Fall 2026

DoW Chesapeake Bay Program Journal

Edited by the DoW Chesapeake Bay Program Team

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

Department of War Meets its Chesapeake Bay Program, Water Quality Federal Planning Goals in Pennsylvania

By U.S. Department of War Chesapeake Bay Program and Jacobs Solutions Inc.

Based on an analysis of data submitted by installations and reported to Pennsylvania, the Department of War (DoW) has met and exceeded its nitrogen and phosphorus pollution reduction targets by the Chesapeake Bay Program 2014 Watershed Agreement's deadline of December 31, 2025. This work demonstrates DoW's federal leadership in the protection, conservation, and restoration of the Chesapeake Bay.

The Chesapeake Bay and its tributaries contain excess nutrients and sediment from various sources. In spite of extensive restoration efforts over 25 years, the Bay was still considered impaired by the U.S. Environmental Protection Agency (EPA). Therefore, in 2010, a Chesapeake Bay Total Maximum Daily Load (TMDL) planning tool was developed by the EPA to calculate the maximum amount of nitrogen, phosphorus, and sediment that the Bay could receive and still meet applicable water quality standards pursuant to the Clean Water Act.



PHOTO CREDIT: JEN GUYTON/WILDPATH

Part of a 3,000-acre restoration effort at Letterkenny Army Depot, Pennsylvania, this meadow features a diverse mix of native wildflowers supporting reestablishment of wildlife habitat and a wide range of pollinators.

To meet the water quality goals of the 2014 Chesapeake Bay Watershed Agreement and the Chesapeake Bay TMDL, the Bay jurisdictions prepared Watershed Implementation Plans (WIPs) that also account for the nutrient and sediment pollution that is generated from DoW land. As part of the WIPs, the jurisdictions have established "Federal Planning Goals" that set maximum pollutant loads that federal agencies can generate and still support achievement of the jurisdiction WIPs.

The DoW Chesapeake Bay Program collects, analyzes, and reports pollution reduction practices implemented by military installations to document progress toward achieving those Federal Planning Goals. As an example, we know that DoW installations in Pennsylvania implemented best management practices on approximately 872 acres and restored approximately 6,674 linear feet of stream banks in Fiscal Year 2025, and that helped them meet their Federal Planning Goals.

Pennsylvania installations have met the current 2014 Watershed Agreement Federal Planning Goals, which is laudable. However, we also know that updates to the Phase 7 Chesapeake Bay Assessment Tool (CAST) model, changes in land use, and the effect of changing environmental conditions on best management practice (BMP) effectiveness, may require additional load reductions to meet updated TMDL obligations in 2029, so this is no time to take the foot off the gas. Pennsylvania installations should continue to conduct BMP inspections and maintenance to retain credit. They should also implement natural and nature-based projects with a water quality co-benefit as they work to implement their integrated natural resource management or resilience plans. These advances will put them in a favorable position to meet future requirements.

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Commander's Guide to the Chesapeake Bay – Focus on Natural Resources

By DoW Chesapeake Bay Program

The Chesapeake Bay region provides realistic training and testing environments to prepare military units for the variety of natural settings encountered during combat operations and humanitarian relief efforts. Moreover, the health of the Bay directly impacts the quality of life of military personnel, their families, and other civilian personnel who call it home.

The DoW Natural Resources Program supports the military's combat readiness mission by ensuring continued access to realistic natural conditions while simultaneously working to ensure the long-term sustainability of our nation's priceless natural heritage. The DoW manages its natural resources consistent with the Sikes Act, which requires that military installations with significant natural resources implement Integrated Natural Resources Management Plans (INRMPs) to manage those resources. INRMPs, which are signed by the Installation Commanding Officer and are coordinated with the U.S. Fish and Wildlife Service and an appropriate state agency:

- Describe natural resources, protected species, and critical habitat present on the installation
- Identify projects to maintain or improve natural resource areas or species
- Sustain or adapt installation natural resources and ecosystem services to persist with anticipated changes in environmental conditions
- Provide an opportunity to identify natural and nature-based projects that meet multiple installation goals and objectives

Projects that align with multiple Chesapeake Bay Goals include stream, wetland and shellfish restoration; shoreline stabilization; tree and riparian buffer planting; fish passage improvement; and wildlife management.

The DoW Chesapeake Bay Program supports installation staff to meet its statutory and regulatory requirements, and leverage assets to meet installation needs. Recent collaborations with the U.S. Army Corps of Engineers Engineering With Nature Program have been integrated into comprehensive strategies to prioritize the implementation of natural and nature-based projects that simultaneously meet natural resource, air and water quality, and installation resilience objectives for mission assurance.



PHOTO CREDIT: KATIE ORLINSKY/WILDPATH

Unmanned Aircraft Systems (UAS) training at Fort Indiantown Gap (FTIG)



PHOTO CREDIT: KATIE ORLINSKY/WILDPATH

Grassland habitat at FTIG

The Sentinel Landscapes Partnership is a coalition of federal agencies, state and local governments, and private organizations that work with willing landowners and land managers to advance sustainable land use practices around military installations and ranges. Located in central Pennsylvania's Appalachian Mountains, the Kittatinny Ridge Sentinel Landscape is anchored by FTIG, located in Annville, Pennsylvania. FTIG is the nation's busiest National Guard training center and the Army's second most active heliport. As one of only three specialized Army National Guard aviation facilities, FTIG is critical in preparing warfighters and projecting military strength and capabilities in forward-deployed areas. The sentinel landscape encompasses forested ridges and fertile valleys that provide clean water and serve as a crucial corridor for rare wildlife and bird migration.

Success Story: U.S. Army Garrison Fort Lee Maintains Resilient Training Environment by Restoring Bailey Creek

USAG Fort Lee, Environmental Management Division

The health of the Chesapeake Bay watershed relies heavily on the countless smaller streams and rivers that feed into it. U.S. Army Garrison Fort Lee has long recognized this critical connection and maintains a proud history of environmental stewardship. Through water monitoring, stormwater management, and aquatic restoration initiatives, the installation remains committed to protecting its local waterways while sustaining the infrastructure and training environments essential to military operations.

At the heart of these efforts is Bailey Creek, an 8.6-mile tributary of the James River located entirely within the Chesapeake Bay watershed. As a vital ecological landmark on the installation, protecting the creek's natural ecosystem is a priority for the Environmental Management Division. Maintaining a sustainable balance between rigorous military training and natural resource conservation helps ensure that our forces have access to realistic, resilient landscapes and reliable infrastructure that support mission requirements for years to come.

Identifying the Challenge

In 2021, the U.S. Army Engineer Research and Development Center conducted a thorough inspection of Fort Lee's 5th Street bridge, which spans Bailey's Creek. The inspection revealed that the bridge was overall in poor condition. Structural cracking was evident, but the environmental findings were equally concerning: three of the five box culverts were severely obstructed by heavy sediment deposition and vegetation.

Obstructed culverts are more than just a structural nuisance; they severely impair the natural hydrologic flow of a stream. This bottleneck effect forces water to move unnaturally, accelerating erosion in other areas of the stream and degrading the habitat for local aquatic life. Left unaddressed, such conditions could reduce installation resilience and increase maintenance requirements while negatively affecting the surrounding ecosystem.

Implementing a Solution that Strengthens Installation Resilience

Recognizing the urgency, Fort Lee initiated a comprehensive restoration project that went beyond simple infrastructure repair. Crews cleared the blocked culverts of accumulated sediment and vegetation, restoring the stream's natural flow and improving hydraulic performance of the bridge.

The project also included removal of a large, obsolete concrete dam and the sediment trapped behind it. To ensure long-term stability, adjacent stream banks were regraded and reseeded with vegetation selected to minimize future erosion. Throughout construction, environmental specialists carefully monitored project activities to ensure compliance with environmental regulations and minimize impacts on the surrounding ecosystem.



PHOTO PROVIDED BY USAG FORT LEE

Proposed sediment removal on the south side of Bailey Creek

A Lasting Impact for the Chesapeake Bay and the Military Mission

The Bailey Creek Restoration Project has delivered lasting benefits. Not only did the project repair structural damage and improve stream flow, but it also implemented erosion control measures that will safeguard this section of the creek for decades. Removal of the concrete dam restored Bailey Creek to a more natural, free-flowing state, supporting aquatic health and advancing water quality goals in the Chesapeake Bay watershed.

The project strengthened installation resilience by protecting critical infrastructure, reducing erosion risks, and preserving the natural landscapes that support military training. The revitalization of Bailey Creek demonstrates that environmental stewardship and military readiness go hand in hand. By investing in localized conservation projects, Fort Lee is improving water quality, safeguarding mission-essential assets, and ensuring the installation remains ready to support soldiers and their mission well into the future.



PHOTO PROVIDED BY USAG FORT LEE

Bailey Creek 5th Street bridge after the restoration project

Success Story: Fort A.P. Hill Improves Resilience by Engaging in Community Stewardship and Restoring Clean Water

By Andrew Satterwhite, Fort A.P. Hill

Fort Anderson-Pinn-Hill Environmental and Natural Resources Division has been working diligently to improve and restore the functions of stormwater BMPs across the installation. These projects have included removing trees, replacing riprap, and adding matting to improve erosion issues. Implementation of these maintenance techniques restore the proper function of stormwater BMPs and further contributes to the restoration of clean water to the Chesapeake Bay, while improving installation resilience and maintaining operational readiness for training.



PHOTO CREDIT: FORT A.P. HILL

Fort A.P. Hill Environmental and Natural Resources Team

Additionally, the Environmental and Natural Resources Division engaged in community stewardship by leveraging seasonal support. During the summer, seasonal support staff assisted in the completion of projects that required a larger team to accomplish. Together, seasonal staff and members of the Environmental and Natural Resources Division hand cut and hauled away problem trees that were compromising the function of the forebay and detention basin in a stormwater BMP. This project exemplifies the power of teamwork and community engagement in improving installation resilience and restoring clean water.





PHOTO CREDIT: FORT A.P. HILL

Forebay and Detention Basin before and after removal of unwanted trees

Success Story: Installation Cleanup Events Protect the Warfighter and Support the Mission

By Angela S. Jones, DoW CBP

Between March and June 2026, the DoW Chesapeake Bay Program collected cleanup information from installations in the watershed that organized events as part of Clean the Base Day. Installations across the military services in Virginia, Maryland, and the District of Columbia mobilized volunteers to clean up their shorelines, streets, piers, streams, and barracks. These efforts directly support the military missions by maintaining a safe and healthy environment for training, readiness, and overall mission accomplishments, while simultaneously helping installations comply with critical environmental laws and regulations. The scope of these cleanups highlights DoW's role as a leader within the Chesapeake Bay Program Partnership and demonstrates its strong stewardship ethic in keeping with the goals and objectives of the Clean Water Act for the protection and restoration of the Chesapeake Bay.

Metric	Achievement Details
Scope of Operations	Installations across military services in VA, MD, and D.C.
Engagement	Conducted 22 events engaging 713 volunteers
Area Cleaned	Cleaned approximately 70 miles of shoreline, streets, piers, streams, barracks, and other areas of the installation
Debris Removed	Collected and removed 23,496 pounds of trash and debris

Check out some of the installations within the watershed engaging civilians and military personnel during various installation cleanup events.

Joint Expeditionary Base Little Creek – Fort Story, VA

During three events in May and June 2026, 28 volunteers from the installation collected more than 10,000 pounds of trash and debris from more than 13 miles of coastline.

Lafayette River Annex, VA



PHOTO PROVIDED BY JACQUELINE BORT, LRA

In May 2026, 16 volunteers collected 21 bags of trash, wood, and large pieces of debris near the installation's shoreline. Approximately 710 pounds of trash and debris were collected.

Naval Air Station (NAS) Oceana, VA



PHOTO PROVIDED BY SEAMAN CIERRA MIDDLETON, NAS OCEANA

During two events in April 2026, nearly 200 military and civilian volunteers from NAS Oceana, Dam Neck Annex, and Naval Support Activity (NSA) Portsmouth removed more than 100 pounds of trash and debris and participated in a dune restoration project.

Joint Base Langley-Eustis (JBLE)-Langley, VA

During Clean the Bay Week in June 2026, 21 volunteers at JBLE-Langley cleaned 3 miles of shoreline and collected approximately 550 pounds of trash.

NAS Patuxent River, MD

On April 13 and June 3, 2026, 59 volunteers collected nearly 1,200 pounds of trash and debris.

Naval Station Norfolk, VA

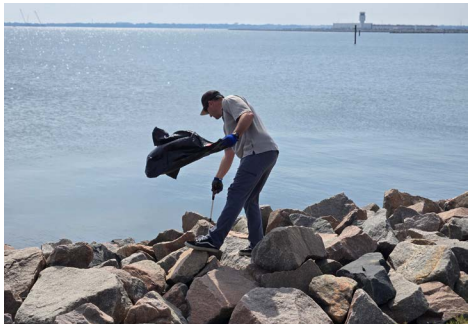


PHOTO PROVIDED BY ANGELA JONES, DOW CBP

During multiple events, 48 volunteers from the Environmental Department, DoW Chesapeake Bay Program, and tenant commands on the installation came together to collect almost 365 pounds of trash and debris.



PHOTO PROVIDED BY ALMA VELA, NAVAL SUPPORT ACTIVITY WASHINGTON

Washington Navy Yard, D.C.

On March 20, 2026, more than 60 volunteers collected 1,456 pounds of trash and debris.



PHOTO PROVIDED BY WILLIAM FABEY, NSF INDIAN HEAD

Naval Support Facility Indian Head, MD

During three events in April 2026, 51 volunteers, both military and civilian, collected approximately 1,380 pounds of trash and debris.



PHOTO PROVIDED BY SHELBY WEST, NNSY AND NSA PORTSMOUTH

Norfolk Naval Shipyard and NSA Portsmouth, VA

During three events in April, May, and June 2026, 63 volunteers collected almost 4,050 pounds of trash and debris.

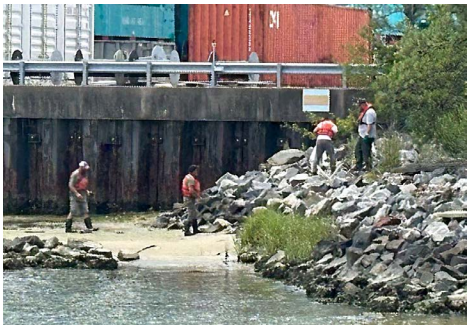


PHOTO PROVIDED BY SCOTT FISHER, USCG BASE PORTSMOUTH

United States Coast Guard Base Portsmouth, VA

During two events in May and June 2026, 99 volunteers collected nearly 2,500 pounds of trash and debris.

Naval Weapons Station Yorktown and Cheatham Annex, VA

On May 21, 2026, 11 volunteers cleaned almost 5.5 miles and collected 100 pounds of trash and debris.

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Biochar-Enhanced Bioretention: An Emerging Tool for Meeting DoW Chesapeake Bay Program Stormwater Goals

By Jacobs Solutions Inc.

Biochar is a charcoal-like substance with a honeycomb structure that helps it absorb and retain nutrients. Biochar-enhanced bioretention is an emerging technology that may offer the DoW installations a way to increase pollutant removal and extend the performance of existing stormwater BMPs. Although the Chesapeake Bay Program Partnership's (Partnership's) crediting for biochar is still under review, current research indicates that biochar may help installations advance Chesapeake Bay TMDL goals with relatively minor modifications to existing bioretention practices in the future.

Chesapeake Bay Program Goals

Excess nutrient and sediment loads in the Chesapeake Bay watershed pollute local waterways and impair water quality throughout the watershed. CBP goals include reducing nutrient and sediment loads to restore the Chesapeake Bay. The Chesapeake Bay TMDL requires reductions in total nitrogen, total phosphorus, and total suspended solids.

DoW installations encompass over 400,000 acres in the Chesapeake Bay watershed and play a critical role in promoting and reaching the Chesapeake Bay restoration goals through the implementation of BMPs to reduce nutrient and sediment loads from stormwater runoff.

The CBP Urban Stormwater Workgroup (USWG) actively investigates emerging stormwater management tools to address watershed restoration goals and is reviewing the use of biochar in stormwater BMPs for additional nutrient and sediment reduction credits under the Chesapeake Bay TMDL.

What is Biochar?

Biochar is a stable, carbon-rich material produced by pyrolysis, which is a process that heats biomass such as wood, crop residues, or organic matter under an oxygen-limited environment. Its porous structure provides for additional water retention and allows for greater surface area for pollutant adsorption, so the material is being increasingly integrated into stormwater treatment systems. Research indicates that biochar can enhance infiltration, increase pollutant reductions, and improve soil health.

Biochar and Bioretention Performance

Bioretention BMPs are engineered systems that mimic natural processes by incorporating fabricated soil media, vegetation, and surface storage to capture stormwater runoff in a shallow depression. These systems promote filtration and biological treatment of stormwater runoff before it is discharged or infiltrated into the ground.

Biochar can be added to new or existing bioretention systems by blending it into the bioretention soil media mix at a specified percentage by volume. The enhanced soil media mix can be implemented into new bioretention systems during construction, or to existing bioretention systems through the replacement of the soil media during retrofit activities.

Biochar offers the following potential benefits that enhance bioretention BMPs by improving stormwater treatment, reducing additional runoff, and increasing BMP resilience:

- **Enhanced pollutant removal** and capture through a high surface area and adsorption capacity
- **Reduced stormwater runoff volume** and localized flooding mitigation by increasing water retention rates within bioretention media
- **Improved soil and plant health** by retaining water, balancing pH in acidic soils, and storing essential nutrients for vegetative growth
- **Reduced soil compaction** to restore degraded or compacted BMPs by promoting root growth and oxygen availability
- **Carbon sequestration and sustainability** through the reuse of organic waste materials and long-term storage of carbon

Chesapeake Bay Program Review

The Partnership's Science and Technical Advisory Committee published a May 2023 biochar workshop report that focused on how biochar could be used to help meet Chesapeake Bay water quality goals. In November 2024, the USWG initiated efforts to review the use of biochar in BMPs for additional pollutant reduction credit. In support of this effort in March 2025, the Center for Watershed Protection (CWP) submitted a white paper titled Biochar as an *Enhancement to Bioretention Practices in the Chesapeake Bay Watershed* supporting the findings that biochar-amended bioretention has the potential to improve stormwater treatment and

BMP performance. The white paper identifies considerations related to implementation, performance verification, and crediting. Based on USWG review comments on the white paper, CWP is continuing to refine stormwater management modeling of biochar and to further refine the protocol for incorporating biochar into bioretention BMPs.

Opportunities for DoW Installations

If biochar is approved for credit by the Partnership, DoW installations can evaluate if they want to specify it for new bioretention facilities or use it to retrofit or rehabilitate existing bioretention facilities to get additional pollutant reduction credits.

Biochar used in the filtering media of bioretention facilities is labeled as biochar-enhanced bioretention media (BEBM). It can be incorporated through soil blending either at the soil vendor's location or onsite.

For new bioretention facilities using BEBM, the design should follow state design requirements. For retrofit or rehabilitated bioretention facilities, a minimum of the first 1 foot of existing material should be removed and replaced with BEBM and should be followed up with replanting. The CWP estimates that adding biochar to bioretention media can increase the total cost of a new bioretention facility by 2 to 5.5 percent while also increasing the runoff reduction credit. Biochar offers the opportunity to improve BMP performance and meet stormwater management objectives without substantial cost increases or changes to existing design approaches.

Proposed Biochar TMDL Crediting

- **New Bioretention:** Potential runoff reduction credit increase of 20%
- **Existing Bioretention:** Varies
- **Example:** If half of the filter media volume for a bioretention BMP is replaced with biochar, this would result in receiving half of the 20% maximum potential increase in credit, equating to a 10% overall increase in existing runoff reduction credit.

Implementation Considerations

DoW installations can consult the CWP white paper for guidance on incorporating biochar into bioretention BMPs if it is approved for TMDL crediting.

- Biochar should be wood-based and contribute to 14 to 18 percent of the bioretention mix by volume.
- Biochar-enhanced media should be incorporated up to a depth between 1 and 3 feet.
- Maintenance routines follow the same protocol as traditional bioretention media and continue to be vital for optimal functionality.

Research and performance modeling of biochar continues, so potential issues should be considered before implementation. Potential consequences and limitations in using biochar include unbalanced uptake of plant nutrients and therefore plant growth opportunity, pesticide adsorption requiring greater application rates, potential runoff transport of pollutants from aged biochar, and dust emissions caused by improper storage and handling. The proposed standards and biochar material requirements to be employed by the Partnership are intended to reduce the potential for these consequences and implications.

Conclusion

The incorporation of BEBM in new and existing bioretention BMPs has been documented by several institutions as providing additional pollutant removal and other benefits with minimal cost increases and design changes. As the Partnership continues to evaluate the impacts of biochar implementation, crediting and implementation strategies will continue to progress. If BEBM is approved for Chesapeake Bay TMDL crediting, DoW installations should consider using it in their bioretention BMPs to help achieve additional pollutant reductions.

FOR MORE INFORMATION
International Biochar Initiative (IBI) Standards
https://biochar-international.org/biochar-standards/

Chesapeake Bay Action Team Updates

By Jacobs Solutions Inc.

The Chesapeake Bay Action Team has not met since publication of the last DoW Chesapeake Bay Journal. The next meeting will be held **November 19, 2026**.

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1510 Gilbert Street
Building N-26, Room 3300
Norfolk, VA 23511

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Webinars and Links of Interest!

Upcoming and Past Webinars *(past webinars can be accessed at the links provided)*

- **09/10/2026: Innovative Approaches to Resolving Coastal Resilience Data Gaps Worldwide**
  Presented by Dr. Raymond Santucci, Naval Research Laboratory and Dr. Soenke Dangendorf, Tulane University
  https://www.youtube.com/watch?v=_Ud5Ke5DiJM
- **09/16/2026: Marsh Challenges, Tradeoffs, and Opportunities for Action**
  Presented by Dr. Matt Kirwan and Erin Reilly, Virginia Institute of Marine Science. Part of "Resilience in Practice," a Chesapeake Bay Foundation Learning Series.
  https://www.youtube.com/watch?v=mcYOgrmLFAo
- **09/18/2026: Engineering with Nature Engineering Practice Guide for Floodplain Benching Projects**
  Presented by Eddie Brauer and Dr. Joanna Curran, U.S. Army Corps of Engineers
  https://ewn.erdc.dren.mil/engagements/event/n-ewn-seminar-engineering-with-nature-engineering-practice-guide-for-floodplain-benching-projects/
- **10/13/2026: Living Shorelines: Adaptation to Rising Sea Level**
  Presented by Erik Yando, Old Dominion University, and Justin Shafer, City of Norfolk Office of Resilience. Part of "Resilience in Practice," a Chesapeake Bay Foundation Learning Series.
  https://www.youtube.com/watch?v=PqPT0CAUbTw
- **11/17/2026: Healthy Trees, Strong Communities: A Path Forward for Virginia**
  Presented by Dr. Laura Costadone, Old Dominion University; Andrew Larkin, Institute for Adaption and Resilience; and Ann Jurczyk, Chesapeake Bay Foundation. Part of "Resilience in Practice," a Chesapeake Bay Foundation Learning Series.
  https://events.cbf.org/webinar-111726
- **12/15/2026: Fighting Invasives at Home**
  Presented by Jack Pizzo, Pizzo Habitat Restoration. Part of the 2026 Monarch Conservation Webinar Series.
  https://secure.qgiv.com/for/monarchconservationwebinarseries/event/2mcwsc/

This newsletter is produced by CH2M HILL, Inc. (now Jacobs) under NAVFAC Atlantic A-E Contract N62470-25-D-0002 in support of the 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 DoW CBP: http://www.denix.osd.mil/chesapeake/home.