Storm Surge Flooding: A Case Study on the Trantramar Region of New Brunswick." Atlantic Climate Adaptation Solutions Association. October 2012.

i. Government Document
ii. Direct Damage Estimation, Economic Impact of Adaptation
iii. Excellent example of direct damage estimation for a region, using GIS as the backbone of the analysis. The adaptation piece was less well developed, using beach nourishment as the sole adaptation option. HRPDC direct damage estimation efforts would closely follow this methodology when allowed to do so by data availability.

7 Hallegatte, Stephane et al. "Assessing climate change impacts, sea level rise, and storm surge risk in port cities: a cast study on Copenhagen," Climate Change 104:113-37

i. Academic
ii. Direct Damage Estimation, Economic Drag from SLR, Economics of Adaptation
iii. Uses the experience of Katrina to make assumptions on the distribution of property damage within Copenhagen (Residential $27-$35B, Commercial $25-$29B, Infrastructure $15-$18B, and Public building $6-8B). Also uses the water depth to measure the extent of damage to building, similarly to the New Brunswick case study. Moves from the direct costs to a 'total cost' analysis that contains significantly more assumptions, and may be considered speculative. For the adaptation estimation, it examined building Dikes for the entire 50 kM coastline of the region, at heights of 1, 2, and 3 meters.

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APPENDIX C:
SURVEY OF LOCAL FLOODPLAIN MANAGEMENT PROGRAMS

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Glossary

Base Flood	The flood having a one percent chance of being equaled or exceeded in any given year. Also referred to as the "100-year flood."
BFE	Base Flood Elevation - The elevation to which floodwater is expected to rise during the base flood.
CRS	Community Rating System
DCR	The Virginia Department of Conservation and Recreation, the state agency responsible for floodplain management.
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map - The official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community
NFIP	National Flood Insurance Program
SFHA	Special Flood Hazard Area
Zone A	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. No Base Flood Elevations (BFEs) are shown.
Zone AE	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown.
Zone AH	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown in this zone.
Zone AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone.
Zone V	Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. No Base Flood Elevations (BFEs) are shown.
Zone VE	Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown.
Zone X (Shaded)	Areas between the limits of the base flood and the 0.2 percent annual chance (or 500-year) flood.
Zone X	Areas of minimal flood hazard outside the SHFA and higher than the elevation of the 0.2 percent annual chance (or 500-year) flood.

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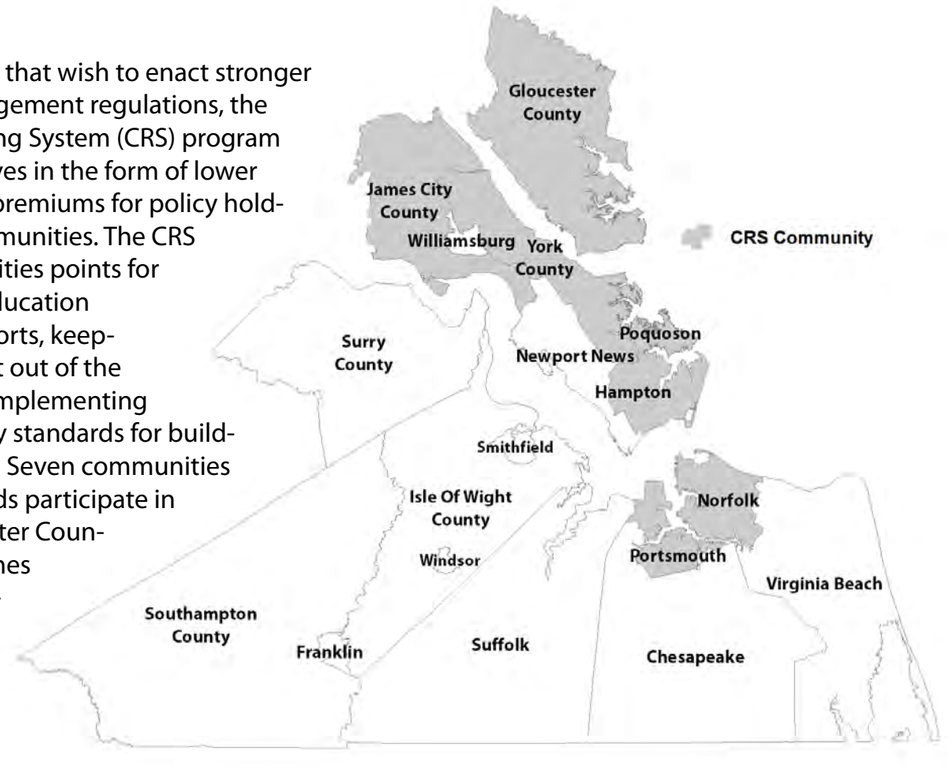
Summary of Local Floodplain Management Programs in Hampton Roads

The National Flood Insurance Program (NFIP) was created by Congress in 1968 and is administered by the Federal Emergency Management Agency (FEMA). Residents and business owners of communities participating in the NFIP are allowed to purchase federally-backed flood insurance. Communities participating in the NFIP are required to implement minimum regulatory standards that compliy with rules laid out in Title 44 of the Code of Federal Regulations. These regulations are intended to protect development within floodplains from flood hazards and to ensure that such development does not increase the threat of flooding on the community. The primary non-administrative components of a locality's floodplain management ordinance are the designation and definition of various flood hazard zones and the specific requirements for building within those zones. While most of a local floodplain management ordinance is determined by the state's model ordinance (as drafted by the Department of Conservation and Recreation (DCR)), localities have significant flexibility in requiring more stringent requirements for new development and for improvement and repair projects.

All seventeen member jurisdictions of the HRPDC participate in the NFIP. Key components of their floodplain management ordinances are summarized in this document. In addition, the towns of Boykins, Branchville, Claremont, Courtland, Ivor, and Windsor also participate in the NFIP. The Towns of Capron, Dendron, Newsoms, and Surry do not participate in the NFIP.

For communities that wish to enact stronger floodplain management regulations, the Community Rating System (CRS) program provides incentives in the form of lower flood insurance premiums for policy holders in those communities. The CRS awards communities points for things such as education and outreach efforts, keeping development out of the floodplain, and implementing higher regulatory standards for building construction. Seven communities in Hampton Roads participate in the CRS: Gloucester County, Hampton, James City County, Norfolk, Poqouoson, Portsmouth, and York County.



Community	Ordinance	Program Administrator	Current Effective Map Date	Floodplain	LiMWA in Ordinance	Freeboard Requirement(s)	CRS Member (Rating)	Substantial Damage	Substantial Improvement
Chesapeake	Chapter 26 Article IV	Director of Development and Permits	12/16/2014	100-year Floodplain	No	1.5'	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to pre-event condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.
Franklin	Zoning Ordinance Article XXI	Zoning Officer	9/4/2002	100-year Floodplain	No	None	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement.
Gloucester	Chapter 8.5	Director of Codes Compliance	11/19/2014	100-year Floodplain	Yes	2'	Yes (7)	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed fifty (50) percent of the market value of the structure before the damage occurred.	Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds fifty (50) percent of the market value of the structure either (a) before the improvement or repair is started, or (b) if the structure has been damaged and is being restored, before the damage occurred.
Hampton	Zoning Ordinance Chapter 9 Article IV	Zoning Administrator	8/16/2011	100-year and 500-year Floodplains	No	3' (VE, AE, A, AO); 1.5' above highest adjacent grade (X500 and X(Shaded)) (new construction only)	Yes (8)	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed fifty (50) percent of, at the discretion of the property owner, either the city's assessed value or the market value of the structure before the damage occurred as established by an independent, unbiased, third party appraiser licensed in the Commonwealth of Virginia, of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds fifty (50) percent of, at the discretion of the property owner, either the city's assessed value or the market value, as established by an independent, unbiased, third party appraisal of the structure either (i) before the improvement or repair is started; or (ii) if the structure has been substantially damaged and is being restored, before the damage occurred, regardless of the actual repair work performed.
Isle of Wight	Zoning Ordinance Article VI	Zoning Administrator	9/4/2002	100-year Floodplain	No	1.5'	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed fifty (50) percent of the market value of the structure before the damaged occurred.	the cost of which equals or exceeds fifty (50) percent of the market value of the structure either before the improvement or repair is started or, if the structure has been damaged, and is being restored, before the damage occurred.
James City	Chapter 24 Article VI Division 3	Development Manager	9/28/2007	100-year Floodplain	No	2'	Yes (7)	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.
Newport News	Chapter 45 Article XXXI Division 2	City Manager	12/9/2014	100-year Floodplain	Yes	2'	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed fifty (50) percent of the market value of the structure before the damage occurred.	Any reconstruction rehabilitation, addition, or improvement of a structure, the cost of which equals or exceeds fifty (50) percent of the market value of the structure before the "start of construction" of the improvement.
Norfolk	Zoning Ordinance Article II Chapter 11 Section 3	Floodplain Manager	12/16/2014	100-year and 500-year Floodplains	Yes	3' (SHFA); 1.5' above highest adjacent grade (X(Shaded)) (new construction only)	Yes (9)	Damage, of any origin, sustained by a structure for which the cost of restoring the structure to its condition before the damage occurred would equal or exceed fifty percent (50%) of the market value of the structure before the damage occurred.	All reconstructions, rehabilitations, additions, or other improvements of a structure the cost of which equals or exceeds fifty percent (50%) of the market value of the structure before the "start of construction" of the improvement.
Poquoson	Chapter 42	Floodplain Administrator	12/16/2014	100-year Floodplain	Yes	3'	Yes (8)	Damage of any origin sustained by a structure whereby the cost of restoring the structure to it's before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.
Portsmouth	Chaper 14.1	Director of Neighborhood Advancement	8/3/2015	100-year Floodplain	Yes	3'	Yes (9)	Damage of any origin sustained by a structure when the cost of restoring the structure to its pre-damage condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. A structure that has been damaged two or more times by flood events during any consecutive ten-year period with a cumulative building loss equal to or exceeding 50 percent of the market value before the damage shall also be considered a substantial damaged structure.	Any combination of repair, reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either before the improvement or repair is started or, if the structure has been damaged and is being restored, before the damage occurred.
Smithfield	Zoning Ordinance Article 3.O	Planning and Zoning Administrator	9/4/2002	100-year Floodplain	No	None	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement.
Southampton	Chapter 18 Article XIV	Zoning Administrator	9/4/2002	100-year Floodplain	No	1'	No		
Suffolk	Unified Development Ordinance Article 4 Section 31.416.2	Director of Planning and Community Development	8/3/2015	100-year Floodplain	Yes	1' (Coastal A and VE Zones only); BFE (all other SFHAs)	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.
Surry	Zoning Ordinance Article III Section 3-1500	Zoning Administrator	5/4/2015	100-year Floodplain	Yes	1' (Coastal A); BFE (all other SFHAs)	No	Damage of any original sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equal or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement.
Virginia Beach	Appendix K	City Manager/Directors of Planning and Public Works	1/16/2015	100-year Floodplain	No	2'	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed fifty (50) percent of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds fifty (50) percent of the market value of the structure before the start of construction of the improvement.
Windsor	Chapter 75	Permit Officer	9/4/2002	100-year Floodplain	No	None	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equal or exceeds 50% of the market value of the structure before the start of construction of the improvement.
Williamsburg	Chapter 21 Article XII	Zoning Administrator	9/28/2007	100-year Floodplain	No	None	No	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.	Any restoration, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.
York	Chapter 24.1 Article III Division 7 Sec 24.1-373	Zoning Administrator	1/16/2015	100-year Floodplain	Yes	3' (VE, AE, and AH); 4' (Coastal AE)	Yes (8)	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent (50%) of the market value of the structure before the damage occurred.	Any repair, reconstruction, rehabilitation, addition, or improvement of a structure, the cost of which equals or exceeds fifty percent (50%) of the market value of the structure before the "start of construction" of the improvement.

APPENDIX D:
GIS SUPPORT FOR DUTCH DIALOGUES WORKSHOP

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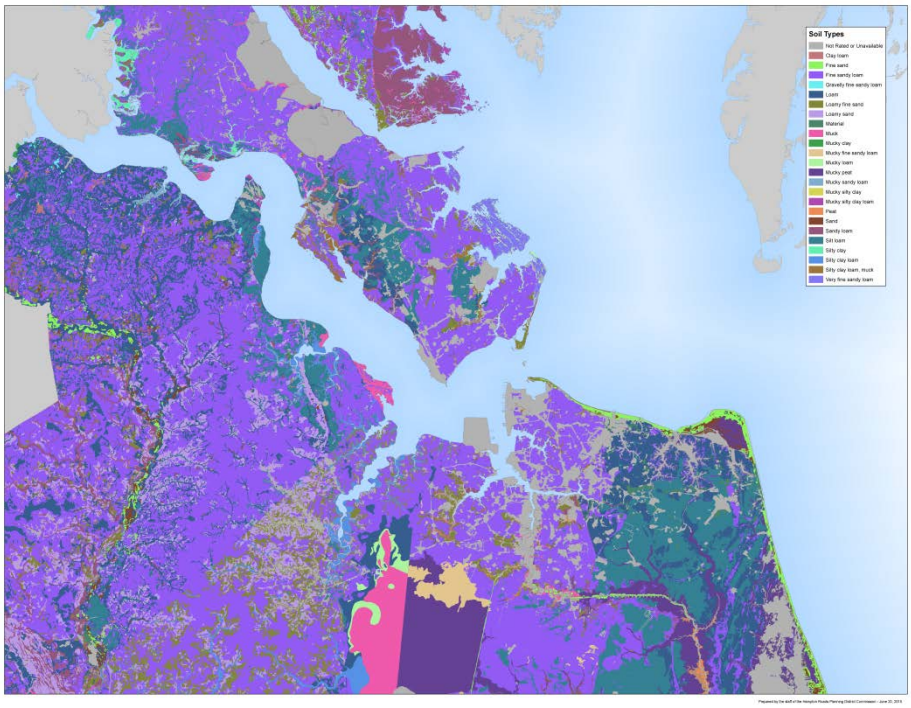
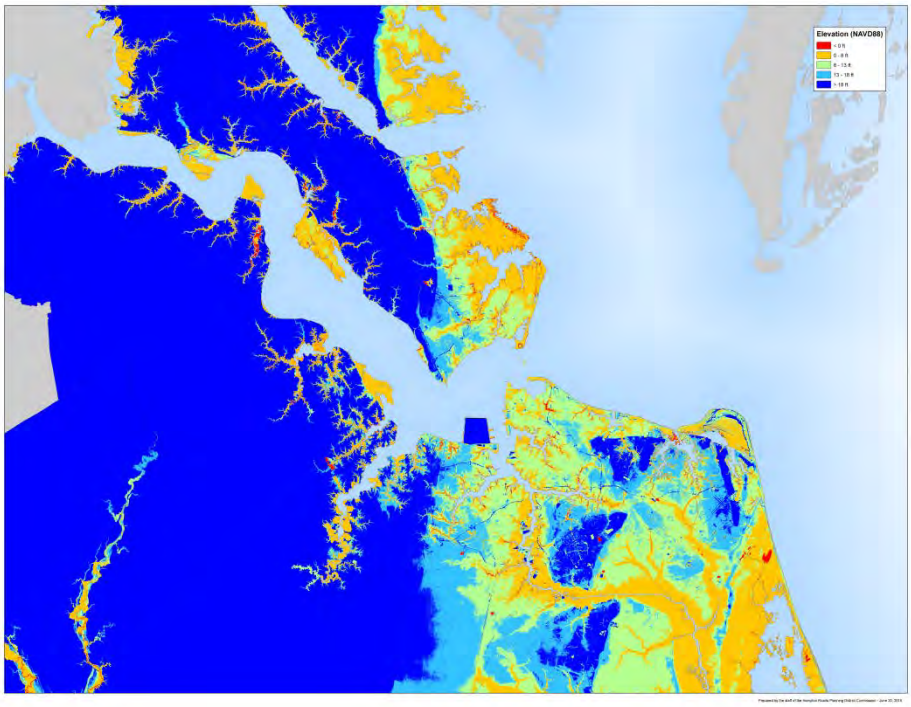
List of Maps Produced During Workshop

1) Continuous Elevation
2) Classified Elevation (version 1)
3) Shoreline Conditions – Structures and Erosion Control Practices
4) Shoreline Conditions – Erosion Status and Wetlands
5) Land Cover
6) Soil Types
7) Aerial Imagery
8) Sea Level Rise Inundation
9) Base Map
10) Watershed Boundaries
11) USGS Historic Maps
12) Economic Factors – Employment, Traffic, Etc.
13) Water Resources
14) Organic Material
15) Water Infiltration Opportunities
16) Classified Elevation (version 2)

Sample Dutch Dialogues Maps



Map #6 – Soil Types



Map #16 – Classified Elevation (version 2)

APPENDIX E:
PRESENTATION AT 2015 COASTAL GEOTOOLS CONFERENCE, CHARLESTON, SOUTH CAROLINA

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Planning for Sea Level Rise at the Local Level

COASTAL GEOTOOLS
APRIL 1, 2015

BENJAMIN J. MCFARLANE, AICP
SENIOR REGIONAL PLANNER
HAMPTON ROADS PLANNING DISTRICT COMMISSION

What is the HRPDC?

The Hampton Roads Planning District Commission is the regional planning agency for Southeastern Virginia.

The staff assists the Commission, composed of local elected and appointed officials, in addressing issues of regional concern.

Project Background

In 2008, the Virginia Coastal Zone Management Program began funding efforts by three Planning District Commissions to study and address the impacts of climate change on their regions

- Hampton Roads PDC
- Middle Peninsula PDC
- Northern Virginia Regional Commission

Virginia Coastal Zone Management Program

What is the problem?

There are two problems.

Recurrent Flooding

- Happening right now
- Causes property damage, disruptions to life and commerce, and health impacts
- **Operational challenge**

Sea level rise

- Projected to accelerate and cause significant impacts to public and private property
- **Planning challenge**

Credit: City of Norfolk

Credit: City of Norfolk

Credit: City of Hampton

Credit: Ben McFarlane

Key Questions for Planners

How much will sea level rise?

What are the causes – can we do anything about it?

Which areas are vulnerable (or will become vulnerable) to flooding/sea level rise?

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Sea Level Rise in Hampton Roads

Global sea level rise occurs as a result of ice melt and thermal expansion of the oceans

Local or relative sea level rise includes local influences:

- Ground subsidence (or uplift)
  - Glacial isostasy
  - Groundwater withdrawals
- Changes in ocean currents

In Hampton Roads, about half of the observed sea level rise is due to global sea level rise and half is due to subsidence

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Sea Level Rise in Hampton Roads

Sea level rise will result in significant impacts:

- Permanent inundation of some areas.
- More frequent flooding of other areas.
- Some areas that have not seen flooding will start to experience it.

The long-term sea level trend in Hampton Roads is approximately 1.5 feet per century, but sea level rise is projected to accelerate.

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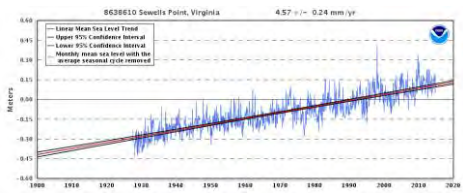
Sea Level Rise in Hampton Roads



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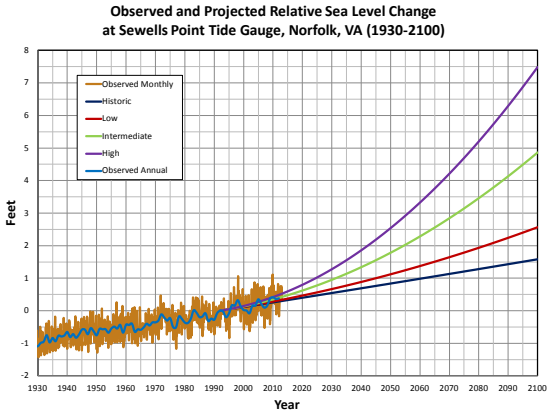

Sea Level Rise and Local Plans

1. Mapping
2. Vulnerability Analysis
3. Build-out Analysis/Hazard Analysis
4. Safe Growth Audit
5. Capital Improvement Programs

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HRPDC Mapping Efforts

Planning grants from the Virginia Coastal Zone Management Program, 2008-present

- Mapping and GIS analysis
- Policy research
- Outreach and education
- Government coordination

Year 1: Climate Change impacts

Year 2: Storm Surge

Year 3: Sea Level Rise

Year 4: Coastal Resiliency

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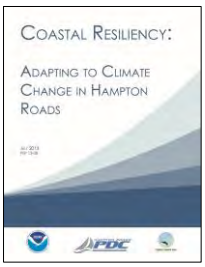
FY11-12 CZM Study - SLR v. 2

LIDAR based analysis of region's exposure to sea level rise

4 scenarios from NCA

- 0.2m, 0.5m, 1.2m, 2.0m

Regional digital elevation model created from multiple datasets



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Mapping Sea Level Rise

Step 1: Prepare Elevation Data

Step 2: Prepare Water Levels

- Tidal surface
- Other surfaces (surge heights, sea level rise, etc.)

Step 3: Overlay water levels on elevation data

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Regional DEM

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Sea Level Rise v. 2

1. Use VDATUM to generate tidal surface (MHHW)
2. Combine with land DEM
3. Using tidal surface, generate sea level rise surfaces
4. Compare generated surfaces with land DEM to identify areas vulnerable to inundation

VDATUM

Developed by NOAA to enable transformations from one vertical datum to another

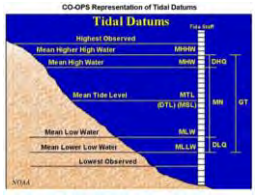
Individual DEMs were in NAVD88

NAVD88 has no relationship to local tidal conditions

- 0 NAVD88 does not mean low tide

MHHW selected as best tidal datum to use since it is a condition that is readily understood and is a good dividing line for development

- Most land below MHHW is wet, most above dry



NOAA

VDATUM Methodology

Create grid that covers region and convert to points

Set elevation of points to 0

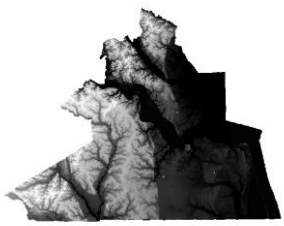
Transform points file using VDATUM from MHHW to NAVD88 to calculate MHHW referenced to NAVD88

VDATUM Methodology

VDATUM does not extend very far inland

Need to interpolate MHHW elevation in NAVD88 for areas not covered

Regional DEM + VDATUM



Mapping Inundation

Need to identify areas that would be inundated by different levels of sea level rise AND are hydrologically connected to the ocean

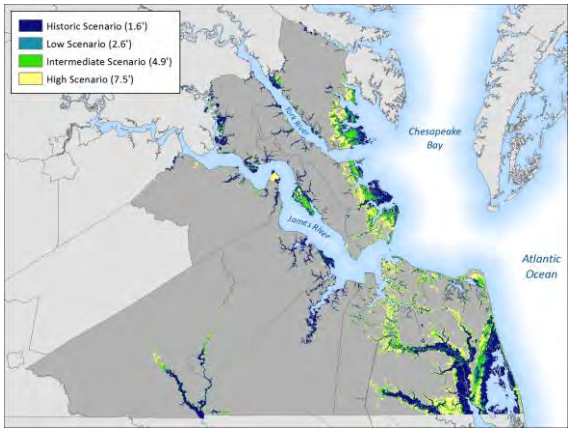
Use NOAA methodology to process

- Modify surface to incorporate SLR
- Evaluate connectivity
- Extract connected areas that are connected to the ocean

Mapping Inundation

1. Merge tidal surface and land DEM
2. Create single value raster
   - (MHHW + SLR) > Elevation
3. Group hydrologically connected regions
4. Extract large regions
5. Clip raster to original DEM shoreline
6. Reclassify to single value

25



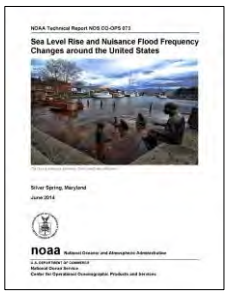
FY13-15 CZM Study - SLR v. 3

Current CZM Sea Level Rise Technical Assistance grant

LIDAR based analysis from three sources
- Eleven County dataset (2010)
- Franklin/Southampton (2012)
- Norfolk LIDAR dataset (2014)

1-foot increments of SLR instead of climate scenarios

Flooding on top of SLR
- 1% Annual Flood
- 0.2% Annual Flood



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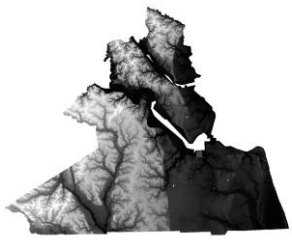
New Regional DEM



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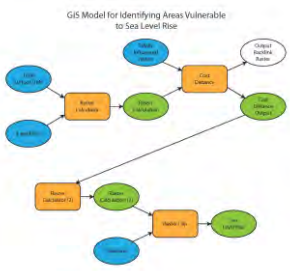
Sea Level Rise v. 3 (In Process)

National Climate Assessme
- Sea level rise scenarios

"Nation Under Siege – Sea Level Rise at Our Doorstep'
- Hydrologic connectivity



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Vulnerability Analysis

Overlay of Federal, State, Regional, or Local Datasets on Inundation layers

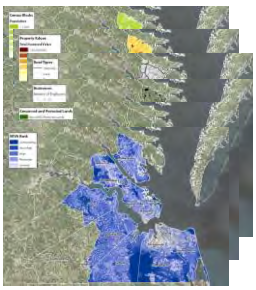
Population

Built Environment

Infrastructure

Economy

Natural Resources



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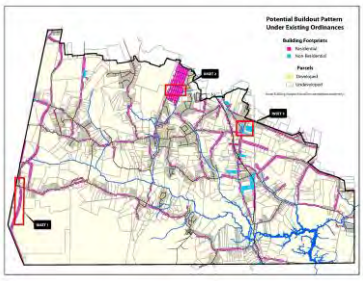
Vulnerability Analysis – Hampton

	TOTAL	HISTORIC	LOW	INTERMEDIATE	HIGH
BUILT ENVIRONMENT					
Parcels	50,921	436	959	3,842	13,817
Improvement Value of Parcels	$ 10,986,533,468	$ 265,721,796	$ 354,575,896	$ 883,009,796	$ 4,067,318,276
Structures	49,774	128	747	5,400	16,697
Commercial	1,471	4	15	86	277
Industrial	347	3	4	13	42
Military	898	26	88	399	797
Public/Semipublic	895	5	19	101	340
Residential, Multi-Family	2,279	2	9	188	798
Residential, Single Family	42,300	76	571	4,391	13,940
Other	1,584	12	41	222	503
INFRASTRUCTURE					
Roads (Miles)	780.8	6.1	22.0	133.7	314.6
Roads (Interstate)	24.6	0.2	0.2	0.4	1.8
Roads (Primary)	73.5	0.3	0.9	5.8	19.6
Roads (Local or Private)	682.7	5.6	20.9	127.6	293.2
ECONOMY					
Businesses	4,148	19	45	369	1,096
Employees	53,135	121	408	3,846	14,851
Total Value of Parcels	$ 15,212,212,560	$ 343,086,492	$ 493,519,892	$ 1,311,888,992	$ 5,483,741,076
NATURAL ENVIRONMENT					
Protected Lands (acres)	2,180.2	387.3	509.8	632.9	861.1
VEVA - Outstanding (acres)	848.0	506.7	637.9	709.1	744.7
VEVA - Very High (acres)	2,488.6	726.8	937.8	1,335.5	1,597.3
VEVA - High (acres)	7,466.3	794.7	1,373.2	2,727.2	4,072.0

Build-out Analysis/Safe Growth Audit



Questions?

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HAMPTON ROADS PDC PLANNING DISTRICT COMMISSION

Virginia Coastal Zone MANAGEMENT PROGRAM

NOAA

APPENDIX F:
SAMPLE NEWS ARTICLES POSTED TO HRPDC WEBSITE

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Online Tools Help Planners Visualize and Plan for Sea Level Rise

October 8, 2014

The Hampton Roads Sea Level Rise and Flooding Adaptation Forum held its sixth meeting September 19, 2014, at the Virginia Modeling and Simulation Center in Suffolk. The focus of this meeting was online tools for visualizing and analyzing the impacts of sea level rise and flooding on local communities. Featured speakers included representatives from the National Oceanic and Atmospheric Administration, Climate Central, The Nature Conservancy, the Virginia Institute of Marine Science, and NASA Langley.

The morning's first speaker was Adam Parris, Program Manager for NOAA's Regional Integrated Sciences and Assessments program. Mr. Parris's subject was the third National Climate Assessment, which was published in May 2014, and the significance of its findings for local governments. More information on the National Climate Assessment can be found here: http://www.globalchange.gov/what-we-do/assessment.

Following Mr. Parris, the forum heard from two speakers on the tools their organizations have developed to assess climate change impacts. Dr. Ben Strauss from Climate Central spoke about newest version of their "Surging Seas" visualization and analysis tool (http://sealevel.climatecentral.org/), which was just released for Virginia on September 16. This tool incorporates the new LIDAR elevation data which the HRPDC provided funds for in 2013.

Ms. Gwynn Crichton from The Nature Conservancy concluded the morning session with a presentation on her organization's Coastal Resilience mapping tool (http://coastalresilience.org/), which allows users to visualize sea level rise impacts on coastal development and natural resources and also identify potential solutions.

The first speaker in the afternoon was Ms. Molly Mitchell, who presented on the VIMS Center for Coastal Resources Management's Comprehensive Coastal Resource Management Portals, which are developed for individual counties and cities in Tidewater Virginia. These portals (http://ccrm.vims.edu/ccrmp/index.html) include guidance and mapping tools to help localities plan for sea level rise. The final speaker was Mr. Brad Ball from NASA Langley, who presented on the facility's efforts to better prepare for storm events through the use of GIS modeling.

The Hampton Roads Sea Level Rise and Flooding Adaptation Forum is a partnership between the Hampton Roads Planning District Commission, Old Dominion University, and Virginia Sea Grant.

The forum provides opportunities for local government staff in Hampton Roads to meet with academic researchers, experts, and other stakeholders in an informal setting so they can stay up to date on climate science, adaptation planning, implementation, and other related fields.

Chesapeake Bay Program Seeks Public Input to Achieve Goals and Outcomes of the Chesapeake Bay Watershed Agreement

March 24, 2015

The Chesapeake Bay Program is seeking public input on plans to achieve the goals and outcomes of the Chesapeake Bay Watershed Agreement. These twenty-five draft management strategies address the thirty-one outcomes of the Watershed Agreement and outline plans for the implementation, monitoring, and assessment of work toward the protection and restoration of the Bay and its watershed.

> ***These plans are the detailed outlines of what may be the most extensive collaboration in the nation. Each one is connected to every other, just like our lands, river, streams and the Bay. As we move forward, we welcome people's input so that we can strengthen those bonds, becoming even more focused, intentional and unified in our vision of a healthy Bay ecosystem.***
>
> **Molly Ward, Virginia Secretary of Natural Resources &Chair of the Bay Program's Principals' Staff Committee**

Drafts of the management strategies are available online. The Bay Program welcomes comments on these drafts through April 30, 2015. Interested parties can review the management strategies and submit comments on the Bay Program's Management Strategy Dashboard website.

In June 2014, representatives from the six watershed states, the District of Columbia, the Chesapeake Bay Commission and the U.S. Environmental Protection Agency signed the landmark Chesapeake Bay Watershed Agreement. This agreement marks the first time representatives from every jurisdiction in the watershed committed to full partnership in the Bay Program and collaborative restoration efforts.

Since the signing of the Watershed Agreement in June 2014, the Chesapeake Bay Program partners have been crafting "management strategies" that describe the steps necessary to achieve the outcomes identified in the Agreement. The strategies are organized into the following categories that mirror the 10 goals identified in the Agreement: abundant life, clean waters, engaged communities, conserved lands, and climate change resilience. The strategies will be further supported by two-year work plans summarizing the specific commitments, short-term actions and resources required for success.

Sea Level Rise Flooding Adaptation Forum Looks at Megaprojects

May 28, 2015

On May 22, 2015, the Sea Level Rise/Flooding Adaptation Forum held an all-day discussion on, Megaprojects – Protective Structures for Hampton Roads, at the Virginia Modeling and Simulation Center in Suffolk. The Forum is a partnership of the HRPDC, Old Dominion University (ODU) and Virginia Sea Grant.

The HRPDC's Whitney Katchmark and representatives from ODU and Virginia Sea Grant welcomed attendees and provided an overview of the day long workshop and series of presentations from representatives of the U.S. Army Corp of Engineers, the University of North Carolina-Chapel Hill (UNC-CH), HNTB, Moffatt and Nichol and the Virginia Institute of Marine Science (VIMS). Some highlights included:

VIMS provided a preview of its analysis of the advantages and disadvantages of a storm surge barrier across the Chesapeake Bay Bridge Tunnel. The final analysis will consider impacts to marshes, submerged aquatic vegetation, fish species, and the effectiveness at reducing flooding in storms.

Both Bob Ivarson (HNTB) and Rick Luettich (UNC-CH) discussed the infrastructure in New Orleans. Mr. Ivarson focused on the $13B spent on the federally funded system of floodwalls, gates and pump stations that protect the area. Mr. Luettich discussed the local funding mechanisms and challenges of getting new taxes approved to maintain the infrastructure. Once the Army Corps of Engineers completes construction, the infrastructure is handed off to localities. The system around New Orleans has over 400 closures (i.e. gates across roads and rail lines) that have to be maintained and closed to protect from flooding caused by storm events. With three parishes (similar to counties) located within the flood wall system, another challenge has developed as one of the 3 parishes has failed, on two occasions, to vote in a tax increase required to maintain its part of the system.

Brian Joyner of Moffatt and Nichol led a discussion of hypothetical solutions for Hampton Roads. He suggested using the PIANC decision-making tool (for more information about PIANC and the decision making tool visit their website, www.PIANC.org) to evaluate potential storm surge barrier locations such as the entrance to the Hampton Roads harbor (near the HRBT), the Elizabeth River, or Lafayette River. The Forum discussed how large protection structures might reduce impacts during Hurricanes and Nor'easters, but concluded that smaller scale infrastructure will still be necessary to reduce recurrent tidal flooding at a neighborhood scale.

Dutch Dialogues Wrap Up, Present Region with Options to Consider

June 24, 2015

**Editor's Note: This article has been edited to provide the correct the wrap up date. A previous version listed an incorrect date.*

Dutch *Dialogues*: Virginia Life at Sea Level wrapped up on Tuesday, June 23, 2015, providing city officials in Norfolk, Hampton and throughout the Hampton Roads region with ideas for long-terms solutions to manage and adapt to regional sea level rise.

Dialogues was a workshop that drew together a team of planners, engineers and architects from the Netherlands along with counterparts from Hampton Roads and Virginia, to examine flooding challenges in specific areas of the cities of Norfolk and Hampton. After the examinations, research and discussions, the cities, and really, the region gained crucial feedback and long-term solutions on how to live and thrive with water.

After evaluating the Tidewater Drive District in Norfolk and Newmarket Creek watershed in Hampton and Newport News, participants proposed multilayered solutions such as starting a regional sea level rise compact, with frontline city managers and business alliances, working together to address regional concerns.

Other solutions proposed include adding more wetlands, in addition to preserving the quality of those that already exist and implementing multi-use roadways that incorporate walking and bike paths. As well as, creating "bioswales" or landscaped retention areas; adding green roofs; and using rain barrels to retain water and reduce demand.

“We have our work cut out for us, but it is exactly what we hoped for,” said Norfolk City Manager Marcus Jones.

To review Dutch Dialogues: Virginia presentations, plans and pictures go to, http://www.lifeatsealevel.org/.