Fall 2018

DoD Chesapeake Bay Program Journal

PROTECTING THE CHESAPEAKE BAY FOR MILITARY READINESS, FOR OUR COMMUNITY, FOR FUTURE GENERATIONS

Meet the DoD Chesapeake Bay Program's New Team Member

By Stephanie MacDurmon, Brown and Caldwell

The Department of Defense (DoD) Regional Environmental Coordination office in Norfolk, Virginia is pleased to welcome Kevin Du Bois as its newest Chesapeake Bay Program (CBP) Coordinator. Mr. Du Bois brings an extensive environmental background and a keen eye for conservation efforts.

Mr. Du Bois received a Bachelor's degree from Southampton College, Long Island University, and a Master's degree from the SUNY Stony Brook School of Marine and Atmospheric Science. From 1986 to 1994, Mr. Du Bois worked with the New York State Department of Environmental Conservation to protect and manage fisheries, wetlands, and shorelines in the state. In 1994, he was hired by the US Fish and Wildlife Service on Long Island, New York as an Endangered Species Biologist.

In 1995, Mr. Du Bois and his family moved to Virginia where he accepted a position with the City of Norfolk. For more than 18 years with the Bureau of Environmental Services, he ensured coastal development projects met regulations for sediment and nutrient pollution and managed the City's Tidal Wetlands and Dune Permit Programs. Mr. Du Bois uses this knowledge to serve as a regular speaker in forums on living shorelines. During this period, Mr. Du Bois also served on the CBP's Shoreline Management Total Maximum Daily Load expert panel.

In 2014, he became the Executive Director of the Norfolk Environmental Commission and Keep Norfolk Beautiful (KNB). With a small staff and limited budget, he managed the City's environmental, beautification, recycling, and litter-prevention programs. Under his leadership, KNB was recognized with multiple national and regional awards.

Mr. Du Bois joined the Navy working for Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Environmental Planning Section, to manage the National Environmental Policy Act (NEPA) environmental impact review process in 2014. Mr. Du Bois then served briefly as Naval Station Norfolk's Natural Resources, Cultural Resources, and NEPA Program Manager. He joined the DoD CBP staff in May of 2018. "I'm really excited about using my natural resources background to complement the existing staff expertise on water quality issues. I look forward to working with DoD installations as they make progress towards cleaner water, restoring wildlife habitat, conserving land, adapting to a changing climate, and engaging DoD service members, employees, and their families in enhanced stewardship practices."

Aside from work, Mr. Du Bois is an avid fly fisher, backpacker, surfer, and photographer. In his personal time, he strives to be a good steward of the coast: volunteering with a number of environmental organizations to protect and restore the Chesapeake Bay, as well as working on his own property in the Lynnhaven River watershed. Mr. Du Bois is married with two daughters.

This Journal's Focus: Climate Resilience

The work done by the DoD CBP team and installations is even more important in an era of a changing climate. More frequent and extreme weather events require robust natural systems and structural practices to protect facilities, resources, and personnel essential to the DoD mission. Therefore, installations must adapt and incorporate resilient systems and processes. This journal highlights topics and examples related to climate adaptability and resilience at DoD installations. We would like to thank Joe Zurzolo of NAVFAC Washington and Ben McFarlane of the Hampton Roads Planning District Commission (HRPDC) for their contributions to this journal.

IN THIS ISSUE

New STAC Report on Efforts to Monitor and Assess Impacts of Climate Change on BMP Siting and Design

By Stephanie MacDurmon, Brown and Caldwell

The Chesapeake Bay watershed is experiencing stronger storms, increasing air and water temperatures, and a rise in sea level. Over the past 100 years, the Bay watershed has seen an average temperature increase of two degrees Fahrenheit, and the region has seen a 70 percent increase in rainfall measured during heavy storm events since 1958. These changes will alter human and natural systems in the watershed, requiring changes to how localities and other decision-makers achieve their restoration goals.

The Chesapeake Bay Program (CBP) Partnership has acknowledged the potential impact of changing climate conditions in relation to the ongoing efforts toward meeting the Chesapeake Bay total maximum daily load. State jurisdictions agreed to include descriptions of how they will address climate change in Phase III watershed implementation plans to account for expected increases in nutrient and sediment pollution. Pending the outcomes of future research, jurisdictions are also expected to include numeric goals in future two-year milestones. To that end, the Science and Technical Advisory Committee (STAC) released a report in March 2018 from a September 2017 workshop on best management practice (BMP) siting and design. The workshop participants identified three goals including:

1. Define the State of Knowledge

Ongoing research means the state of knowledge is still evolving. Though attendees agreed that more work is needed to understand the impacts of extreme weather and precipitation on BMPs, the workshop attendees concluded BMP resilience is influenced by six characteristics:

Sensitivity. BMPs function through a variety of mechanisms, such as retention, filtration, and biological uptake. The primary mechanism of the BMP determines its sensitivity to climate drivers. For example, many structural BMPs are sized based on historical precipitation statistics. Shifts from those historical norms may impact the performance of the BMP.

Adaptability. If a system can be modified, it is adaptable. The degree of adaptability is dependent upon the extent to which a system can accommodate change.

Timeliness. Timeliness refers to the amount of time needed to adapt or modify a system to address changing environmental conditions. BMPs with a shorter lead time are preferable. In this context, lead time is the amount of time and effort required to physically change the system,

PHOTO BY LESLIE BOORHEM-STEPHENSON, CBP.

The bank of a stormwater retention pond in Ellicott City, Maryland collapsed during historic floods in July 2016. Extreme events are occurring with greater frequency in the Bay watershed.

such as time for plants to mature or the extent of construction required to modify a BMP. This minimizes the amount of time necessary for the BMP to return to full functionality.

Cost-effectiveness. For a resilient BMP, the cost to prevent or remove increasing pollutant loads must be both reasonable and feasible.

Robustness. Robustness refers to the ability of a BMP to meet a stated goal over a range of future environmental conditions.

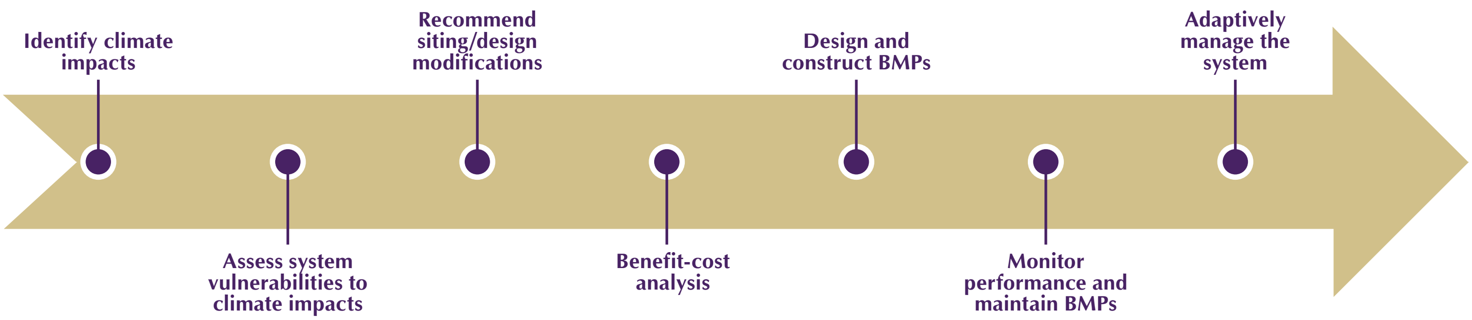
Co-benefits. BMPs that offer added or co-benefits are preferred. Those co-benefits may include habitat creation, recreation, mitigating for heat island effects, or flooding attenuation.

BMPs with resilient characteristics in these categories are more likely to stand the test of changing climate conditions and extreme events.

2. Provide Guidelines and Resources to Increase the Resiliency of BMPs

To account for the impacts of climate, project teams must meaningfully incorporate resilience in the design process. From a review of project-specific case studies, the report identified seven basic steps to factor climate considerations into the siting and design of water-quality BMPs.

The seven-step process is shown in the figure below.



Process to incorporate climate considerations in the location and design of BMPs.

The report also cites numerous resources for project managers seeking to learn more about future climate condition, modeling tools, and project guidelines.

Climate Information

- The Environmental Protection Agency (EPA) Stormwater Calculator
- The US Army Corps of Engineers Sea-Level Rise Calculator

Modeling Tools

- EPA System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN)
- EPA Stormwater Management Model (SWMM)

Project Guidelines

- Climate Smart Framework and Decision Support Tool (developed by the Climate Resilience Work Group)
- Naval Facilities Engineering Command Installation Adaptation and Resilience Planning Handbook

3. Identify Gaps and Priorities for the Future

The STAC workshop also identified future focus areas for the CBP Partnership. Those focus areas include: design guidance to increase resilience, improved modeling and monitoring protocols, targeted research to quantify impacts on structural integrity and pollutant removal, and advancement of programmatic practices that include legal and regulatory tools.

In summary, the report highlights high-level principles and processes to account for resilience in BMP siting and design. To see the full report, go to **http://www.chesapeake.org/pubs/392_Johnson2018.pdf**. In the end, though, this report provides only a framework for future projects. The next article describes a real-world example of an installation using these principles to develop a resilient and multi-benefit solution to a seemingly simple problem: a broken pipe. Read on to learn how NSA Annapolis and the US Naval Academy are looking to the future and building resilience for years to come.

Creative Solutions to Climate Resilience with Co-Benefits

By Joe Zurzolo, Naval Facilities Engineering Command (NAVFAC) Washington, PWD Annapolis

The United States Naval Academy (USNA), like many other DoD installations on the Chesapeake Bay, faces climate challenges including sea-level rise and flooding. The effects of higher tides and extreme storm events are often worsened by aging stormwater infrastructure at the end of its service life. At USNA, a collapsed 50-year old stormwater line in the Perry Center industrial area highlighted the need to integrate climate adaptation into routine stormwater facility maintenance. The collapsed line caused back-up and flooding of many upland assets. At first, the solution seemed simple and clear: fix the stormwater line. However, Maryland Department of the Environment regulation, the Clean Water Act, DoD guidance, and Navy environmental goals called for better approaches than simply installing a new pipe to replace the old one.

The new solutions required alternative thinking, and they were not without challenges. Like many DoD sites, the Perry Center consisted of paved surfaces, buildings, and an empty lot that once held a greenhouse and temporary structures from World War II. Unfortunately, the location was too small for a standard bioretention area and it was located only about 5 feet above and 50 feet from the inlet to the collapsed line. With those constraints in mind, NAVFAC considered an array of improvement options, such as: large- and small-scale pervious pavement, rebuilding three failed outfalls, and the installation of smaller rain gardens.

Ultimately, the USNA developed a more sustainable and innovative solution: the re-use of rainwater through a system to convey stormwater, prevent tidal backflow, and reduce the discharge of pollutants. The project included a subgrade 25,000-gallon storage vault rated for traffic and pumps that transferred collected rainwater to a bioretention area. Controls were

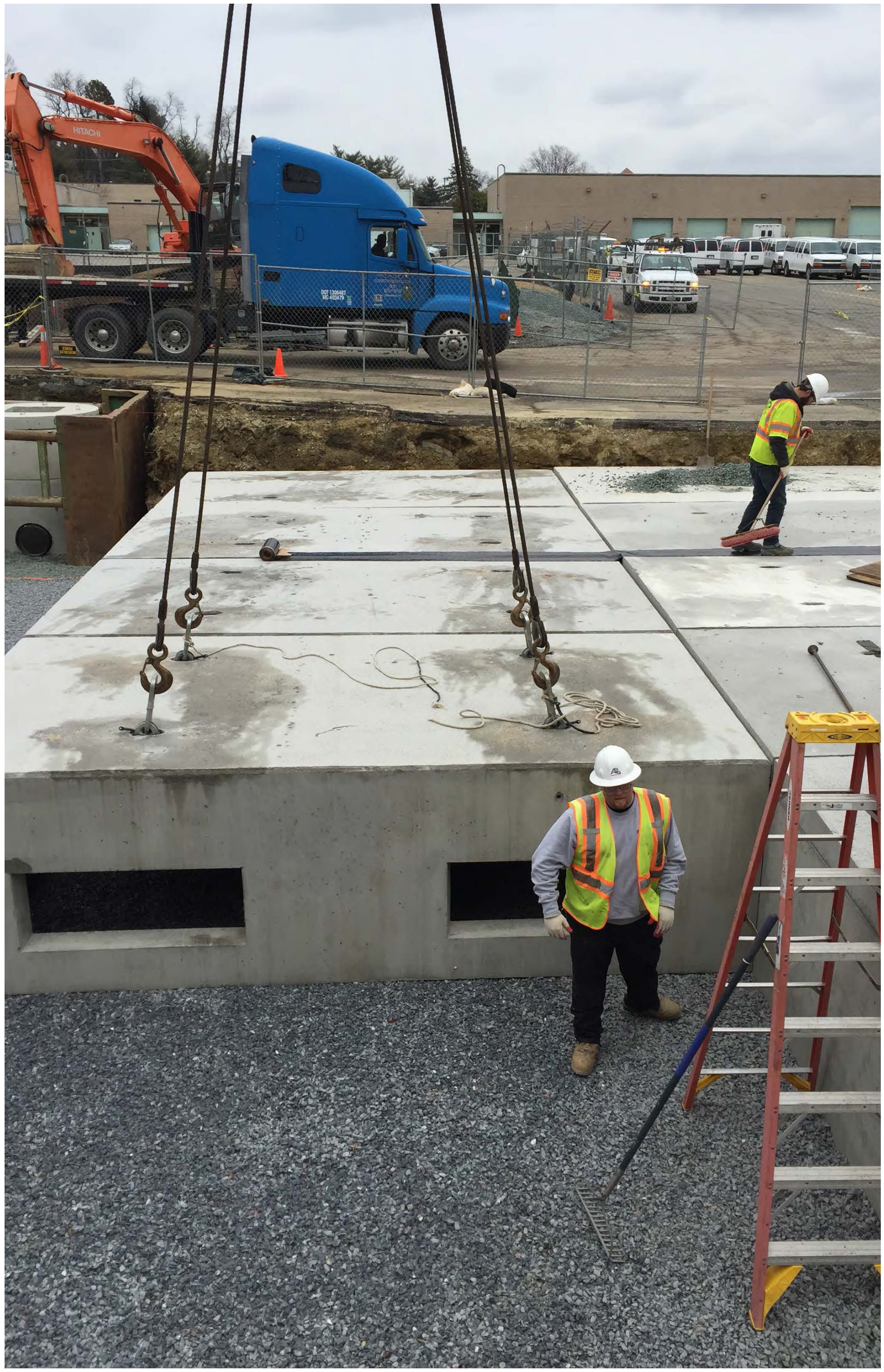
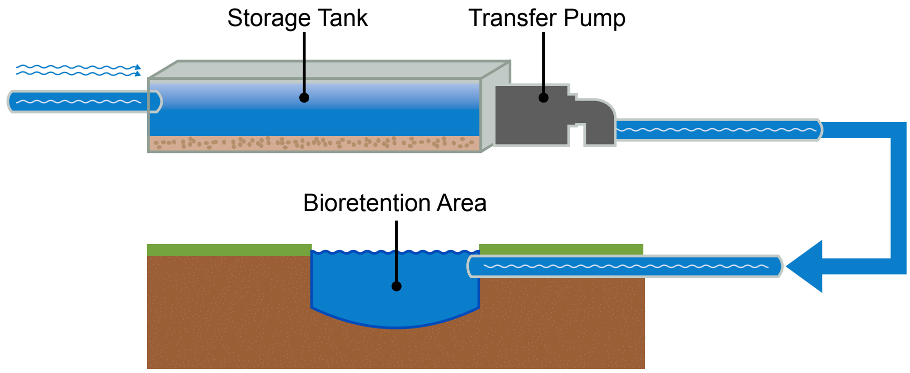


PHOTO BY JOE ZURZOLO, NAVFAC WASHINGTON

This photo shows the tank system with the transfer pump vault in the back-left corner. The openings in the tanks create a flow path to slow stormwater and settle out debris before it enters the transfer pump station and is discharged to the bioretention pond.

Ultimately, the USNA developed a more sustainable and innovative solution: the re-use of rainwater through a system to adequately convey stormwater, prevent tidal backflow in the stormwater line, and reduce the discharge of pollutants.



System diagram of the prototype installed at the Perry Center: stormwater flows into a storage tank where debris are settled. A pump transfers water based on the level to a downstream bioretention cell.

installed to monitor the water level in the bioretention cell and phase the delivery of water.

With the added storage provided by the vault, the bioretention area is able to operate as if it were twice its actual size. As a result, the system is capable of treating over four acres of impervious surface with no impact to operations. The storage vault is also protected from tidal flow. To reduce the overall energy demand, solar panels were placed on a nearby building that provide continuous power to the building and pumps used to operate the vault, resulting in a "net-zero" energy project.

The benefits of innovative thinking for this project are measurable. Two years after completion, all phases of the project continue to function as designed with little maintenance required. In the end, the completed project treats more than seven acres of impervious surface, improved drainage, and effectively ended storm-induced flooding in vehicle-staging areas. But this pilot project was just the beginning…

The Perry Center project—and particularly the tank and harvesting solution—was a prototype of a much larger design effort funded by Commander, Naval Installations Command (CNIC) via NAVFAC Environmental. The larger project applies the concept of pre-treatment and storage at a watershed scale. The first full design, called the Bancroft Watershed Repairs, treats stormwater from 63 acres, reduces 36.7 acres of impervious surfaces, and provides more than 5 million gallons of harvested rainwater for irrigation of more than 50 acres of training fields. In addition, the system provides improved drainage to the storage tank system and isolation from tidal backflow.

A companion project in the academic areas at USNA is also in the works using similar concepts from the Perry Center and Bancroft Watershed improvements. Once built, the projects will together treat more than 110 total acres, providing 72 acres of impervious surface retrofit credit toward the Chesapeake Bay total maximum daily load for nutrients and sediment. The project is also expected to eliminate nuisance flooding and provide sea-level rise and flood protection to an elevation of 5.0 feet NAVD. All of these projects will mark a new era of infrastructure and operational resilience for the installation with design features to integrate longer-term responses to flooding and sea level rise. All of this can be achieved while improving Anti-Terrorism Force Protection configuration, adding parking, and improving traffic flow/safety.

Capable NAVFAC engineers are using their talents to achieve even greater advances in pollution abatement and climate resilience. This project demonstrates how CNIC via NAVFAC Environmental afforded local NAVFAC engineers the opportunity to innovate and improve the installation's stormwater system. The result was a large-scale project to improve water quality and reduce the discharge of pollutants with no negative impact to operational area and functions. Across the Chesapeake Bay, DoD faces ongoing challenges to maintain mission readiness while achieving greater resiliency for future operations. The DoD and its NAVFAC engineers have the technical expertise and ability to innovate to meet these challenges and mitigate the obstacles facing the Chesapeake Bay.

Project Scale-up

By the Numbers

Prototype:

Perry Center Project

25,000 gallon vault

Net Zero Project | Treats **7** acres of impervious area

First phase:

Bancroft Watershed Repairs

Treats **63** acres (including **36.7** acres of impervious area) | **5 million** gallons of harvested rainwater

Full implementation:

Across US Naval Academy

Treats **110** acres (including **72** acres of impervious area)

Building Community-Military Resilience

By Ben McFarlane, Hampton Roads Planning District Commission (HRPDC)

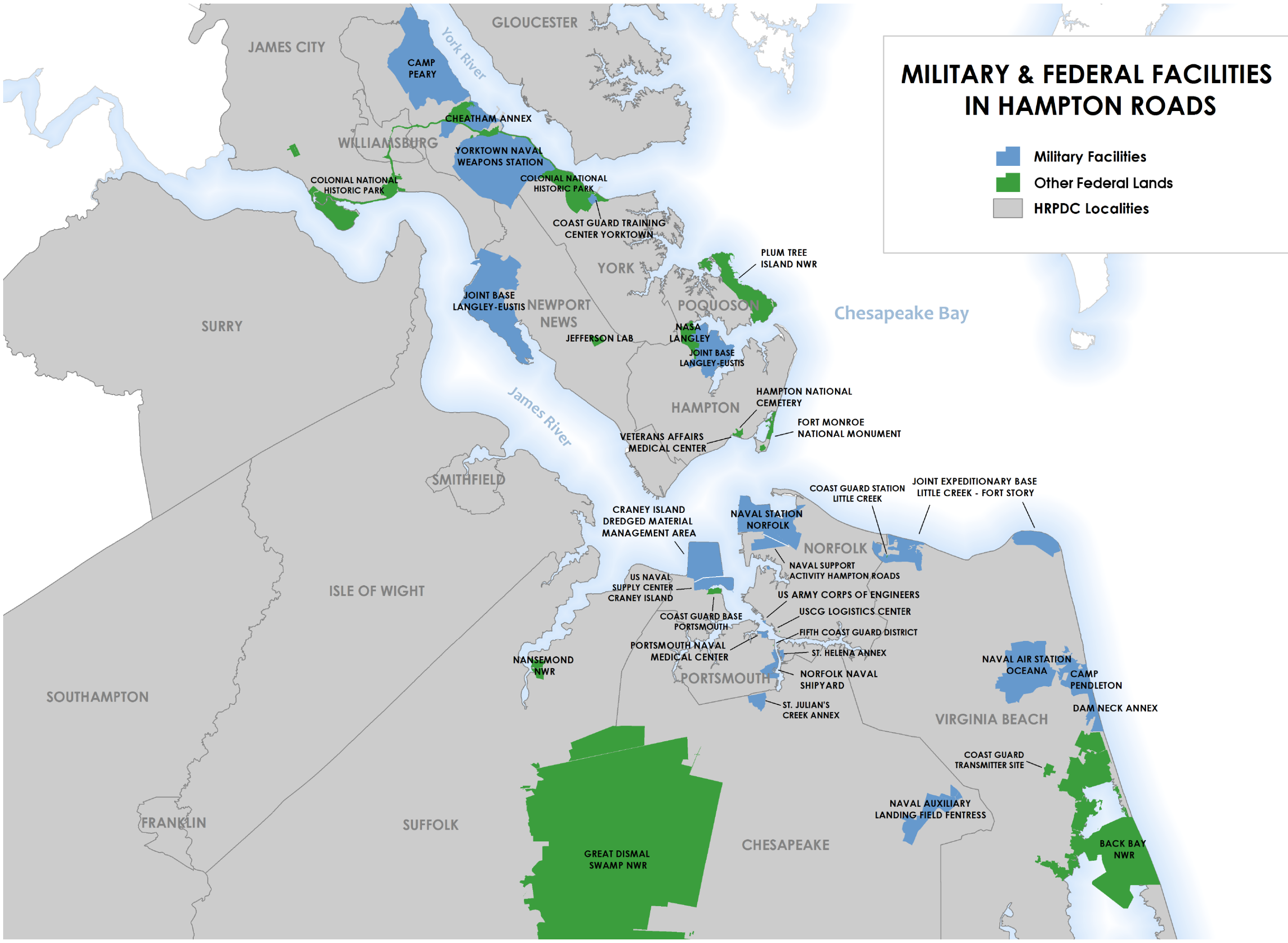


PHOTO PROVIDED AND RELEASED BY HRPDC

Military installations, shaded in blue, have a significant footprint in the cities of Norfolk and Virginia Beach in the Hampton Roads area of Virginia.

With a population of over 1.7 million, Hampton Roads, Virginia, is the nation's 37th largest metropolitan area. It is also home to one of the largest concentrations of military installations in the world. Many of these installations are located in or near urban centers, so coordination between communities and installations is essential to minimize the risks to the public and military operations. One of the tools to address these issues is the Joint Land Use Study (JLUS), a planning process managed by the DoD Office of Economic Adjustment. The JLUS provides a forum for installations and localities to address conflicts and issues of mutual concern. For example, in Hampton Roads, successful studies have addressed conflicts between the airfields at Langley Air Force Base (Hampton), Naval Air Station Oceana (Virginia Beach), Naval Auxiliary Landing Field Fentress (Chesapeake), Naval Station Norfolk (Norfolk), and the surrounding areas.

Hampton Roads is also becoming known for its vulnerability to coastal hazards, including flooding and sea-level rise. The region has the highest rate of relative sea level rise on the East Coast. That, combined with the relatively flat terrain, means many coastal communities are experiencing more frequent flooding.

The guiding principles of the Joint Land Use Study are:

- **Sustain the military mission**
- **Support economic viability and community growth**
- **Promote civilian-military collaboration**

Military installations are also feeling the same impacts. As a result, six cities recently partnered with their local military installations to start the conversation about how to reduce the impacts of flooding on military operations in the region through approved JLUSs. The JLUS projects all attempt to answer the same questions: How does flooding outside the fence line impact military readiness, and what can local governments due to mitigate those impacts?

The Hampton Roads Region – Norfolk and Virginia Beach JLUS is specifically focused on improving the resilience of Navy installations in the cities of Norfolk and Virginia Beach. The two cities and four participating installations (Joint Expeditionary Base Little Creek-Fort Story, Naval Air Station Oceana, Naval Station Norfolk, and Naval Support Activity Hampton Roads) joined forces to broadly analyze how flooding negatively affects military readiness. What roadways are critical to base access, and when do they flood? How do city stormwater systems and other infrastructure support Navy properties? What community assets do Navy personnel and their families rely on? How are those assets affected by flooding? What community improvements, including services, infrastructure, or development patterns, can improve base operations? These questions were considered through the lens of the process's guiding principles, noted on the previous page.

Through this process, departments from both Norfolk and Virginia Beach gained a better understanding of the specific challenges that the Navy installations face related to flooding. Although still underway, the project has already had several beneficial results. Participants identified city assets critical for the Naval community. That information can now be used by city staff to make decisions and prioritize future improvements. Projects already identified in the cities' capital improvement programs were assessed to determine how they may benefit the Navy. Projects with noted benefits may be eligible for state or federal funding. Alternatively, localities may prioritize those projects for city funds. The JLUS also developed policy recommendations to improve community resiliency and protect military readiness.

PHOTO BY J. DEREK LOFTIS, VIRGINIA INSTITUTE OF MARINE SCIENCE.

Flooding along critical roadways near military installations, like Hampton Boulevard, can disrupt access to bases during storm events. The photo depicts flooding at the intersection of Hampton Boulevard and Lexan Avenue in Norfolk as a result of Hurricane Hermine in September 2016.

More generally, the study helped both the Navy and the cities recognize the need for ongoing dialogue on the study's recommendations and other issues that emerged during the process. Like many others, this JLUS is the beginning of a process that will help both the Navy and the communities protect installations in Hampton Roads for years to come.

How to Participate or Obtain Information

The Norfolk and Virginia Beach JLUS was initiated in February 2017 and is expected to be completed this fall. Please visit the project website at **www.hamptonroadsjlus.com** for updated information about the process, schedule, and methods for input. The dates of the next two public meetings have not yet been announced but will be held at the HRPDC office.

PHOTO BY KEVIN DUBOIS, DODCBP.

The JLUS is a coordinated effort between military installations and the surrounding community to identify vulnerabilities and build resilience to provide mutual benefits. In this photo, Captain Dean VanderLey provides a brief at the HRPDC public meeting on May 2, 2018.

Where to Put the Water: Assessing the Vulnerability of Urban Stormwater Systems to a Changing Climate

By Michelle Karpaitis, Brown and Caldwell

More extreme weather events are on the rise. Since the 1990s, scientists have observed higher than average annual rainfall and more intense weather events. Also, over time, it has become apparent that these more intense rain events negatively impact stormwater systems, and the inability of stormwater systems to convey increased flow from those events leads to millions of dollars in damage. As a result, more attention must be focused on stormwater management to minimize flooding and protect water quality, especially in urban areas.

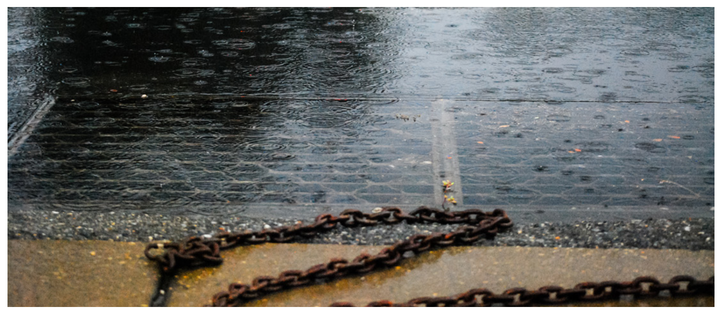
In an applied research project, Michael H. Simpson and his colleagues at Antioch University New England used the cities of Minneapolis and Victoria, Minnesota in the Minnehaha Creek watershed to demonstrate how to develop an urban stormwater vulnerability assessment that accounts for more frequent extreme storms. The process can be summarized in the following four steps.

Minnehaha Creek Watershed

The Minnehaha watershed in Minnesota includes the cities of Victoria and Minneapolis. This image and the graphic on the next page are sourced from the full published paper on this project (Stack et al, 2014).[1]

Step 1: Build Stakeholder Capacity. The first step to assess vulnerability is to build stakeholder capacity in the community. A broad and educated stakeholder base can help communities develop solutions from the bottom up and avoid many common missteps from lack of awareness. In Minnesota, Simpson used the Nested Adaptive Management Approach. This approach begins with small local meetings, then grows to a regional task force, and lastly evolves into a watershed-wide force. Simpson emphasizes the importance of understanding how citizens perceive their environment and what issues they associate with weather and climate. Then, their observations can be grouped in categories of environmental issues. In the Minnesota communities, intense storms and impacts from flooding rose to the top after stakeholder discussion.

Once existing problems are catalogued, the conversation shifts from the stakeholders' personal experiences to the science. However, this transition can often be difficult for community members without a scientific background. Therefore, using scientific data related to local events helps make the connection so the audience is more engaged when the information reflects their own experiences and concerns. **The Climate Resilience Toolkit** and **National Climate Assessment** are examples of online resources that provide extensive information including case studies, reports, and tools on climate-related topics. These tools can connect stressors and outcomes, such as increased precipitation that leads to significant flooding. Taking it one step further, the increased property damage and costs to the owners demonstrate the inadequacy of existing stormwater systems.



PHOTOS BY MIKE LAND, CBP.

For many citizens, clogged storm drains or street flooding may be their first exposure to the effects of climate change. These events can also be the symptoms of a stormwater system that is not resilient to climate change effects.

Step 2: Applied Research Approach. To assess resilience, researchers must evaluate the design of the existing system. The Minneapolis stormwater system was designed based on the rainfall amount and frequency of a historical design storm (a 10-year, 24-hour event) defined from precipitation records through 1957. Given the flooding reported by residents, that design is no longer sufficient for current conditions. Simply, a 10-year, 24-hour storm in 2018 does not look like one from 1957. However, sophisticated models and tools now exist to project the characteristics of a future 10-year, 24-hour storm. The model used by Simpson and his team

[1] *Stack, Latham & Simpson, Michael & Moore, Trisha & Gruber, James & Yetka, Leslie & Gulliver, John. (2014). Long-term climate information and forecasts supporting stakeholder-driven adaptation decisions for urban water resources: Stormwater and cost, under population growth and climate change. 10.13140/RG.2.2.24572.13444.*

projected what a 10-year, 24-hour storm would look like in the mid-21st century. This projection accounts for the changes in impervious area and the potential impact of green infrastructure. It also analyzes the impact of upsizing existing systems versus using other floodwater storage options. The results include estimates of cost savings from averted flood damage by the more resilient infrastructure system.

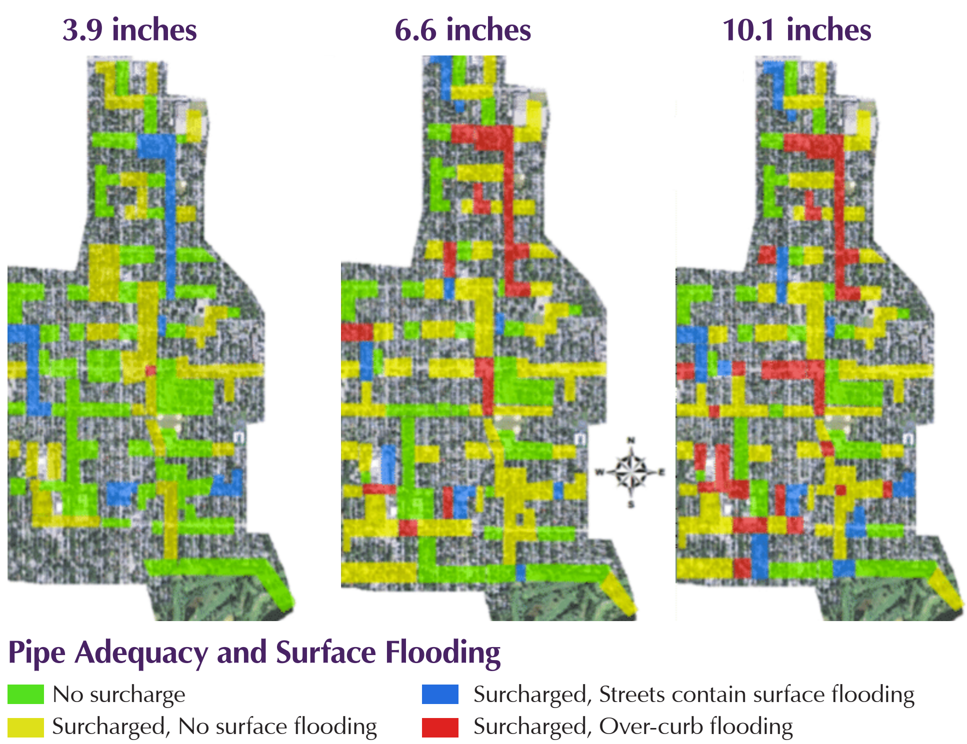
Step 3: Analysis of System. At-risk areas should be identified in the analysis. Using the EPA's Storm Water Management Model in the Hiawatha watershed, a sub-watershed of the Minnehaha in urban Minneapolis, researchers modeled the response of undersized stormwater pipes for a range of rainfall amounts. This type of analysis provides stakeholders with a range of potential outcomes from multiple scenarios. Visual graphics, like color-coded maps, of the results can help stakeholders identify at-risk areas. For example, pipe adequacy can be displayed in stoplight maps that color code pipes that are not full and those that are beyond capacity and overflowing (i.e. surcharged). A surcharged pipe may occur without surface flooding, with street flooding, or with over-curb flooding. See the image at right for an example of this type of graphic. Stakeholders can then visually compare the effects of different storms in their neighborhood.

Other data provided to stakeholders may identify the length of pipes needing to be upsized and the cost, as well as how improvements will reduce negative outcomes. In Minneapolis, the analysis found that upsizing pipes in the upper part of the watershed would lead to increased flooding in the lower portion. In cases like this, other options must be identified and evaluated. Implementing alternative options in an already built-up watershed may stir political debate, but with our changing climate, inaction leads to tangible consequences.

In the developing Victoria community, urbanization has resulted in an increase in impervious area, decreasing the watershed's ability to absorb rainfall. However, analysis of Victoria's stormwater system found the system was more resilient than in Minneapolis. For example, moderate and worst-case-scenario rainfall events led to flooding of recreational areas but no over-curb flooding, which would cause property damage. This may be because Victoria had incorporated 31 stormwater management features throughout the stormwater system and implemented policies to create or fund resiliency, including local ordinances, development requirements, and stormwater fees. As a result, the system responded more effectively to extreme events.

Step 4: Building in Cost. Cost is an important consideration for stakeholders and community leaders. The inconvenience of road closures due to flooding is minor compared to structural damage from over-curb flooding. The Minnesota study identified the number of structures with an elevation below the Federal Emergency Management Agency base flood elevation. These findings were also used to to assess damage risk and provide an estimate of the per-flood cost. This cost was compared with the estimate for construction of other strategies designed to increase the system's resilience. This analysis puts the benefits of adaption in perspective with the savings from avoided damage. Additionally, green infrastructure has significant social and economic benefits as a tool to offset flooding impacts compared to traditional infrastructure. It was found that incorporating low-impact development with alternative mitigation options can reduce project costs from 32 to 45 percent, depending on the practice, relative to traditional gray infrastructure improvements. There are also co-benefits reaped from green infrastructure as it helps mitigate water quantity and restores water quality.

Increased rainfall, more intense storms, and aging infrastructure will eventually require decision-makers to answer the question: Where do we put the water? Through a stormwater vulnerability assessment, stormwater managers can find the best option based on local concerns, conditions, and costs. At installations, such an approach could proactively identify vulnerabilities and provide a full analysis of the costs and benefits of multiple solutions in multiple scenarios. Like the Minnesota communities, DoD installations are seeing more flooding, and in-depth analyses of the stormwater system may ensure that critical facilities and missions are not impacted, now or in years to come.



Stoplight map of pipe adequacy and surface flooding in Minneapolis.

EPA Releases Midpoint Assessment

From EPA Press Release, edited by and with additions from Stephanie MacDurmon, Brown and Caldwell

On July 27, the Environmental Protection Agency (EPA) released its midpoint assessment of efforts by Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, the District of Columbia, and federal partners to reduce the delivery of nitrogen, phosphorus, and sediment pollution to the Chesapeake Bay. The 2010 Bay total maximum daily load (TMDL) requires that 100 percent of the necessary pollution control measures to restore the Bay be in place by 2025 with controls in place to achieve 60 percent of the needed reductions by 2017.

Collectively, the Bay jurisdictions have made considerable progress in reducing pollution delivery to the Bay. That progress has been demonstrated in measurable ways, including record-breaking amounts of other Bay health indicators, including underwater grasses (i.e. submerged aquatic vegetation). EPA also estimates that attainment of water quality standards is at its highest in more than 30 years. According to data submitted by the Bay jurisdictions, restoration efforts across the watershed exceeded the 60 percent goals for phosphorus and sediment. Additional work is needed to meet the midpoint goal for nitrogen. All reductions were assessed using the Phase 5.3.2 suite of modeling tools.

In the urban sector, EPA found that, while states have improved their regulatory programs, overall loads continue to increase due to population growth and development. Maryland and Pennsylvania committed to significant reductions in this sector and will need to reevaluate their strategies to meet the 2025 goals. In some states, over 70 percent of the urban land is not regulated under a municipal separate storm sewer system permit. EPA indicated that these jurisdictions need to either implement additional voluntary programs or consider broadening their regulatory authorities to reduce runoff pollution from these areas.

	Agriculture	Urban/Suburban	Wastewater	Trading/Offsets
Delaware	Enhanced Oversight	Ongoing Oversight	Ongoing Oversight	Ongoing Oversight
District of Columbia	Not Applicable	Ongoing Oversight	Ongoing Oversight	Ongoing Oversight
Maryland	Enhanced Oversight	Enhanced Oversight	Ongoing Oversight	Ongoing Oversight
New York	Ongoing Oversight	Ongoing Oversight	Enhanced Oversight	Ongoing Oversight
Pennsylvania	Backstop Action Levels	Backstop Action Levels	Ongoing Oversight	Enhanced Oversight
Virginia	Ongoing Oversight	Ongoing Oversight	Ongoing Oversight	Ongoing Oversight
West Virginia	Ongoing Oversight	Ongoing Oversight	Ongoing Oversight	Ongoing Oversight

2018 Oversight Status — Ongoing | Enhanced | Backstop

This graphic shows the oversight status of four source sectors in the Bay jurisdictions in 2018. Graphic adapted from EPA Press Release.

Collectively, the Chesapeake Bay watershed jurisdictions have made considerable progress reducing pollution to the Bay.

EPA's assessment includes an evaluation of the state jurisdictions' and federal agencies' progress toward meeting their 2016-2017 milestones and their 2018-2019 commitments. These two-year milestones are short-term goals that were developed by the states, the District, and federal partners with support from EPA to help meet the 2025 targets.

The "Evaluation of Federal Agencies' 2016-2017 and 2018-2019 Milestones" reviewed the progress of all federal agencies toward 2016-2017 milestones and priorities for 2018-2019 milestones. Based on the data submitted, federal agencies met the 2017 watershed-wide target for phosphorus and sediment but not the nitrogen target. The evaluation highlighted achievements by DoD installations from the 2016-2017 milestones, including ongoing participation in CBP workgroups, coordination among DoD staff through the Chesapeake Bay Action Team (CBAT), and the collection and reporting of BMP data. It also included a summary of the 2018-2019 milestones, including DoD's plans to conduct an internal midpoint assessment and develop 2025 scenarios that support jurisdictions' Phase III watershed implementation plans (WIPs).

Looking forward, the partners recently approved updated, numeric planning targets for nitrogen and phosphorus based on improved science, modeling, and monitoring information. Strategies to help meet these refined targets will be outlined in the state jurisdictions' Phase III WIPs, which are due to be released in draft form in April 2019 and finalized in September 2019.

For more info or to read the Midpoint Assessment, go to: **https://www.epa.gov/chesapeake-bay-tmdl.**

Chesapeake Bay Action Team (CBAT) Updates

By Michelle Karpaitis, Brown and Caldwell

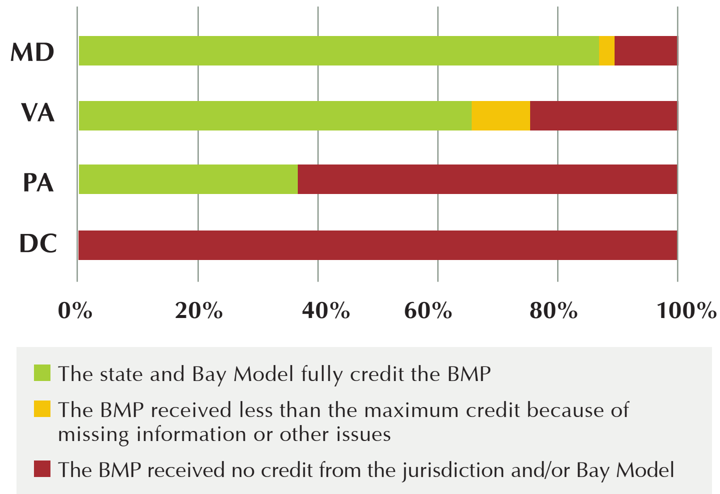
Members of the CBAT convened for their quarterly meeting on July 26, 2018, to discuss new best management practices (BMP) crediting reports, review the upcoming datacall needs, and overall Chesapeake Bay Program Updates.

BMP Crediting Reports and the Fiscal Year (FY) 2018 Datacalls

Due to new functions that the Chesapeake Bay Assessment and Scenario Tool (CAST) provides, the DoD CBP was able to fund a project to assess the crediting of BMPs reported by installations in Maryland, Pennsylvania, Virginia, and Washington, D.C. Each BMP follows a crediting process from the installation to the Chesapeake Bay Watershed Model (Bay Model), and the reports summarize BMP information in two ways: (1) if a BMP is credited to DoD in the Bay Model with the DoD Agency Code and (2) if a BMP is credited at all. From the report, each BMP was assigned a color: RED if no credit could be verified in the Bay Model, YELLOW for partial credit due to missing information, and GREEN if a BMP is fully credited in the Bay Model. RED and YELLOW BMPs were also assigned an explanation code with a short description why the BMP received less than full credit. Some non- or partial-credit issues will be resolved by the DoD Chesapeake Bay Program (CBP); others will be the responsibility of the installations to improve the status of YELLOW and RED BMPs by reviewing their records for accuracy, providing missing information, and updating inspection and maintenance dates.

The BMP datacall, released on July 31, was discussed. Installations were asked to report progress BMPs (implemented between July 1, 2017 and June 30, 2018), planned BMPs (to be implemented between July 1, 2018 and June 30, 2025), and historical BMPs (implemented prior to July 1, 2017) in the state template appropriate to their installation. Several required fields will be emphasized in this year's and future datacalls: up-to-date inspection and maintenance information to maintain credit; latitude and longitude locations; and information for all required fields outlined in red, which ensure maximum credit for BMPs. The DoD CBP encouraged installations staff to coordinate internally to ensure natural BMPs were reported in the BMP datacall.

The Project and Indicators datacall, released on August 31, was also discussed; responses will be due by October 1. Installations were asked to update and report projects funded or programmed through FY2025 and update the indicators and metrics on the Installation Information sheet. This year's template includes questions to respond to EPA's Phase III watershed implementation plan (WIP) expectations for federal lands and facilities, including: acres of anticipated growth, active permits, and funding mechanisms and resources for BMP implementation.



This graph shows the percent of DoD-validated BMPs in the Bay Model, regardless of agency code. See the BMP Crediting Reports for more information.

MS4 Redevelopment Credit Opportunities

Ms. Hanses discussed the background of municipal separate storm sewer system (MS4) total maximum daily load (TMDL) reporting and redevelopment. MS4s must provide local plans and annual progress reporting for the Bay TMDL. Redevelopment is sometimes overlooked as a crediting opportunity, but it can provide "free" TMDL credit to installations.

Since redevelopment credit calculations vary by state, it was recommended to check those standards. Highly developed installations or installations with changes to mission may have more redevelopment, but each installation should consider the overall reductions and credit from redevelopment as potentially substantial. In the Bay Model, credit for all BMPs, including redevelopment of land, is accounted for through the collection of BMP data, in conjunction with updated land use information in CAST.

Chesapeake Bay TMDL 2017 Midpoint Assessment and DoD Chesapeake Bay Program Updates

- Welcome to Kevin Du Bois, the newest member of the Chesapeake Bay Program team
- Phase III WIP planning meetings are underway
- National Public Lands Day applications and DoD Legacy Proposals were due in July and August, respectively. The Legacy Project for oysters at ATFP was not accepted for FY2019. Additional projects will be submitted in the future
- The next CBAT meeting is scheduled for October 30.

DoD/DoN Chesapeake Bay Program Office
1510 Gilbert Street
Building N-26, Room 3300
Norfolk, VA 23511

Check it Out

Chesapeake Bay Program *Quick Reference Guide for BMPs.* The BMP guide provides summarized profiles for CBP-approved BMPs.

Washington Post Features USMC Base Quantico and Virginia Tech Collaboration. Read the full article at: **https://tinyurl.com/y8pjmge3**

Signs of Resilience Video. CBP has released a video on resilience in the Chesapeake Bay. Watch the video at: **https://www.chesapeakebay.net/discover/videos/signs_of_resilience_in_the_chesapeake_bay**

Unlikely Ally: How the Military Fights Climate Change and Protects the Environment. A new book, released September 1, highlights efforts by DoD installations to combat climate change and maintain mission readiness in California.

CBAT Quarterly Conference Call. October 30, 2018, 10:00 a.m. to 12:00 p.m. EDT. The agenda will include discussion of the results of the Midpoint Assessment.

Attend: Norfolk Naval Station, Building N-26 Room 3303

Call in: 1.866.749.3638/Passcode: 7362645

Web connect: **https://conference.apps.mil/webconf/quarterlyCBAT**

Supporting DoD Installation Sustainability Through Informed Stormwater Management. SERDP-ESTCP webinar, November 1, 2018, 12:00 to 1:30 pm, EDT. Register online: **https://serdp-estcp.org/Tools-and-Training/Webinar-Series**

CBP Reports Watershed-Wide Progress Toward Environmental Education Goals. Learn more at **https://www.chesapeakebay.net/news/blog/chesapeake_bay_program_reports_progress_toward_environmental_education**.

This newsletter is produced by Brown and Caldwell under NAVFAC Atlantic A-E Contract N62470-14-D-9022 for Support of Safe Drinking Water Act and Clean Water Act Environmental Compliance Program. For more information or to be added to the email distribution list, please contact the DoD Chesapeake Bay Program: http://www.denix.osd.mil/chesapeake/home.