Hampton Roads Coastal Resources Technical Assistance Program Fiscal Year 2019-2020 Final Report

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HAMPTON ROADS COASTAL RESOURCES TECHNICAL ASSISTANCE PROGRAM
FISCAL YEAR 2019-2020

Final Report

This report was produced, in part, through financial assistance from the Virginia Coastal Zone Management Program in the Virginia Department of Environmental Quality through Grant No. NA19NOS4190163 from the National Oceanic and Atmospheric Administration. The views expressed herein are those of the authors and do not necessarily reflect the views of NOAA or any of its sub-agencies. Federal financial assistance for this project amounted to $69,000 or approximately 50% of the total project cost.

This project was included in the Hampton Roads Planning District Commission Unified Planning Work Program for FY20, approved by the Commission on May 16, 2019, and in the HRPDC FY2020 Extension Work Program, approved by the Commission on May 21, 2020.

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 2019 – 2020 through its Coastal Resources Management Program. This program encompasses environmental impact review, participation in state and federal programs, coordination of regional programs addressing environmental issues, 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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Virginia Coastal Zone
MANAGEMENT PROGRAM

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

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Introduction

In March 2019, 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, including academic institutions and for-profit and not-for-profit entities. This program has operated successfully with financial assistance from the Virginia Coastal Zone Management Program since the VCZMP's inception in 1986. In October 2019, the HRPDC was awarded financial assistance to maintain its Technical Assistance Program through September 2020. This report provides an overview of the activities and accomplishments of the Hampton Roads Coastal Resources Technical Assistance Program during that period.

The Hampton Roads Technical Assistance Program is a comprehensive program, providing on-call staff capacity, a regional coordination mechanism, and technical analysis and research capabilities. It assists the region's localities on local issues in a timely manner, 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. 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, coordination on stormwater management, and planning for coastal issues such as resiliency and green infrastructure.

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, Stormwater Management, and Coastal Resiliency 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, Chesapeake Bay Preservation Act (CBPA) regulations, air quality regulations, and several state water quality programs. This participation results in cost savings to the state by educating localities

[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.

collectively about state and federal initiatives and coordinating local government input to these efforts. Over the past thirty-four (34) years, several hundred local government staff members from the region's seventeen 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, floodplain management, geographic information systems, land conservation, land use planning, coastal resiliency, green infrastructure, watershed management, and comprehensive coastal resources management. Local government board members, staff from other PDCs, and representatives of the private sector have also participated. As a result, the capacity of the region to address these issues has increased.

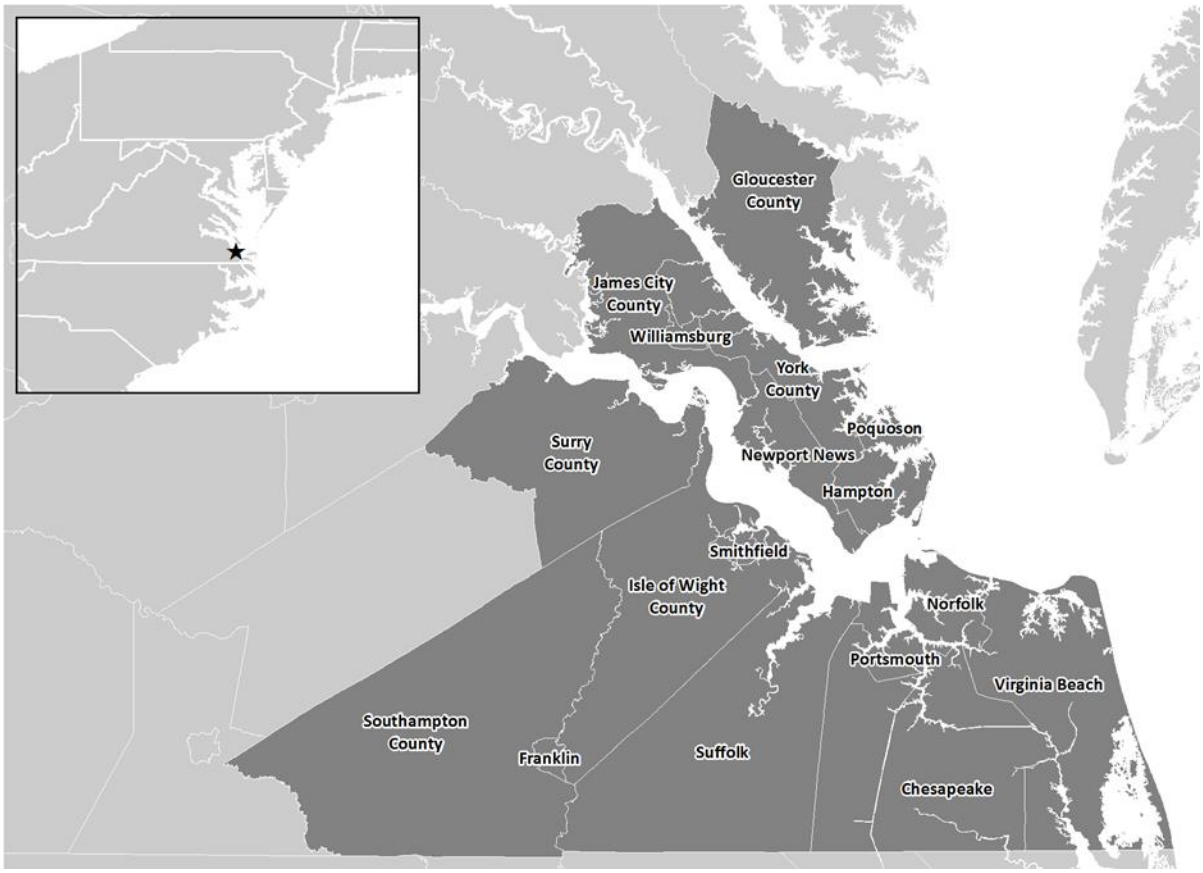

Figure 1: Map of Local Government Members of the Hampton Roads Planning District Commission

Through review of environmental impact documents and coastal zone consistency determinations, the regional coastal resources management 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 harbor dredging, military facility construction and operations, military-civilian encroachment issues, offshore energy and resource planning, 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, such as U.S. Census data, high-resolution elevation data, and land cover data, as well as datasets developed by HRPDC and Hampton Roads Transportation Planning Organization (HRTPO) staff. In 2018, the HRPDC started placing GIS datasets on its regional data portal, www.HRGEO.org.

The FY 2019 – 2020 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 - Chesapeake Bay issues, environmental impact review, local land use and comprehensive planning, wetlands protection, shoreline management, coastal resiliency, public access, and GIS data analysis. 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

The Hampton Roads Technical Assistance Program has six (6) primary objectives. 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, 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 state and federal priorities.
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 Program, 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 to involve a range of activities in the following categories: regional coordination, environmental impact review, public information and education, training, regional technical studies, and technical assistance.

Program Accomplishments

Regional Coordination

The regional coordination component of the HRPDC's Coastal Resources Management Technical Assistance Program includes the facilitation of meetings between the area's local governments and other organizations as well as participation in state and federal programs. 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, sea level rise, resiliency, and coastal zone management are coordinated and mutually supportive. This coordination process provides opportunities for local government innovation and enhancement of activities in each of these areas.

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. Through the Regional Environmental Committee, HRPDC staff support local governments in implementing legal requirements of various state and federal regulatory programs. This process also helps the region by providing support for coastal resources management and environmental education. The Regional Environmental Committee meets approximately ten to twelve times per year. The Hampton Roads Technical Assistance Program also enables the HRPDC staff to support regional coordination on issues related to coastal resiliency, sea level rise, recurrent flooding, and climate change. These issues fall under the purview of the HRPDC's Coastal Resiliency Committee, which is comprised primarily of locality senior officials and department heads. The committee meets on a quarterly schedule, with additional workgroup discussions of technical matters scheduled for off-months when necessary.

During this grant year, the HRPDC staff continued local government coordination of ongoing consideration of various environmental issues. Stormwater regulations and program management, the Chesapeake Bay, and coastal resilience continue to be issues of considerable interest. The meetings usually include 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 meeting summaries describe the discussions of the HRPDC Regional Environmental Committee during the past year.

October 3, 2019	The primary focus of this meeting was stormwater management. The meeting included staff presentations on the FY21 regional stormwater program budget, Virginia's Phase III Chesapeake Bay TMDL Watershed Implementation Plan (WIP), and policies to support green infrastructure for stormwater management. The meeting also included a presentation on a proposed bioenergy project being developed in Chesapeake, Virginia.
Outcome(s)	Outcomes of this meeting included the approval of the FY21 HRPDC Stormwater Program Budget and increased knowledge of stormwater management and bioenergy practices.
Meeting Materials	https://www.hrpdcva.gov/events/details/873/regional-environmental-committee/
Total Attendance	38
Total Stakeholders	22

November 7, 2019	The primary focus of this meeting was water quality. The main presentation from this meeting was from Dr. Ashley Haines, a professor at Norfolk State University, on a STEM curriculum program that includes community engagement. The meeting also included presentations on the VCZMP Coastal Needs Assessment, Governor Northam's Executive Order 6, and stormwater management.
Outcome(s)	Outcomes of this meeting included increased knowledge of water quality policy issues and the CZMP's long-term grant strategy.
Meeting Materials	https://www.hrpdcva.gov/events/details/874/regional-environmental-committee/
Total Attendance	21
Total Stakeholders	15

December 5, 2019	The primary focus of this meeting was land conservation. This meeting featured a presentation from Joe Weber, Virginia Department of Conservation and Recreation – Division of Natural Heritage, on the department's ConservationVision and ConserveVirginia programs. The meeting also included a presentation from Norfolk staff on the city's new special service districts for flood mitigation program and briefings on stormwater management and offshore wind.
Outcome(s)	Outcomes of this meeting included increased knowledge of land conservation tool and flood mitigation programs.
Meeting Materials	https://www.hrpdcva.gov/events/details/875/regional-environmental-committee/
Total Attendance	33
Total Stakeholders	18

February 6, 2020	The primary focus of this meeting was resiliency. The meeting featured a presentation from Mr. Tim Stromberg, Stromberg/Garrigan & Associates, on a plan to redevelop the Harbor Park area in Norfolk and a presentation from Ms. Whitney McNamara, Virginia Beach, on the city's participation in the Community Rating System. The meeting also included briefings on stormwater management and legislative developments.
Outcome(s)	Outcomes of this meeting included increased knowledge resiliency planning efforts and floodplain management policies.
Meeting Materials	https://www.hrpdcva.gov/events/details/1052/regional-environmental-committee-(rec)/
Total Attendance	32
Total Stakeholders	22

March 5, 2020	The primary focus of this meeting was land development practices. The meeting included a presentation from Ms. Dawn Oleksy, James City County, on recent changes to the county's recycling program and a presentation from Mr. Vince Maiden, DEQ, on resources available to help localities and developers redevelopment brownfield areas. The meeting also included briefings on stormwater management and legislative developments.
Outcome(s)	Outcomes of this meeting included increased understanding of how changes to the recycling industry are affecting local programs and awareness of brownfields development policies and programs.
Meeting Materials	https://www.hrpdcva.gov/events/details/1114/regional-environmental-committee/
Total Attendance	29
Total Stakeholders	19

June 4, 2020	The primary focus of this meeting was resilience. The meeting featured a presentation from Mr. Bryant Bays and Mr. Robbie Lewis, Virginia Department of Forestry, on the department's urban forestry and coastal resilience efforts. The meeting also included a presentation from HRPDC staff on the Get Flood Fluent regional flood risk outreach and education campaign and an update from HRPDC staff on the Chesapeake Bay Program. This meeting was held virtually.
Outcome(s)	Outcomes of this meeting included increased knowledge of how forestry practices can contribute to local resiliency.
Meeting Materials	https://www.hrpdcva.gov/events/details/1117/regional-environmental-committee/
Total Attendance	41
Total Stakeholders	19

July 2, 2020	The primary focus of this meeting was coastal hazards. The meeting featured a presentation from Mr. Mike Mundy, Virginia Beach, on a city project to convert the Bow Creek Golf Course to a park that will incorporate water storage and other flood mitigation components. The meeting also featured a presentation from Mr. John Harbin, Living River Trust, on efforts to convert frequently flooding residential parcels to conserved open space to reduce flood risk and improve ecological function. The meeting also included a briefing on how Surry County's new comprehensive plan addressed Chesapeake Bay Preservation Act requirements. This meeting was held virtually.
Outcome(s)	Outcomes of this meeting included increased knowledge of local and regional resilience efforts.
Meeting Materials	https://www.hrpdcva.gov/events/details/1118/regional-environmental-committee/
Total Attendance	32
Total Stakeholders	20

August 6, 2020	The primary focus of this meeting was land conservation. The meeting featured a presentation from Mr. Joe Weber, DCR-DNH, on ConserveVirginia 2.0, the department's new model for guiding land conservation activities in Virginia. The meeting also included a presentations from HRPDC staff on potential risks from hazardous materials stored in floodplains and regional solid waste management planning. This meeting was held virtually.
Outcome(s)	Outcomes of this meeting included increased knowledge of land conservation tools and regional planning.
Meeting Materials	https://www.hrpdcva.gov/events/details/1119/regional-environmental-committee/
Total Attendance	50
Total Stakeholders	27

September 3, 2020	The primary focus of this meeting was water quality and resiliency. The meeting featured a presentation from Mr. David Taylor, DEQ Tidewater Regional Office, on MS4 program matters. The meeting also featured a presentation from Mr. Joe Rieger, Elizabeth River Project, and Mr. Sam Bowling, Work Program Architects, on ERP's new headquarters and resiliency lab in Norfolk, which incorporates several resiliency best practices. The meeting also included updates on legislation, the state budget, and the FY22 regional stormwater program budget. This meeting was held virtually.
Outcome(s)	Outcomes of this meeting included increased knowledge of how buildings and sites can be designed to be more resilient and support for the FY22 regional stormwater management program budget.
Meeting Materials	https://www.hrpdcva.gov/events/details/1120/regional-environmental-committee/
Total Attendance	39
Total Stakeholders	23

The following The following meeting summaries describe the discussions of the HRPDC Coastal Resiliency Committee during the past year.

December 13, 2019	The primary focus of this meeting was coastal hazards. The meeting featured a presentation from HRPDC staff on Governor Northam's Executive Order 45, which included specific requirements for state agencies related to floodplain management. The meeting also included a presentation from HRPDC staff on how Surry County's new comprehensive plan incorporated resiliency. The meeting also included briefings and updates on the Joint Subcommittee on Coastal Flooding, potential state funding criteria, resilience project tracking, flood sensors, the state building code, and other matters.
Outcome(s)	Outcomes of this meeting included increased awareness of state resiliency policy efforts.
Meeting Materials	https://www.hrpdcva.gov/events/details/1026/coastal-resiliency-committee/
Total Attendance	32
Total Stakeholders	18

June 26, 2020	The primary focus of this meeting was coastal hazards. The meeting featured a presentation from Virginia Beach public works staff on the city's new Public Works Design Standards Manual, which incorporates several specific policies and requirements to promote resiliency to flooding. The meeting also included updates from HRPDC staff on the regional flood risk and insurance calculator and the regional first floor elevations project. This meeting was held virtually.
Outcome(s)	Outcomes of this meeting included support for developing regional standards and guidelines similar to Virginia Beach's new policies.
Meeting Materials	https://www.hrpdcva.gov/events/details/1168/coastal-resiliency-committee/
Total Attendance	35
Total Stakeholders	22

September 25, 2020	The primary focus of this meeting was coastal hazards. The meeting featured presentations from HRPDC staff on the regional roadway flooding sensor project the development of regional resiliency design guidelines, and regional legislative proposals and briefings on proposed changes to the Virginia Uniform Statewide Building Code and the FY21 HRPDC Coastal Resiliency Program work program and budget. This meeting was held virtually.
Outcome(s)	Outcomes of this meeting included consensus on moving forward with the regional roadway flooding sensor project and the development of regional resiliency design guidelines.
Meeting Materials	https://www.hrpdcva.gov/events/details/1171/coastal-resiliency-committee/
Total Attendance	43
Total Stakeholders	30

Full agendas and related materials, including presentations, for these and all HRPDC public meetings are available on the HRPDC website, www.hrpdcva.gov.

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, 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.

In the Hampton Roads region, the Hampton Roads Technical Assistance Program and its associated committees helps provide this function. Both HRPDC staff and local government members of the HRPDC Advisory Committees (including the Regional Environmental Committee, Directors of Utilities Committee, and Coastal Resiliency 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 recommend 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 2019-2020, this program included regional participation in state or federal programs addressing resiliency, stormwater management, groundwater, and the Chesapeake Bay Program.

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. During the past year, this included participating on the Department of Housing and Community Development's building code resiliency sub-workgroup and on the habitat restoration committee for the York River-Small Coastal Basins Roundtable.

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 one Coastal Policy Team meeting on January 15, 2020 and two Section 309 strategy workgroup meetings on February 24, 2020 (Cumulative and Secondary Impacts of Growth and Development), March 2, 2020 (Ocean Resources), and March 5, 2020 (Coastal Hazards). HRPDC also

participated in Coastal PDC meetings on October 8, 2019 (hosted by George Washington Regional Commission), June 9, 2020 (hosted virtually by Middle Peninsula PDC), and on September 17, 2020 (hosted by Northern Neck PDC).

The Coastal PDCs provide a network linking all regional agencies and localities in the Coastal Zone to address environmental issues. In recent years this network has provided support for multi-regional partnerships and initiatives, including working waterfronts and planning for the Lower Chickahominy River Watershed. The HRPDC staff has played an integral role in the development and enhancement of these larger networks as well. During the past year, HRPDC staff supported PlanRVA's Lower Chickahominy Watershed Partnership project by participating on the planning committee.

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. The HRPDC staff currently participates in the Chesapeake Bay Program's Water Quality Goal Implementation Team and Climate Resiliency Workgroup, attending in-person meetings when possible and otherwise participating in conference calls. Since March 2020, these meetings have been held as virtual video conferences and conference calls due to the COVID-19 pandemic.

Environmental Impact Review

The HRPDC staff reviews and comments on applications for state and federal regulatory permits, including 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, 2019 through September 30, 2020, the HRPDC staff reviewed and commented on eight (8) federal consistency certification for federal projects actions and two (2) environmental impact reviews, for projects from agencies such as the U.S. Navy, U.S. Air Force, U.S. Department of Housing and Urban Development, and the College of William and Mary. HRPDC staff also provided scoping comments on a U.S. Army Corps of Engineers shoreline stabilization project and a Hampton Roads Transit project. The specific projects are listed below. The HRPDC, in cooperation with the localities, worked to ensure that these projects were coordinated with 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.

1) DEQ #19-093F – ACOE Hampton Roads Bridge Tunnel Expansion Project
2) DEQ #19-112F – Navy Dredging of Pier 11
3) Hampton Roads Transit Proposed Bus Rapid Transit System
4) DEQ #20-021F – FAA Fuel Tank Installation
5) DEQ #20-028F – Navy Demolition Training Complex Upgrade
6) DEQ #20-029S – W&M Compton Drive Walkway
7) DEQ #20-037F – HUD Proposed Obici Apartments
8) DEQ #20-042F – Air Force Combat Adversary Air at Newport News-Williamsburg International Airport
9) DEQ #20-045F – Air Force Training Area 1 Shoreline Stabilization and Erosion Protection
10) Shoreline Stabilization, James River, City of Newport News
11) DEQ #20-046F – HUD Marlin Bay Apartments
12) DEQ #20-051F – ACOE Parkside Manor Development

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. In addition, projects are often submitted for environmental impact review before designs are complete. Localities often wait for permit applications, which require complete designs and plans, prior to commenting.

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. During FY 2019-2020, the HRPDC staff identified and completed three such projects: a non-linearity analysis of the impacts of sea level rise on storm surge analysis; development of design tailwater elevations for stormwater and floodplain management requirements; and the refinement of future floodplain mapping that incorporates sea level rise. These initiatives are described below.

Non-Linearity Analysis of Sea Level Rise and Storm Surge Flooding

Understanding both current and future coastal flood risk is important for both public and private sector entities to incorporate mitigation or adaptation strategies into their decision-making. At the local level, FEMA's Flood Insurance Rate Maps (FIRMs) and their accompanying data products provide the basis for planning decisions and building requirements. However, these products do not account for sea level rise. Some efforts, including previous efforts by the HRPDC, have applied a "bathtub" approach to combining sea level rise with current flood exposure. This approach involves adding a given amount of sea level rise, such as the HRPDC's sea level rise planning scenarios, to the results of a present-day storm surge model. An interpolation can then be run to generate new coastal floodplain extents or depths for various storm scenarios, such as the 1% annual chance storm. This approach was documented in the HRPDC's FY2018-2019 Technical Assistance Program report.

The "bathtub" approach is relatively simple to apply and does not require a large amount of processing time or cost. However, studies by the U.S. Army Corps of Engineers (USACE) and others have indicated that sea level rise may not have a linear impact on storm surge. In other words, adding three feet of sea level rise does not necessarily increase the flood elevation of the 1% annual chance storm by three feet. This work was documented in the USACE's North Atlantic Coast Comprehensive Study (NACCS).[2] Subsequent work by the City of Virginia Beach in consultation with Dewberry, built on the findings from the NACCS as part of the city's comprehensive program for addressing sea level rise.[3] Their approach used the model outputs from the NACCS for a one-meter sea level rise scenario compared to a linear rise to calculate non-linearity factors for sea level rise amounts of three feet and higher for the watersheds covered in the city's Public Works Design Standards Manual.[4] The formula for calculating a non-linearity factor is:

Non-Linearity Factor = (Modeled Surge Elevation with SLR) / (Existing surge elevation + SLR)[5]

The process for developing non-linearity factors begins with the spatial database from the NACCS. Each point in this database contains values for flood elevations of various recurrence intervals (10-year, 20-year, 50-year, 100-year, and 500-year) for the baseline analysis and for the analysis with one meter of sea level rise. A non-linearity factor is calculated for each point in the database for each recurrence

[2] https://www.nad.usace.army.mil/CompStudy/
[3] https://www.vbgov.com/government/departments/public-works/comp-sea-level-rise/Pages/default.aspx
[4] Virginia Beach Public Works Design Standards Manual, June 2020 https://www.vbgov.com/government/departments/public-works/standards-specs/Pages/default.aspx
[5] Dewberry Technical Memorandum to City of Virginia Beach Public Works Department, Dated October 31, 2018

interval. An average is then calculated for each point, and then an average is generated for all points within the corresponding HUC-10 and HUC-12 watersheds. Using this methodology, the HRPDC staff generated non-linearity factors for nearly all HUC-12 watersheds that are entirely or partially located within the HRPDC's coastal communities (this analysis does not cover Franklin or Southampton County, since they are not coastal). For HUC-12 watersheds without any points from the USACE analysis, the HUC-10 factor can be used as a substitute. The average non-linearity factor across all of the watersheds is 1.11, with a low value of 0.99 and a high value of 2.73. These outlier cases appear to be the result of a limited number of points and challenges with modeling storm surge in areas a significant distance from a major tidal body (the low value was far into the Southern Branch of the Elizabeth River, while the higher value was in a small watershed near Richmond). More research and analysis may be necessary to refine the factors in such areas. Overall, this analysis will improve planning for sea level rise. These values can be used to improve how sea level rise is incorporated into other data products, including floodplain mapping, local floodplain management requirements, and design standards. They will also be incorporated into the HRPDC's resilience design guidelines, which are currently under development.

Design Tailwater Elevations

Having design standards that consider both appropriate levels of risk and safety requirements and accurately reflect underlying environmental conditions is critical to protecting public health, safety, and welfare. The Commonwealth of Virginia and its cities, counties, and towns enact laws, regulations, and ordinances to ensure that development projects minimize negative impacts to the surrounding environment and communities. Stormwater management standards are an important part of Virginia's efforts to protect surface water quality and make sure that development is conducted in a way that is safe for the public. In coastal environments, design tailwater elevations are an important standard that help make sure that stormwater management infrastructure functions under certain minimum conditions. These standards establish a water elevation for any stormwater outfalls that drain to a water body based on a specific storm recurrence interval, such as the 1% or 10% annual chance storm event, or other specified condition.

In Hampton Roads, communities have varying requirements for tailwater assumptions. Some communities rely on the Virginia Department of Transportation's (VDOT) standards, which apply an elevation of 80% of the outfall pipe's diameter. Others, such as Chesapeake, establish one requirement for outfalls that drain to tidal waters and another for outfalls that drain to non-tidal waters. Virginia Beach, as part of its sea level rise and stormwater planning efforts, has adopted tailwater requirements for nine (9) watersheds or areas of the city. In addition to having geographic tailwater elevations, the city also factored sea level rise into those elevations.[6]

The HRPDC staff created a regional set of design tailwater elevations based on the methodology that Virginia Beach used for its new standards. Originally, the HRPDC staff considered using the published

[6] Virginia Beach Public Works Design Standards Manual, June 2020
https://www.vbgov.com/government/departments/public-works/standards-specs/Pages/default.aspx

stillwater elevations from FEMA's flood insurance studies for coastal communities in Hampton Roads. However, those studies only include elevations for four storm recurrence intervals (0.2%, 1%, 2%, and 10%) for specific transects or locations within the communities. Instead, the ADCIRC-generated storm surge grid was used, which had several relative benefits. This grid was created by the USACE as part of the storm surge analysis that was used to develop the flood insurance studies. Using the grid of points allowed for calculated an average for a given area, such as a watershed or shoreline, instead of using a specific point that may or may not be representative of an area. In addition, the grid also included the 4% annual chance stillwater elevation in addition to the four published recurrence intervals in the flood insurance studies.

The original grid included five scenarios corresponding to the 10-year, 25-year, 50-year, 100-year, and 500-year recurrence intervals. The HRPDC staff used the same methodology used by Virginia Beach and Dewberry to calculate stillwater elevations for the 1-year, 2-year, 3-year, and 5-year recurrence intervals.[7] This involved using the five elevations from the original grid to develop a log-linear extrapolation for each grid point. Baseline design tailwater elevations for all nine recurrence intervals were then generated by calculating the 95th percentile value for each HUC-12 watershed. Additional tailwater elevations were also calculated for each of the HRPDC's sea level rise planning scenarios (1.5', 3.0', and 4.5'). The tailwater calculations for the 1.5' sea level rise scenario used a linear extrapolation. The calculations for the 3.0' and 4.5' scenarios incorporated the non-linearity factors described above.

The design tailwater elevations developed as part of this special project are being incorporated into the HRPDC's resilience design guidelines.

Future Floodplain Maps

As part of the FY2018-2019 HRPDC Coastal Resources Technical Assistance Program, the HRPDC staff developed future floodplain maps that incorporated the HRPDC's adopted regional sea level rise scenarios: 1.5' of sea level rise by 2050, 3.0' of sea level rise between 2050 and 2080, and 4.5' of sea level rise between 2080 and 2100.[8] During FY2019-2020, the HRPDC has worked on efforts to improve these map products by increasing the number of flooding scenarios mapped and incorporating the non-linearity analysis for higher levels of sea level rise.

The standard 1% annual chance flood scenario is the most typical flood scenario used for local planning purposes since it corresponds directly with the products and requirements of the National Flood Insurance Program. However, other recurrence intervals are also useful to local floodplain management, resilience, or adaptation efforts. For example, the 0.2% annual chance flood or 500-year flood is also often incorporated into local floodplain management ordinances, while more frequent recurrence intervals, such as the 10% annual chance flood or 10-year flood may be used for stormwater management requirements or standards. During FY2019-2020, the HRPDC staff expanded upon the

[7] Dewberry Technical Memorandum to City of Virginia Beach Public Works Department, Dated October 31, 2018
[8] https://www.hrpdcva.gov/departments/water-resources/policy-guidance-

previous year's efforts to develop GIS layers for storm surge scenarios corresponding to the 10-year (10%), 25-year (4%), 50-year (2%), and 500-year (0.2%) recurrence intervals. In addition to developing GIS layers for the current flood scenarios, the HRPDC staff also developed future floodplain estimates that incorporated the regional sea level rise planning scenarios, accounting for non-linearity for the 3.0' and 4.5' sea level rise scenarios as described above.

These future storm surge floodplain maps have already been used in several other projects by HRPDC and partner organizations. The next step in this effort will be to integrate the storm surge scenarios with riverine and other floodplain data to create combined flood vulnerability maps that account for sea level rise. These maps will then be incorporated into the HRPDC's resilience design guidelines.

Local Assistance and Coordination

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, public access, floodplain management, 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 Wetlands Watch, Elizabeth River Project, Lynnhaven River NOW, and others in their environmental planning and restoration initiatives. GIS data, aerial photographs and additional technical information on wetlands, hazardous waste sites, and soils are provided to private consultants upon request. During this grant year, the HRPDC staff assisted localities with data needs for resiliency and water quality. In addition, the HRPDC staff continues to work with local government representatives to identify research priorities for issues of interest, such as stormwater, groundwater, and climate adaptation. One key research need that Hampton Roads localities have continued to express a need for is updated precipitation data and projections of future precipitation trends to inform local public works design standards. During the grant year, Virginia Beach completed a study on regional precipitation trends and adopted a revised Public Works Design Standards Manual incorporating future projections. The HRPDC staff continues to work with local, state, and federal partners to address this need. In addition, work from previous years on measuring land subsidence (a partnership with the U.S. Geological Survey) and detecting roadway flooding using sensors continues.

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 in FY2019-2020 continued to be

state and federal stormwater management programs, groundwater issues, the Chesapeake Bay Program, and coastal resiliency. Most of the region's member localities have received individual assistance through this program during the past year on request.

The HRPDC staff continued development and enhancement of the region's geographic information system (GIS). The HRPDC staff continues to build out the capacity of HRGEO, the HRPDC's online geospatial data portal. Located online at www.hrgeo.org, is an online GIS data resource that provides access to local, regional, state, and federal geographic data. The HRPDC staff continues to add data and applications to this portal. Over the past year, these included a resilience policy story map, a "map of the month" feature, and an application to help property owners and other interested parties determine if a property is located within a Chesapeake Bay Preservation Act Resource Protection Area.

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 coastal resources management issues of importance. During the year, briefings were given to the HRPDC on offshore wind energy development and coastal hazards.

The HRPDC staff has provided briefings on regional environmental programs, environmental issues and state and federal regulations to a variety of groups and given presentations on related HRPDC technical studies and programs at several state, regional, and national conferences. Briefings are also provided to state agency boards, legislative commissions, local government planning commissions, city councils/county boards, and town councils on request. During the grant period, HRPDC staff presented individually or on panels on several environmental issues, including stormwater management, the Chesapeake Bay TMDL, groundwater, and coastal resiliency. These meetings and presentations are summarized in Table 1.

Table 1: FY19-20 Coastal Resources Presentations by HRPDC Staff

Date	Event/Audience	Presentation Title
October 11, 2019	Hampton Roads Adaptation Forum	"Working Together to Become More Resilient: Hampton Roads Region Norfolk and Virginia Beach Joint Land Use Study"
November 8, 2019	National Association of Counties – Strengthening Coastal Counties Resilience Workshop	"Flood Insurance: A Regional Approach to Outreach"
December 5, 2019	Society of American Military Engineers	"Norfolk and Virginia Beach Joint Land Use Study"
February 5, 2020	2020 NOAA Social Coast Forum	"Flood Insurance: A Regional Approach to Outreach"
March 4, 2020	York 2040 Committee	"Planning for Coastal Resilience in Hampton Roads"
March 6, 2020	Chesapeake Conservation Conference	"Regional Planning for Coastal Resilience in Hampton Roads"
September 22, 2020	Department of Environmental Quality Climate Change Training	"Working Together to Become More Resilient: Hampton Roads Joint Land Use Studies"

The HRPDC regularly updates its website, www.hrpdcva.gov, with news articles and reports from HRPDC staff. During this grant, HRPDC planning staff posted sixteen (16) entries related to coastal management issues, covering topics such as wind energy, resiliency, flood insurance, and stormwater management. The HRPDC staff continues to update the agency's website, adding and updating program information, meeting materials, presentations from conferences or other outside events, and technical reports and other work products. 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, coastal resiliency, and water resources programs, including links to 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 the organization's YouTube channel.[9] Recordings of all virtually held meetings have also been posted to the agency's website and YouTube channel.

Through the Regional Environmental Committee, HRPDC staff has provided, facilitated, or hosted training on a variety of topics to localities. The HRPDC has partnered with state or federal agencies on various training events by providing logistical support. The HRPDC continues to partner with Old Dominion University and Virginia Sea Grant to hold meetings of the Hampton Roads Sea Level Rise/Recurrent Flooding Adaptation Forum. The HRPDC staff helps ODU faculty develop agendas, coordinate speakers, and publicize events. In addition, the HRPDC staff has established a Chesapeake Bay Preservation Act (CBPA) Working Group that brings together CBPA staff from each locality to share

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

insights, ask questions, and discuss program implementation. This group met four (4) times during the grant year. The specific training opportunities are listed in Table 2.

Table 2: Educational and Training Opportunities Provided in FY19-20

Program Title	Content Provider	Date	Host	Attendance
Measuring and Evaluating Resilience	HRPDC/ODU/ Virginia Sea Grant	October 11, 2019	Old Dominion University	86
CBPA Workgroup	HRPDC	October 28, 2019	HRPDC	15
VCZMP Coastal Needs Assessment	Virginia Coastal Zone Management Program	November 7, 2019	HRPDC	21
CBPA Workgroup	HRPDC	January 29, 2020	HRPDC	18
CBPA Workgroup	HRPDC	April 29, 2020	HRPDC*	18
CBPA Workgroup	HRPDC	July 29, 2020	HRPDC*	22
Site-Level Resilience Strategies	HRPDC/ODU/Virginia Sea Grant	July 31, 2020	Old Dominion University*	148

*These meetings were held virtually.

CZM Success Story

In October 2008, the HRPDC was awarded the first of a series 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 2009 (FY '09 Task 12.04), 2010 (FY '10 Task 12.04), 2011 (FY '11 Task 51), 2014 (FY '13 Task 54), 2015 (FY '15 Task 94.01), 2017 (FY '17 Task 84), 2018 (FY '18 Task 84), and 2019 (FY '19 Task 84). These efforts have required considerable research and analysis and have resulted in several reports which are now available on the HRPDC's website. These reports documented the results of various GIS analysis, mapping, and policy 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. Based in part on this work, the HRPDC's member localities have consistently recognized the importance of these issues and have support regional coordination to address them. In 2016 the HRPDC created a new, locally funded Coastal Resiliency Program, to provide coordination and technical assistance services to the region's localities. This program has been supplemented in the last year with focused discussions from the region's chief administrative officers and a new subcommittee of the HRPDC board.

The HRPDC's Coastal Resiliency Program has focused on the development of a comprehensive set of resiliency design guidelines for local governments. Inspired by other local efforts (such as those in Virginia Beach) and other programs nationwide (Maryland, New York City), these guidelines are taking the GIS and other research and analysis work that has been funded in part by the Virginia Coastal Zone Management Program to create a set of specific policy recommendations and related data products to support local resiliency efforts. The guidelines, which are in development, include sea level rise projections and trends, precipitation values, design tailwater elevations, and flooding and sea level rise inundation maps and GIS layers. Once complete, these guidelines will be shared with the HRPDC's local

governments and posted on the HRPDC's website and GIS data portal, www.hrgeo.org. They will also be shared with the other coastal planning district commissions to support capacity-building for resilience planning efforts throughout the coastal zone.

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. This past year has seen continued focus on issues such as stormwater management, sea level rise, and coastal resiliency, along with a renewed emphasis on implementation of the Chesapeake Bay Preservation Act. This continues a trend of the VCZMP providing capacity for the HRPDC to identify issues of interest and to enable support for addressing those issues over a period of several years. This support forms a major part of the HRPDC's capacity to support its member local governments' efforts to effectively manage coastal resources in Hampton Roads.