2021 Federal Agency Progress Evaluation

Prepared for

Environmental Protection Agency,
Chesapeake Bay Program Office

September 29, 2023

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Table of Contents

List of Figures

List of Tables

List of Abbreviations

ARS	Agricultural Research Service
BC	AH/BC Navy JV, LLC
BMP	best management practice
CAST	Chesapeake Assessment Scenario Tool
DoD	Department of Defense
DEP	Department of Environmental Protection
DEQ	Department of Environmental Quality
DOEE	Department of Energy and the Environment
DSA	driving surface aggregates
ED	dry extended detention
EO	Executive Order
EOT	Edge of Tide
EPA	Environmental Protection Agency
FFWG	Federal Facilities Workgroup
FPG	federal planning goal
GSA	General Services Administration
MD	Maryland
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MS4	municipal separate storm sewer system
NASA	National Aeronautics and Space Administration
NCR	National Capital Region
NEIEN	National Environmental Information Exchange Network
NPS	National Park Service
NY	New York
PA	Pennsylvania
PADEP	Pennsylvania Department of Environmental Protection
Protocol	*Protocol for Setting Targets, Planning BMPs and Reporting Progress for Federal Facilities and Lands*
PSC	Principals' Staff Committee
Report	*Federal Agency Progress Evaluation*
ST	stormwater treatment
SWCGP	Stormwater Construction General Permit
TMDL	total maximum daily load
TN	total nitrogen
TP	total phosphorus
TSS	total suspended solids
US	United States
USACE	US Army Corps of Engineers
USDA	Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VA	Virginia
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
WIP	Watershed Implementation Plan
WV	West Virginia

Section 1

Introduction

The Chesapeake Bay jurisdictions and federal agencies were among the first partners to commit to the restoration of the Chesapeake Bay and its tributaries through the Chesapeake Bay Total Maximum Daily Load (TMDL) (2010) and the Chesapeake Bay Watershed Agreement (2014). Executive Order (EO) 13508, which was also signed in 2010, detailed the important role of federal agencies as stakeholders in the Chesapeake Bay watershed restoration and called for federal agencies to lead by example in implementing actions to protect and restore the Bay. Though a number of federal agencies operate and own land in the Chesapeake Bay watershed, eight federal agencies are included with a designated agency code in the Chesapeake Bay Assessment Scenario Tool (CAST) in recognition of their potential load contributions to the Chesapeake Bay: the Agricultural Research Service (ARS), Department of Defense (DoD), General Services Administration (GSA), National Aeronautics and Space Administration (NASA), National Park Service (NPS), Smithsonian Institution, US Fish and Wildlife Service (USFWS), and US Forest Service (USFS). These federal agencies own and operate facilities in six jurisdictions (Maryland, New York, Pennsylvania, Virginia, Washington, D.C., and West Virginia). The other federal agencies in the watershed are consolidated in CAST as "Other Federal Land" and are not evaluated as a part of this effort.

Federal agencies set and report progress toward two-year milestones, which include short-term goals related to water quality and other restoration objectives. Federal agencies are also expected to annually report the implementation of stormwater best management practices (BMPs) that contribute to the reduction of total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS) pollutant loads as part of the Chesapeake Bay TMDL.

1.1 Background

In 2019, the Environmental Protection Agency (EPA) Chesapeake Bay Program Office contracted AH/BC Navy JV, LLC (BC) to assess the progress of major federal agencies toward the Chesapeake Bay TMDL utilizing the results of CAST (AH/BC, 2021). That effort included:

- A comparison of BMPs currently credited to federal agencies in CAST and the agencies' records of implemented BMPs to assess the accuracy and completeness of the federal BMP records reported by the jurisdictions.
- An assessment of the federal agencies' current pollutant loads and BMPs credited in CAST based on the 2019 Progress scenario.
- A comparison of the federal agencies' 2019 Progress scenario loads with potential federal planning goals (FPGs) from the EPA Default Method, the Phase III Watershed Implementation Plans (WIPs), and the WIP 3 Final scenario in CAST to determine the levels of effort to achieve the FPGs.
- An evaluation of the equity of FPGs from the above sources.

Regarding the BMP data inputs to the 2019 Progress scenario, the report summarizing the outcomes of the 2019 Federal Agency Progress Evaluation (2019 Report) found that most federal agencies rated the accuracy and completeness of the data in the 2019 Progress scenario as low or medium compared to their data records. The 2019 Report also noted that the data maintained by federal agencies may be incomplete or include other issues that would prevent the BMPs from

validation by the jurisdiction or the NEIEN, which may also explain why the BMPs are not present in CAST. Because the data record in CAST was found to be incomplete, the 2021 Progress loads and remaining reductions needed to achieve the FPGs were not considered representative of the actual progress and remaining level of effort required by most federal agencies.

The 2019 Report also found a lack of consensus around the 2025 pollutant load goals for federal agencies from the Phase III WIPs, the updated EPA Default Method, and the WIP 3 Final CAST scenario. The updated EPA Default Method, which is based on an equal level of effort for federal and non-federal entities within the Developed load source sector, is an equitable alternative to the Phase III WIP FPGs but has not been mutually agreed to by the federal agencies, Federal Facilities Workgroup (FFWG), and EPA.

The 2019 Report identified actions and recommendations for federal agencies, jurisdictions, and EPA, including:

- Federal agencies report BMP information annually, evaluate internal data management processes, and consider efforts to fill gaps in data for existing BMPs where budgets and staff resources permit
- Jurisdictions ensure all federal BMPs are reported under the proper agency code, increase coordination with federal agencies during annual progress reporting, and participate in discussions about the appropriate FPGs and other Phase III WIP expectations of federal agencies
- EPA coordinate a discussion around FPGs to develop consensus and evaluate the value of subsequent analyses to further assist federal agencies and jurisdictions

This 2021 Federal Agency Progress Evaluation builds on the results and recommendations of the 2019 Report to provide actionable information for jurisdictions and federal agencies to improve the reporting and crediting of federal BMPs and further the effort to build consensus about the equity of FPGs.

1.2 Report Organization

This Report includes four sections.

- Following this introduction (Section 1), Section 2 reviews the results of the BMP Credit Evaluations, which utilized federal agency, jurisdiction, NEIEN, and CAST BMP data to assess the presence or absence of BMPs in the 2021 Progress scenario and why absent BMPs were excluded from CAST.
- Section 3 includes the 2021 Progress scenario loads for federal agencies that have at least 95 percent of their reported BMP record present in CAST.
- Section 4 summarizes the results of discussions with jurisdictions about the FPGs, including outstanding questions and action items regarding the equity of their FPGs.
- Section 5 compares the 2021 Progress scenario loads for federal agencies that met the minimum completeness criteria described in Section 3 to the FPGs determined to be equitable in Section 4.
- Section 6 provides conclusions and recommendations for federal agencies, jurisdictions, and EPA to continue improving reporting and coordination between entities.

Section 2

BMP Credit Evaluations

The 2019 Report found that federal agencies had relatively low confidence in the accuracy and completeness of the BMP record assigned to their agency code in the 2019 Progress scenario. However, that analysis did not identify why federal agency BMPs were not included in CAST. To better understand why BMPs were not included, BMP Credit Evaluations were developed for each jurisdiction as part of the 2021 Federal Agency Progress Evaluation.

The purpose of the BMP Credit Evaluations is to compare each major federal agency's BMP record to the BMP data assigned to their agency code in the jurisdiction database, NEIEN, and CAST. The federal community reports water quality BMPs implemented at their facilities to the jurisdictions, who compile and report all BMP records to NEIEN, which is a pre-processor for CAST. CAST is the water quality model for nutrient and sediment loads across the watershed and those that reach the Bay. The current version of CAST is CAST 19 (Phase 6 – 7.4.0). For many federal facilities, BMP information is reported from facility staff to an agency-level entity, to the jurisdiction, who ultimately reports to NEIEN where the data is processed, transformed, and transferred to CAST. Each transfer of data from one repository or node to the next introduces the possibility of data errors. By evaluating the federal BMP records at each node, the reason BMPs are excluded can be identified.

This evaluation leverages information provided by the jurisdictions and in the NEIEN Validation Report to describe why some BMPs are not present in the CAST 2021 Progress scenario.

2.1 Data Request

Each fall, federal agencies are asked to report BMPs implemented in the previous state year (July 1 to June 30) to the jurisdictions and EPA. A separate data request was made for the BMP Credit Evaluations to give federal agencies an opportunity to provide additional data to be included in the analysis.

Therefore, in the spring of 2022, the eight major federal agencies were asked to provide a copy of their full historical record or their most recent annual progress submission. Because DoD and the US Army Corps of Engineers (USACE) report data independently, a separate data request was provided to USACE, in addition to the DoD Chesapeake Bay Program which manages data for other DoD installations in the Chesapeake Bay watershed. The jurisdictions were also asked to provide an export of BMPs with a federal agency code from their database. Table 2-1 shows the federal agency response by jurisdiction. Green indicates that data was provided or that the federal agency confirmed no BMPs are implemented in the jurisdiction, and red indicates no response was received.

Table 2-1. Summary of Federal Agency Responses Received for 2021 Progress Data Request

Agency/State	MD	NY	PA	VA	DC	WV
ARS						
DoD						
GSA						
NASA						
NPS						
Smithsonian						
USACE						
USFWS						
USFS						

Data was received from all jurisdictions and most federal agencies with the exception of GSA Region 3, the Smithsonian Institution, and the US Forest Service. EPA has coordinated with the agencies to identify appropriate contacts for those agencies.

2.2 Process

The Chesapeake Bay Program Principals' Staff Committee (PSC) previously decided that federal agencies would be assigned loads from only the Developed and Natural source sectors in CAST and not from the Agriculture, Atmospheric Deposition, Construction, Septic, and Wastewater source sectors. Therefore, when BMP data is submitted to NEIEN, federal BMPs that are applied to those source sectors are recategorized under the "non-federal" agency code or are not credited. This change is not notated with an error code. Upon receipt of the federal agency BMP data, BC reviewed the BMPs to identify those that will not be credited to the federal agencies with their associated agency code. The BMP Credit Evaluation spreadsheets include a column labeled "Can the BMP type be credited to Feds?" to indicate that the BMP type is one that federal agencies are not eligible to receive TMDL credit for in CAST. In addition to the excluded source sectors, there are additional BMPs that will not be present in the CAST progress scenario, including BMPs with a credit duration of one year that are not from the current state year (2021), shoreline BMPs implemented before December 31, 2007, and BMPs that are proprietary practices. These BMPs are also flagged as "NO" in the "Can the BMP type be credited to Feds?" column. For more information on common reasons why BMPs are not credited, refer to Section 2.5.

In NEIEN and CAST, BMPs are identified based on a State Unique ID assigned by the jurisdiction. In some jurisdictions (e.g., Virginia, Pennsylvania, Washington, D.C.), the State Unique ID is assigned after the data is submitted by the federal agency to the jurisdiction, and the federal agency may not know the State Unique ID of their BMPs.

BC reviewed the federal agency data to determine if the State Unique IDs were provided. If the State Unique ID was not found, BC performed a line-by-line comparison of the federal agency and the jurisdiction federal BMP data to identify each BMP's State Unique ID based on the BMP name, description, type, location, and area treated. In some cases, a confident match could not be made, and no State Unique ID was matched to the federal agency BMP record. Because the BMP data provided by the jurisdictions only includes BMPs assigned a federal agency code, it is possible a BMP may be present in the jurisdiction database with an incorrect agency code (most commonly as "non-

federal"). BMPs were designated as "PRESENT" or "ABSENT" in the jurisdiction database based on whether a State Unique ID could or could not be matched, respectively.

To assess each BMP's status in NEIEN, BC downloaded the "2021 Progress 20220211" NEIEN Validation Reports. The NEIEN Validation Report Excel workbook includes five sheets that summarize the processing results: CAST Land BMP Errors, NEIEN BMP Errors, NEIEN Event Status Errors, NEIEN BMP Successes, and NEIEN Event Status Successes. BMPs were designated as "ABSENT" if the State Unique ID was not found in the NEIEN Validation Report under a federal agency code, "ERROR" if the State Unique ID was present on one of the error sheets, and "NO ERROR" if the State Unique ID was found on both success sheets.

To assess BMP presence in CAST, BC downloaded the BMP Input report for the 2021 Progress scenario in CAST. BMPs were designated as "PRESENT" or "ABSENT" if the State Unique ID was or was not found under the correct agency code in the BMP Input report.

Finally, the overall status of each BMP was assigned. A BMP is credited only if it is present in the jurisdiction, NEIEN, and CAST BMP records. Figure 2-1 summarizes the assessment process followed for the BMP Credit Evaluations.

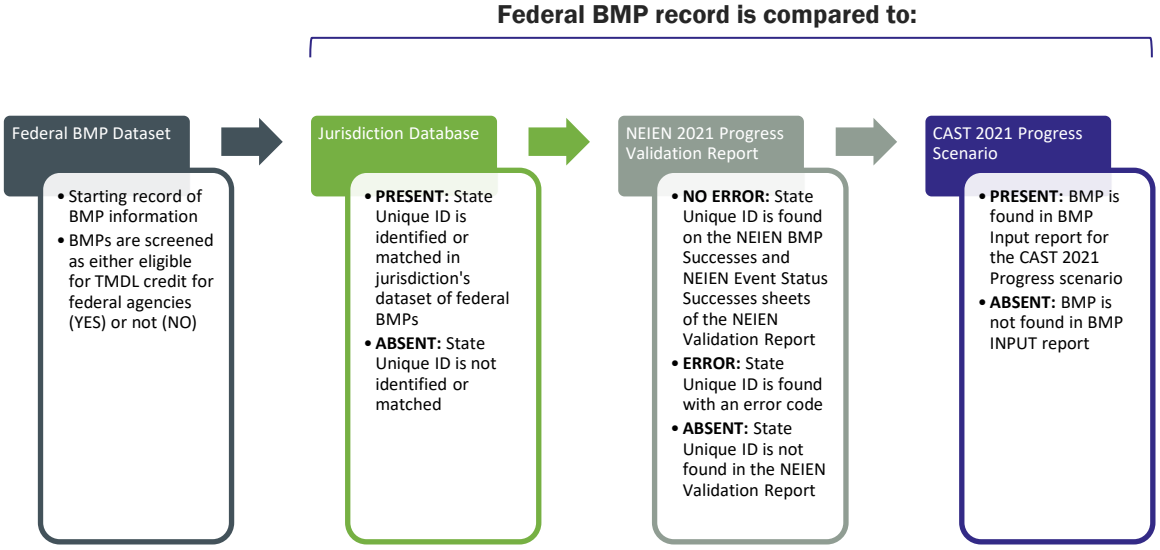


Figure 2-1: BMP Credit Evaluation process

BC included additional information to assist federal agency staff in their evaluation of the results. If the BMP was assigned an error code in the NEIEN Validation Report, BC included the error code text in the BMP Credit Evaluation spreadsheet column "Error Code." A separate column "Notes" includes additional observations from BC or interpretation of the NEIEN or CAST Error Codes based on the analysis results.

2.3 BMP Credit Evaluation Spreadsheets

The results of the BMP Credit Evaluations are summarized in an Excel workbook for each jurisdiction. This section will describe the components of the Excel workbook to help users navigate the data and results.

2.3.1 READ ME

In each workbook is a READ ME sheet with a summary of the analysis' purpose, limitations, the organization of the workbook, and the overall results.

The overall results are summarized in two forms, a table and a graph. The table includes columns for each federal agency that provided data for the BMP Credit Evaluation and six rows with summary information as listed:

- **BMPs in CAST from the Agency Dataset**: The number of BMPs in the data provided by the federal agency that are present in the CAST 2021 Progress scenario.
- **BMPs Not in CAST from Agency Dataset**: The number of BMPs in the data provided by the federal agency that are not present in the CAST 2021 Progress scenario.
- **Number of BMPs Eligible for Credit:** The number of BMPs in the federal agency data that can be credited to a federal agency, meaning that they are one of the BMP types that federal agencies can receive credit for as described in the previous section. This number represents the maximum number of BMPs that an agency may receive credit for.
- **Number of Eligible BMPs not in CAST:** The number of BMPs that can be credited to a federal agency that are not present in the CAST 2021 Progress scenario. This number represents the BMPs that could potentially be credited but are not currently.
- **BMPs in only Jurisdiction Database:** In many jurisdictions, the jurisdiction record includes federal BMPs not found in the federal agency database. This field is a count of those additional BMPs. These BMPs should be added to the federal agency record or removed from the jurisdiction record, following a review of the data by both parties.

The graphs on the READ ME sheet show the number and percent of eligible BMPs in CAST.

2.3.2 Agency Tabs

The agency tabs include the BMP records provided by each federal agency and the results of the analysis described in Section 2.2. Table 2-2 below summarizes the information found on the tab with the agency name.

Table 2-2. BMP Credit Evaluation

Column Name	Description
RecordID	The cell contains a unique identifier assigned to the BMP for this analysis.
Is it Credited?	The cell contents (YES/NO) indicate whether the BMP is present with the correct federal agency code in CAST.
Jurisdiction Status	The cell contents (PRESENT/ABSENT) indicate whether the BMP was found in the jurisdiction's database of federal BMPs.
NEIEN BMP Status	The cell contents indicate whether the BMP was present in the NEIEN validation report with a BMP error (ERROR), if it was present in the NEIEN validation report without a BMP error (NO ERROR), or if the BMP was not found on the sheets that screen for BMP errors (ABSENT).
NEIEN BMP Event Status	The cell contents indicate whether the BMP was present in the NEIEN validation report with an event error (ERROR), if it was present in the NEIEN validation report without an event error (NO ERROR), or if the BMP was not found on the sheets that screen for BMP event errors (ABSENT).
CAST Status	The cell contents (PRESENT/ABSENT) indicate whether the BMP was found in the 2021 Progress scenario BMP input deck in CAST with the correct federal agency code.

Table 2-2. BMP Credit Evaluation	
Column Name	**Description**
Can the BMP type be credited to Feds?	The cell contents (YES/NO) indicate whether the BMP can/cannot be credited. Reasons why may include: • The BMP type is one that federal agencies are not eligible to receive TMDL credit for in CAST (e.g., agriculture, septic, forest harvesting, wastewater, and construction BMPs) or that is not a credited BMP in CAST (e.g., Proprietary Practices). This assessment is based on the reported BMP type or, if no BMP type is provided, the BMP description. • The BMP is annual practice (e.g., street sweeping, storm drain cleaning, etc.) that was not performed in state year 2021. • The BMP is a shoreline management BMP implemented before 12/31/2007, which is already accounted for in the CAST baseline land use.
NEIEN or CAST Error Code	If applicable (i.e., if NEIEN BMP Status or NEIEN BMP Event Status is ERROR), the cell includes the error message from the NEIEN validation report explaining why the BMP was not validated for inclusion in CAST.
Notes	Additional observations from the BC team or interpretation of NEIEN or CAST Error Codes based on analysis results.

2.3.3 Jurisdiction Tab

The Jurisdiction tab includes the federal BMP records provided by the jurisdiction. The sheet includes a column labeled “In Federal Database?” to indicate if the BMP was matched in the federal agency records. “ABSENT” indicates the BMP was not found in the federal agency’s BMP records. A number in the cell corresponds to the row number of the BMP on the corresponding federal agency sheet.

2.4 Overall Results

The results of the BMP Credit Evaluation are shown in Table 2-3 and Figure 2-2. This section also includes a summary of major observations by jurisdiction and federal agency.

Table 2-3. BMP Credit Evaluation Results, Percent of Eligible BMPs Present in CAST

Agency/State	MD	NY	PA	VA	DC	WV
ARS	0% (0/58)				0% (0/13)	
DoD	96% (1799/1884)	100% (1/1)	94% (314/335)	75% (1388/1859)	39% (67/172)	0% (0/7)
GSA	7% (8/111)	No BMPs reported.	No BMPs reported.	No BMPs reported.	6% (6/108)	No BMPs reported.
NASA	62% (29/47)			29% (16/56)		
NPS	0% (0/25)		100% (2/2)	95% (20/21)	No BMPs reported.	0% (0/4)
Smithsonian	No BMPs reported.			No BMPs reported.	No BMPs reported.	
USACE	No BMPs eligible.	No BMPs eligible.	65% (11/17)	No BMPs reported.	No BMPs reported.	No BMPs eligible.
USFWS	0% (0/129)		25% (3/12)	2% (2/104)		0% (0/29)
USFS[1]				No BMPs reported.		No BMPs reported.

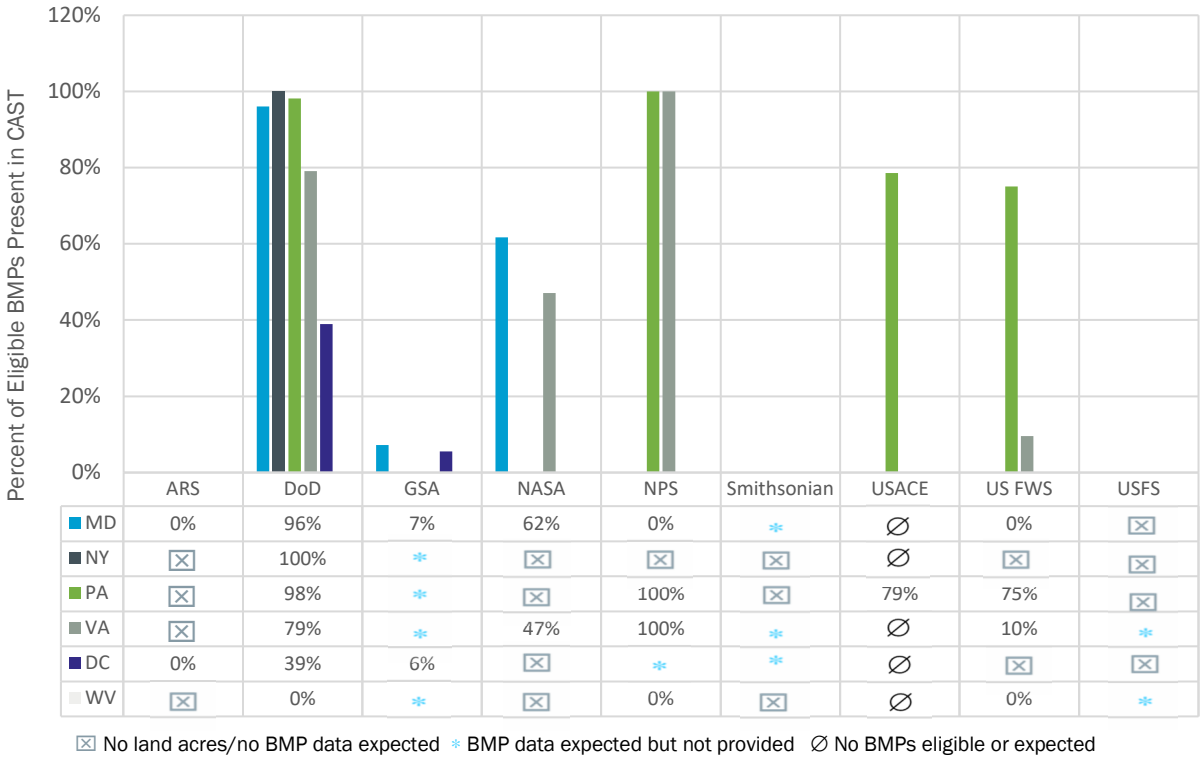


Figure 2: BMP Credit Evaluation results for federal agencies with reported and eligible BMPs in the jurisdiction.

[1] In this context, 0% refers to BMPs that were reported and eligible for credit but did not receive credit. No BMPs eligible refers to BMPs that cannot be credited to federal agencies. No BMPs reported means the installation did not respond or indicated that no BMPs were in that jurisdiction.

The following are observations about the results by jurisdiction:

- **Maryland:** Several federal agency datasets that reported BMPs in Maryland were absent from the Maryland jurisdiction record (ARS, NPS, and USFWS) and thereby not reported to CAST. In some cases (e.g., ARS), the BMP data were first compiled after the 2021 progress data submission period and therefore not anticipated to be present in the 2021 Progress scenario. Because Maryland compiles and submits a new BMP record each year, it is important that federal agencies submit a full BMP record each year for inclusion in the Progress scenario.
- **New York:** The jurisdiction BMP record includes two DoD BMPs, one of which is in the DoD BMP dataset. USACE reported several impoundments in New York, but these are not credited as BMPs in CAST.
- **Pennsylvania:** Pennsylvania has the highest completeness percentage for the federal agencies in its jurisdiction. EPA staff indicated that they will coordinate with Pennsylvania Department of Environmental Protection (PADEP) about some discrepancies between the federal agency and jurisdiction reporting of large impoundments.
- **Virginia:** In Virginia, the federal agencies that provided data from the BMP Warehouse (DoD, NASA, and NPS) had generally high completeness percentages.
- **Washington, D.C.:** The percent of eligible BMPs found in CAST is consistently low in Washington, D.C. DOEE requests that Federal agencies only report voluntary BMPs, as DOEE tracks and reports required BMPs within the Surface and Groundwater System reporting application. For GSA and DoD, BC could not find the BMP identifier (i.e., the State Unique ID or other ID field) or similar records in the jurisdiction database for many BMPs. Therefore, these BMPs were marked as absent from CAST. DOEE has been reconciling BMPs at the federal agencies from the paper records previously utilized to electronic records. The information presented in the report reflects the efforts of DOEE at the time analysis was conducted.. Additionally, DOEE tracks separately BMPs implemented to comply with development requirements for all federal agencies, even if these agencies did not report data for inclusion in this report.
- **West Virginia:** In West Virginia, the jurisdiction contact was aware of federal BMPs submitted for 2021 Progress but could not provide the State Unique IDs. Federal BMPs need to be assigned the appropriate agency code when the data is submitted to NEIEN.

The following are observations about the results by federal agency:

- **ARS:** ARS compiled BMP data in spring 2022. Therefore, the analysis correctly shows no ARS BMPs in the 2021 Progress scenario. The BMP information should be reported in the 2022 progress data submission period.
- **DoD:** DoD's BMP record is mostly complete in several jurisdictions (MD, NY, and PA), partially complete in Virginia, and needs improvement in Washington, D.C., and West Virginia.
- **GSA:** The GSA National Capital Region (NCR) has recently conducted BMP assessments in Maryland and Washington, D.C.; therefore, some data may not have been submitted for 2021 Progress. There was no response to the request for BMP records from GSA Region 3 (WV, NY, and PA).
- **NASA:** The NASA data record is generally complete in Maryland and Virginia. In Virginia, NASA Langley Center provided a list of BMPs that have been submitted to the BMP Warehouse as well as a list of older historical BMPs records that the facility staff were not sure had been reported. Among BMPs that have been submitted to the Virginia BMP Warehouse, the BMP record is mostly complete. The overall percent complete for NASA in Virginia is lower, however, because some of the older BMPs provided by NASA staff were not found in the BMP Warehouse export provided by Virginia Department of Environmental Quality (DEQ).

- **NPS:** The NPS data record is generally complete within Pennsylvania and Virginia and needs improvement in Maryland and West Virginia.
- **Smithsonian Institution:** No data was submitted by the Smithsonian Institution.
- **USACE:** In several jurisdictions, the impoundments tracked by USACE are not considered eligible for credit in CAST. Impoundments that act as pollutant sinks are accounted for in the CAST base data and will not be credited as BMPs. In addition, impoundments do not meet the criteria to be reported as wet ponds and therefore should not be reported as such to NEIEN.
- **USFWS:** The USFWS data includes many environmentally beneficial practices that align with the goals and outcomes of the 2014 Chesapeake Bay Watershed Agreement; however, only a subset of the projects are eligible for credit for the Chesapeake Bay TMDL. In addition, the data is tracked in an agency template, not the templates provided by the jurisdictions. Therefore, it was difficult in some cases to match BMPs from the federal agency and jurisdiction records. Except in Pennsylvania, there are USFWS BMPs that may be eligible for credit as stormwater BMPs that are not present in the jurisdiction database.
- **USFS:** USFS provided the Forest Management Plans for three national forests in the Chesapeake Bay watershed. Because the plans did not readily include stormwater BMPs, they were not evaluated in this analysis.

2.5 Common Reasons for Lack of Credit

This subsection includes brief descriptions of the most common reasons why federal BMPs are excluded from CAST.

2.5.1 BMPs Not Eligible for TMDL Credit

The Chesapeake Bay Program has identified a set of BMPs that reduce TN, TP, and TSS and quantified the estimated load reductions they achieve. However, some BMPs are not a recognized BMP included in CAST, such as indoor water conservation measures or land conservation. Often, these practices may contribute to other goals and outcomes from the 2014 Chesapeake Bay Watershed Agreement, such as protected lands, habitat, or toxic contaminants.

Proprietary practices, such as Filterra and Contech devices, are not approved BMPs for TMDL credit in CAST, though they can be reported and credited as State Performance Standard-Runoff Reduction and State Performance Standard-Stormwater Treatment BMPs if they meet the performance and reporting criteria for those BMP types. During review of the BMP Credit Evaluations, it was observed that some proprietary practices are being reported to NEIEN as other BMP types (e.g., Filtering Practices). EPA indicated that they will coordinate directly with the jurisdictions to address this issue in future progress years.

The CAST Source Data[2], available on the CAST webpage, and the Chesapeake Bay BMP Quick Reference Guide[3] include the names and descriptions of BMPs that can be credited toward the Chesapeake Bay TMDL.

2.5.2 BMPs Not Eligible for Credit by Federal Agencies

Federal agencies do not receive credit in CAST for some classes of BMPs because they do not have assigned pollutant loads in those source sectors. Federal agencies can receive credit in CAST for

[2]CAST Source Data: https://cast.chesapeakebay.net/Home/SourceData

[3] Chesapeake Bay BMP Quick Reference Guide: https://www.chesapeakebay.net/what/publications/quick-reference-guide-for-best-management-practices-bmps

most BMPs that are applied to the Developed or Natural load source sectors. A list of the BMPs federal agencies can receive credit for is included in Appendix A. Federal agencies are not assigned Harvested Forest (Natural sector) or Construction (Developed sector) acres, so BMPs applied to these load source groups are uncredited. BMPs applied to other source sectors (Agriculture and Septic) are re-assigned to the non-federal agency code in NEIEN and may be credited in CAST but not to the federal agency. For example, NPS practices agro-ecology and crop land conversion to native grasslands in several National Battlefield Parks, though many jurisdictions do not recognize these as BMPs. There are no BMPs in CAST that are applied to the Atmospheric or Wastewater source sectors. This evaluation did not include an assessment of federal BMPs reassigned to the non-federal agency code.

Federal agencies and jurisdictions are strongly encouraged to report BMPs implemented in other source sectors in order to capture the load reductions these BMPs provide.

2.5.3 Inspection, Maintenance, and Lifespan Issues

Some BMPs were excluded from CAST because of the BMP's inspection, maintenance, or implementation information. Each BMP type is assigned a credit duration measured in years in CAST. If a passed inspection is not reported within its credit duration, the BMP will no longer be credited in CAST. For example, a wet pond installed in January 2010 with a credit duration of 10 years must have an inspection reported no later than the 2020 Progress data submission period (October 2020) in order to maintain credit. If a BMP credit duration has been exceeded, credit can be resumed if a new inspection is reported in the next data submission period.

Annual BMPs are BMPs with a credit duration of one year; they include street cleaning practices, storm drain cleaning, septic system pumping, forest harvesting practices, and erosion and sediment control practices. These BMPs are only credited in the progress year they are implemented and reported. For example, street sweeping conducted in state year 2021 will only be credited in the 2021 Progress scenario. Each year's activity must be reported in a new BMP record annually to maintain credit.

It is the responsibility of federal agencies to perform inspections/maintenance and report these updates to the jurisdiction. If a BMP is reported with a failed inspection and no maintenance date, the BMP would not be credited. Credit can be resumed if a new passed inspection or a maintenance date is reported.

In some cases, the BMP's implementation or built date determine if it will be credited. For example, CAST's base data includes information about shoreline conditions from 2007. Therefore, shoreline management projects implemented in 2007 or earlier are already accounted for in CAST and credited. Similarly, the date of the underlying land use data determines if land use change BMPs (e.g., impervious surface removal, tree planting) are credited or removed as "Credit Backed Out" in CAST.

2.5.4 Missing Required Information

If required information is not included with the BMP record, it will be excluded from CAST. For example, Bioretention BMPs must include the area treated, and storm drain cleaning must include the pounds of TN, TP, and TSS removed. If a BMP is reported without the required metric or with a different metric (e.g., length cleaned for storm drain cleaning), it will not be credited.

In most jurisdictions, the reporting template includes instructions that identify required fields and information. In some cases, federal agencies did not track BMPs for Chesapeake Bay TMDL credit in the correct jurisdiction template and therefore did not have the correct metrics for the BMP types

reported. The CAST Source Data and the Chesapeake Bay BMP Quick Reference Guide also provide information about the required metrics for each BMP type.

2.5.5 BMP Not Found in Jurisdiction Database

If a BMP's State Unique ID was provided in the federal agency dataset and not found in the jurisdiction database, the BMP either has not been reported to the jurisdiction, has been reported but was rejected due to issues with the BMP record, or was reported and may be included under a different agency code. As previously mentioned, in Washington, DC an ongoing reconciliation effort is in place to match records from federal agencies to a State Unique ID in DOEE's database.

If a BMP's State Unique ID was not provided in the federal agency dataset, BC reviewed the jurisdiction database to attempt to match the federal agency BMP record to a State Unique ID. If a match could not be found, then the BMP was not assigned a State Unique ID. These BMPs may be missing entirely from the jurisdiction database and therefore should be reported or may be present but include sufficient differences that they are not a certain match.

2.6 Recommended Actions

The BMP Credit Evaluations are intended to provide information on how to improve federal BMP data through CAST. Therefore, the recommendations in this sub-section are actions federal agencies, the jurisdictions, and EPA may consider based on the outcomes of the BMP Credit Evaluations.

2.6.1 Federal Agencies

The following are actions recommended for federal agencies in order by suggested priority. Not all actions are required for all federal agencies; each agency should review their BMP Credit Evaluation results to determine which action are applicable.

- **Review BMPs that are not in the jurisdiction database.** These BMPs will include text in the "Notes" column to the effect that the BMP ID could not be found in the jurisdiction database. BMPs that are part of the federal agency database but are not part of the jurisdiction database should be reported to the jurisdiction in the next progress data submission period in the jurisdiction template.
- **If the BMP lifespan is expired, report the latest inspection date**. If the BMP has not been inspected within its associated credit duration, prioritize inspection of the BMP so a new inspection date can be reported to resume credit.
- **If the BMP is not credited because of a failed inspection, complete corrective actions and report the maintenance date**. Credit can be resumed by reporting the maintenance date or by reporting a new passed inspection.
- **If required information is missing, report it in the next data collection period.** The jurisdiction templates typically indicate what information is required to receive credit. Federal agencies are strongly encouraged to report BMP information in the jurisdiction's reporting template to increase the likelihood it will include all required information to reach CAST.
- **Review BMPs that are in the jurisdiction database but not in the federal agency data record.** On the "Jurisdiction" sheet, BMPs with "ABSENT" in the "In Federal Database?" column were not matched with the federal agency BMP data. They may represent BMPs that have since been removed, duplicate records, or existing BMPs that are not tracked by the federal agency. The federal agency should verify if the ABSENT records are existing BMPs.
    - If the BMP exists, the federal agency should add the BMP to its BMP database and incorporate it in future reporting to the jurisdiction.

  - If the BMP no longer exists, the federal agency should report the BMP as removed to the jurisdiction.
  - If the BMP record is a duplicate, the federal agency should coordinate with the jurisdiction to remove the duplicate BMP record from the jurisdiction database.
- **Review uncredited BMPs without a NEIEN error code.** The BMP Credit Evaluation was limited to the information available from the federal agency BMP database, the jurisdiction database, the NEIEN Validation Report, and the CAST BMP Input report. The jurisdiction and EPA can provide additional support for BMPs without a detailed explanation for lack of credit.

2.6.2 Jurisdictions

The following are actions recommended for jurisdiction staff.

- **Review BMPs that are in the jurisdiction database but not in the federal agency data record.** Jurisdiction staff should coordinate with federal agencies to determine if the records found only in the jurisdiction database are duplicates or invalid records that should be removed.
- **Review the BMP Credit Evaluation results in your jurisdiction and assess trends to identify potential issues and improvements**. If the completeness of the federal agency BMP data is low for multiple agencies in a jurisdiction, an evaluation of the most common reasons for their exclusion from CAST may suggest changes to the reporting process. For example, if many federal BMPs were not found in the jurisdiction database, additional coordination between the federal agency and jurisdiction after data collection may be warranted to provide greater transparency between the two parties.
- **Share State Unique IDs with federal agencies**. If the jurisdiction does not currently provide the State Unique IDs to federal agencies after the data is submitted, consider sharing this information with federal agencies to encourage transparency.
- **Provide detailed instructions specific to the jurisdiction's BMP reporting template.** Additional coordination with jurisdictions during the BMP reporting period could resolve common data entry errors. For example, one jurisdiction listed a data field as 'optional', though this resulted in erroneous BMP grouping and thereby failed reporting.
- **Provide feedback and information to federal agencies to correct data entry errors.** Jurisdiction staff could implement feedback loops during the BMP submission process to ensure federal agencies are receiving as much credit as possible. If staff notify federal agencies after data submission into CAST or NEIEN, agencies will know when to check the status of BMPs to identify which BMPs receive or do not receive credit. Additionally, if jurisdiction staff provided a list of BMPs that did not receive credit and the reason this occurred early on, then agencies could correct any entry issues before the EPA deadline.

2.6.3 EPA

The following are actions recommended for EPA.

- **Reiterate with jurisdictions how to report federal BMPs that are applied to source sectors other than Developed and Natural.** During data collection, some jurisdiction staff expressed uncertainty about how to report BMPs to NEIEN with federal agency codes. Others noted that when they submit federal BMPs in other sectors, NEIEN generates a load source group error. Additional communication with jurisdictions to clarify these procedures is recommended.
- **Vet BMP verification of proprietary practices.** In the analysis of the federal BMP data, it was found that some proprietary practices are being reported into CAST under other BMP names.

Unless reported as Stormwater Treatment or Runoff Reduction BMPs, these BMPs are not approved for TMDL credit and should not be submitted to NEIEN or CAST as other BMP types.

- **Reestablish feedback loops between federal agencies and jurisdictions.** During the analysis, jurisdictions and federal agencies indicated that additional communications between all parties may improve the federal agency data reporting, tracking, and ultimately the completeness of BMP records within the CAST. Communication recommendations include, but are not limited to, the confirmation of receipt and communication of data reconciliation issues for resolution between parties.

Section 3

2021 Progress Evaluation

The CAST 2021 Progress scenario reflects pollutant loads resulting from the scenario base conditions and inputs of BMP implementation data from NEIEN. Therefore, the accuracy of the scenario results is dependent in large part on the accuracy and completeness of the scenario's BMP implementation data. For this reason, the evaluation of 2021 Progress loads is limited to federal agencies with a reasonably complete record as determined from the BMP Credit Evaluations. This section summarizes the results of that analysis.

3.1 Minimum Completeness Criteria

Table 2-3 summarizes the percent of eligible BMPs present in CAST for each federal agency by jurisdiction. EPA and BC staff determined that at least 95 percent of a federal agency's BMP records must be present in the 2021 Progress scenario BMP Input report to have high confidence that the scenario loads reflect actual conditions. The federal agencies with BMP records meeting the minimum completeness criteria are DoD in Maryland, New York, and Pennsylvania and NPS in Pennsylvania and Virginia.

3.2 2021 Progress Results

This section will include a summary of the loads in the 2021 Progress scenario by state-basin. All loads are evaluated at Edge of Tide (EOT) because the FPGs, which are discussed in Section 4, are also defined at EOT. The results of the 2021 Progress evaluation are also included in Appendix B.

3.2.1 Department of Defense

The DoD BMP record was found to be 96-percent complete in Maryland, 100-percent complete in New York, and 98-percent complete in Pennsylvania. The DoD loads by state-basin in these jurisdictions are included in Table 3-1. It is important to note that the DoD loads from CAST are inclusive of loads from USACE land as well as reductions from USACE BMPs, which are assigned to the DoD agency code. Based on the results of the BMP Credit Evaluation, USACE BMPs will have the largest impact on DoD loads in Pennsylvania.

The table also includes the change in loads from the 2019 Progress scenario, which was analyzed in the 2019 Report, and the 2021 Progress scenario. Positive values indicate a decrease in loads from 2019 to 2021; negative values indicate that the loads have increased. In general, pollutant loads from DoD lands have decreased since 2019 with the exception of TN in the Maryland Patuxent River basin and TSS in the Maryland Potomac River basin.

Table 3-1. DoD 2021 Progress Loads									
State-Basin Name	2021 Progress Loads (lbs/yr EOT)			2019 Progress (lbs/yr EOT)			Changes in Loads, 2019-2021 (lbs/yr EOT)		
	TN	TP	TSS	TN	TP	TSS	TN	TP	TSS
MD Eastern Shore of Chesapeake Bay	18,935	6,663	29,533,747	19,225	6,851	30,030,580	-290	-188	-496,833
MD Patuxent River Basin	77,972	15,148	45,154,614	77,807	15,261	45,796,378	+165	-113	-641,764
MD Potomac River Basin	124,798	32,195	129,092,153	125,769	32,244	128,785,173	-971	-49	+306,980
MD Susquehanna River Basin	970	42	60,778	982	43	61,513	-13	-1	-735
MD Western Shore of Chesapeake Bay	170,666	53,872	206,475,651	171,888	55,031	209,851,307	-1,222	-1,159	-3,375,656
NY Susquehanna River Basin	7,647	818	853,496	7,651	819	853,797	-4	-1	-301
PA Potomac River Basin	38,138	3,486	5,947,436	38,169	3,490	5,948,541	-31	-4	-1,105
PA Susquehanna River Basin	266,529	10,709	9,331,563	267,523	10,855	9,626,087	-994	-146	-294,524

3.2.2 National Park Service

The NPS BMP record was 100-percent complete in Pennsylvania and Virginia. NPS submitted BMP records to Maryland in 2021 that were not incorporated in Maryland's NEIN/CAST submission. The NPS loads by state-basin in these jurisdictions are included in Table 3-2. In general, NPS loads have remained generally consistent in the Pennsylvania Susquehanna River Basin, the Virginia Rappahannock River Basin, and the Pennsylvania Potomac River Basin. In the remaining Virginia River Basins, NPS loads have decreased relative to the 2019 Progress scenario.

Table 3-2. NPS 2021 Progress Loads									
State-Basin Name	2021 Progress (lbs/yr EOT)			2019 Progress (lbs/yr EOT)			Changes in Loads, 2019-2021 (lbs/yr EOT)		
	TN	TP	TSS	TN	TP	TSS	TN	TP	TSS
PA Potomac River Basin	17,778	3,305	2,657,366	17,796	3,305	2,661,045	-18	0	-3,679
PA Susquehanna River Basin	14,129	592	510,621	14,129	592	510,621	0	0	0
VA James River Basin	54,734	8,149	17,885,176	54,901	8,199	17,889,952	-167	-50	-4,776
VA Potomac River Basin	184,166	36,390	101,158,304	184,220	36,402	101,174,531	-54	-12	-16,227
VA Rappahannock River Basin	72,876	13,232	29,474,714	72,876	13,232	29,474,712	0	0	+2
VA York River Basin	27,078	6,380	10,125,725	27,212	6,475	10,282,049	-134	-95	-156,324

Section 4

Federal Planning Goal Review

The 2019 Progress Evaluation reviewed three potential sources of FPGs for equity: the Phase III WIPs, the WIP 3 Final scenario in CAST, and the EPA Default Method. FPGs were considered fair and equitable if they were:

- Numeric, or a clear method was documented that could be replicated to determine the final load they were expected to achieve
- Expected an equivalent level of effort between federal and non-federal partners
- Considered equitable by EPA, the federal agencies, and the jurisdictions.

The 2019 Report documented concerns about the clarity and equity of some FPGs in the Phase III WIPs, which were not resolved before the report was finalized. The EPA Default Method was initially developed for the 2015 *Protocol for Setting Targets, Planning BMPs and Reporting Progress for Federal Facilities and Lands* (Protocol), which set local area planning goals for federal agencies; the methodology and load targets were updated by EPA in 2019 for the 2019 Report. Most jurisdictions indicated that the WIP 3 Final scenario was not intended to serve as FPGs; therefore, that source has been removed from consideration in this report.

This section will document the outcome of discussions with the jurisdictions about the equity of the FPGs and next steps to develop consensus around a 2025 end point. Due to the size of the federal presence in the jurisdiction, the evaluations were limited to Maryland, Pennsylvania, Virginia, and Washington, D.C. where the largest federal landholdings are located. The status of the FPGs by jurisdiction is summarized in Table 4-1.

4.1 Maryland

4.1.1 2019 Assessment

As noted in the 2019 Report, the Maryland Phase III WIP did not assign numeric local area planning goals or directly address expectations for federal agencies. However, federal sites covered under a separate Phase II municipal separate storm sewer system (MS4) permit are subject to nutrient and sediment reduction requirements, which call for the additional treatment of 20 percent of existing impervious developed land. The expected load reductions from the MS4 permits are also not quantified in the Phase III WIP document. Due to the ambiguity in the Phase III WIP, the FPGs were not considered equitable compared to the process followed for local areas in the 2019 Report.

4.1.2 2022 Discussion

BC, Maryland Department of the Environment (MDE), and EPA staff met in June 2022 to discuss the state's expectations for federal agencies through 2025. At that time, Greg Sandi with MDE confirmed that the Phase II MS4 permit is the primary vehicle for required reductions toward the Chesapeake Bay TMDL for both federal and non-federal partners with developed land. MDE later confirmed that all federal facilities in the state are holders of the MS4 General Permit for State and Federal Agencies.

MS4 permittees are responsible for submitting an assessment of their baseline acreage of impervious surfaces and calculations of the 20-percent restoration requirement to MDE. MDE has

not attempted to convert the 20-percent restoration requirements to a commiserate load reduction of TN, TP, and TSS. To develop a jurisdiction or state-basin numeric FPG, federal agencies would need to calculate the equivalent load reductions achieved by the treatment of 20 percent of existing impervious developed land at each facility and aggregate the facility reductions at the state-basin or jurisdiction scale.

BMP reporting procedures were also discussed. Mr. Sandi indicated that federal agencies have an annual opportunity to improve their data through the Phase II MS4 annual reporting or the annual datacall through the FFWG. Agricultural BMPs should be reported to the Maryland Department of Agriculture (MDA) through the Soil and Water Conservation District Ag Tracker application; generally, the individual or organization that pays for the BMP is responsible for reporting. It is not known if MDA distinguishes BMPs from federal owned or leased farms.

4.1.3 2022 Assessment & Recommended Actions

The Phase III WIP expectation that federal agencies comply with the load reduction requirements in their facilities' MS4 permits is considered **equitable**. The MS4 permit program includes clear expectations for how the restoration requirements must be achieved and provides mechanisms to calculate and report progress. **The key weakness of this approach is that progress can only be meaningfully tracked at the facility level**; without the equivalent load reductions, EPA and federal agencies have limited means to assess progress at the state-basin or jurisdiction scale.

4.2 New York

4.2.1 2019 Assessment

New York developed local area planning goals based on the available land for BMP implementation and the difference in loads between the 2018 Progress and the jurisdiction's 2025 implementation scenario. However, the State Department of Environmental Conservation did not define numeric FPGs. Instead, the Phase III WIP document referenced the reduction requirements developed in the Protocol (NYSDEC 2019, 134). The Protocol utilized an older version of the Chesapeake Bay Watershed Model and was intended to provide only interim goals. For this reason, the 2019 Report concluded that it was unclear if the FPGs were equitable.

4.2.2 2022 Assessment

Due to the small federal presence in New York, the New York FPGs were not assessed further for this Report.

4.3 Pennsylvania

4.3.1 2019 Assessment

In the original Pennsylvania Phase III WIP, federal and non-federal entities were expected to reduce an equivalent percentage (73.92) of the controllable load, which is defined as the difference between the 2010 No Action and the 2010 E3 scenarios. This was a mathematically equivalent but not equitable level of effort for federal partners because federal agencies can only achieve reductions in the Developed and Natural source sectors. At the time the 2019 Report was written, there was consensus between the PADEP, EPA, and federal agencies that the goals were not equitable.

4.3.2 2022 Discussion

Following completion of the 2019 Report, DoD and PADEP agreed to utilize the revised EPA Default Method loads as the agency's FPGs. The revised FPGs were included in a narrative in the revised Phase III WIP submitted to EPA in December 2021. However, FPGs for the other federal agencies were unchanged from the original Phase III WIP.

BC, PADEP, and EPA staff met in June 2022 to review the status of the FPGs in the latest Phase III WIP. BC staff pointed out that while the Federal Agency narrative in the revised Phase III WIP included new FPGs for DoD based on the revised EPA Default Method, Tables 4-1 and 4-2 of the Phase III WIP, which include the federal agency TN and TP reductions, had not been revised for any federal agencies.

Jeff Sweeney (EPA) noted that because the revised Phase III WIP included different programmatic and BMP commitments for non-federal partners, the revised EPA Default Method calculations should also be updated to reflect the higher level of effort expected of non-federal partners. Ted Tesler (PADEP) and Mr. Sweeney agreed to coordinate to update the FPGs in the WIP's Tables 4-1 and 4-2. PADEP prefers that the goals remain defined at the county level. It was stated that the revised goals could be included in a future addendum to the Phase III WIP.

Greg Allen (EPA) asked if federal agencies would have an opportunity to update the federal plans included as an appendix to the Phase III WIP. PADEP agreed to allow federal agencies an opportunity to update their plans, which could be part of a future addendum to the Phase III WIP.

BMP reporting was also discussed. Federal agencies are encouraged to report agriculture BMPs with the standard data collection template used for developed land BMPs. The state also uses Practice Keeper to track agricultural BMPs. A future system improvement will allow PADEP to check the two systems for double reporting.

4.3.3 2022 Assessment and Recommended Actions

At the time this report was written, the county-level goals in the Phase III WIP had not been updated to align with the revised EPA Default Method and are therefore not considered equitable. However, the change to incorporate the revised EPA Default Method is supported by PADEP, EPA, and federal agency staff, and the EPA Default Method is considered to provide equitable FPGs. The update should be considered a priority while all parties remain engaged on the issue. This change is also expected to address the inconsistency between the DoD FPGs documented in the text and the tables in the jurisdiction's revised Phase III WIP from December 2021.

4.4 Virginia

4.4.1 2019 Assessment

As noted in the 2019 Report, the Virginia Phase III WIP quantified FPGs as reductions from unregulated land in the Developed and Natural source sectors. The WIP also stated that federal facilities are expected to:

- Meet all applicable regulatory requirements (MS4, Industrial Stormwater, Wastewater, Erosion and Sediment Control, Post-Construction Stormwater, and Chesapeake Bay Preservation Act).
- Reduce loads from all agency-owned lands managed for agricultural use (45 percent TN reduction goal from 2017 levels).
- Reduce loads from all onsite systems (septic and alternative onsite systems) on federal agency owned lands (6 percent TN reduction goal from 2017 levels).

- Ensure that any forest harvesting is accompanied by implementation of the full suite of silviculture water quality practices.
- Account for and offset any load changes resulting from changes in land use through time.
- Account for and offset the federal agencies share of load changes resulting from climate change.
- This will be quantified by the Chesapeake Bay Program in 2021. Virginia estimated the additional reduction to be 1.72 million pounds of nitrogen and 0.19 million pounds of phosphorus across the entire state (VA DEQ 2019, 132-133).

The FPGs were considered equitable because the WIP established similar expectations for federal and non-federal partners. However, the 2019 Report noted concerns about equity because of a lack of mechanisms to track and hold federal agencies accountable for load reductions from septic, agriculture, and silviculture sources.

4.4.2 2022 Discussion

BC, EPA, and Virginia Department of Environmental Quality (VDEQ) staff met in June and August 2022 to discuss the concerns around the narrative expectations documented in the Phase III WIP. VDEQ maintains that the expectations in the Phase III WIP are equitable with those established for non-federal partners. Furthermore, VDEQ staff support model changes that assign the appropriate pollutant sources to federal agencies so BMPs can be reported and credited to the associated source. All parties understand that the PSC decision currently limits federal agencies to loads in the Developed and Natural sector; this decision may be revisited in the development of the Phase 7 Chesapeake Bay Watershed Model but would require a new review and approval.

The group discussed the potential for interim mechanisms to track federal progress toward the expectations in other source sectors.

- **Septic.** VDEQ is aware of some septic systems present at federal facilities and developed septic system data for the Phase III WIP that was ultimately not included in CAST; however, there is not currently a comprehensive inventory from the Chesapeake Bay Program or the Virginia Department of Health (VDH) of septic systems on federal land. In the short-term, federal agencies should report septic BMPs such as pump-outs to the BMP Warehouse. In the long-term, an additional data request to federal agencies or assessment by VDH or the Chesapeake Bay Program may be required to identify the septic systems on federal land.
- **Silviculture.** It was not known if the Virginia Department of Forestry tracks harvested forest activities on federal land. If that information is not available from the state, the data may be requested from federal agencies in order to track implementation of silviculture BMPs on harvested forest land.
- **Agriculture.** VDEQ does not maintain a spatial dataset of farm locations. USDA holds an internal dataset of agricultural fields and a publicly available raster (i.e., grid) dataset of croplands by type. Requirements to protect the privacy of individual farmers and the leasing of federal agriculture land to private parties has historically limited the ability of federal partners, the jurisdictions, and the Chesapeake Bay Program to track agriculture loads on federal land.
- **Land Use Changes.** Construction acres are currently tracked by county and are not assigned to a federal agency. The decision to track construction acres for federal agencies would require coordination between the Land Use and Federal Facility Workgroups.

VDEQ also maintains that it is appropriate that BMPs installed to meet state stormwater standards under a Stormwater Construction General Permit (SWCGP) are assigned to the “non-federal” agency code. Because CAST does not capture construction and therefore development on federal lands, VDEQ contends that the offset in loads from those BMPs should be credited to the non-federal

agency code. BC disagreed with this assessment. Land use data captures shifts in the number of developed and natural acres and therefore the resulting increase in pollutant loads. Also, because federal agencies do not know the Tracking IDs of BMPs installed under a SWCGP, they cannot report inspection and maintenance information to maintain credit over time. VDEQ believes enough information is present in the SWCGP database to attribute BMPs from that system to federal agencies in its next update to the BMP Warehouse.

4.4.3 2022 Assessment and Recommended Actions

The numeric reductions from unregulated land included in the Phase III WIP and the additional contributions from regulated land by federal agencies that hold MS4 permits are considered **equitable** expectations for federal agencies because they are clear, similar to the expectations for non-federal partners, and can be quantified. At this time, however, there are not sufficient data or mechanisms for VDEQ or EPA to hold federal agencies accountable to the additional expectations included in the WIP. The inclusion of other source sectors for federal agencies should be discussed during development of the Phase 7 Chesapeake Bay Watershed Model.

In the short-term, federal agencies are strongly encouraged to report BMPs across all source sectors to the BMP Warehouse, regardless of whether they are currently credited to federal agencies.

4.5 Washington, D.C.

4.5.1 2019 Assessment

The District Phase III WIP defined FPGs for "major" federal agencies, which include the Department of Agriculture (USDA), DoD, GSA, NPS, and the Smithsonian Institution, as well as a consolidated local area planning goal for non-federal loads. The same calculation methodology was applied for both the federal and non-federal goals; federal agencies will not receive additional FPGs for climate impacts. In the 2019 Report, the District Phase III WIPs were not considered equitable because federal landholders pay a stormwater utility fee to the District Department of Energy and the Environment (DOEE) and have individual FPGs. Non-federal landholders also pay a utility fee, but unlike federal agencies, they contribute to a general non-federal local area planning goal that is anticipated to be achieved through compliance with stormwater development standards.

DOEE has noted that if federal agencies cannot meet their FPGs through existing and planned BMPs, the agency can discuss opportunities to calculate pollutant reductions for the federal agencies from their stormwater fee payment. Additionally, DC's Phase III WIP documents DOEE's direct support of federal agencies to assist the achievement of their FPG.

4.5.2 2022 Discussion

BC, EPA, and DOEE staff met in July 2022 to discuss the equity of the FPGs. DOEE noted that the stormwater utility fee is set up solely to comply with the requirements of the District's MS4 permit. In DOEE's view, federal agencies are called to lead by example in the Chesapeake Bay's restoration (EO 13508). It was countered that EO 13508 should not be construed to obligate to expectations above and beyond the stated expectations.

DOEE staff explained that the stormwater utility fee is largely used to fund programmatic efforts related to the MS4 program; other parts of the department's operations are funded out of the District general fund. It is not generally used for the Chesapeake Bay TMDL. BC suggested that it could be helpful for DOEE to clarify the different funding sources utilized within the District MS4 program and if funds collected from federal agencies contribute to Chesapeake Bay TMDL compliance. DOEE provided additional information regarding the use of stormwater utility fees for

TMDL BMP implementation. DOEE indicated that 75 percent of the stormwater utility fee supports implementation of the Municipal Separate Storm Sewer System Permit requirements other than the TMDL. Approximately 25 percent of the stormwater utility fee is used to implement BMPs to achieve the TMDL. This funding is supplemented by additional capital funds from other sources.

4.5.3 2022 Assessment and Recommended Actions

The FPG methodology is considered **equitable**; **however, additional clarity regarding proportion of the stormwater utility fee and other capital improvement funds would provide additional clarity**. If DOEE can demonstrate that the stormwater utility fee revenue is a small proportion of the funding to implement Chesapeake Bay TMDL projects, which federal agencies may then expect to receive some credit for, the goals may be considered equitable. Furthermore, several federal agencies have achieved or are close to achieving the target loads identified in the Phase III WIP, potentially negating concerns about achieving the FPGs.

4.6 West Virginia

4.6.1 2019 Assessment

The West Virginia Phase III WIP did not define FPGs for federal agencies. The WIP notes that federal landowners are subject to the requirements of the Construction Stormwater General Permit and Section 438 of the Energy Independence and Security Act, which addresses stormwater runoff requirements for federal projects. The jurisdiction will continue to track and report BMPs reported by federal agencies, but no additional implementation is required by the Phase III WIP (WV DEP 2019, 68-69).

4.6.2 2022 Assessment

Because the jurisdiction did not assign FPGs, no additional assessment was performed for West Virginia for this Report.

4.7 Recommended Actions

Table 4-1 includes a summary of the current status of the FPGs in Maryland, Pennsylvania, Virginia, and Washington, D.C., and action items noted during the meetings with jurisdiction staff.

Table 4-1. Status of FPG Review

Jurisdiction	FPG Source	FPG Scale	Equity Considerations	2022 Equity Assessment	Action Items	Action Item Status
Maryland	Facility MS4 permit requirements	Facility/permittee	• FPG units (impervious acres restored, not loads) • Facility-level goals, rather than jurisdiction-or state-basin scale	Equitable; progress cannot be tracked because goals are not quantified as loads	MDE to review NEIEN inputs to assess if BMPs from federally owned agricultural land are tracked (short-term)	To be completed
					MDE will renew the MS4 permit in 2025 (long-term); federal agencies should engage in the renewal process	To be completed
Pennsylvania	Phase III WIP (based on revised EPA Default Method calculations)	• Current Phase III WIP FPGs are county-scale • EPA Default Method is at state-basin scale	• Tables 4-1 and 4-2 in the Phase III WIP should be updated to reflect new FPGs, including the previously agreed upon EPA Default Method FPGs for DoD	Equitable, if action items are completed	PADEP and EPA (Jeff Sweeney) to update FPGs using the revised EPA Default Method (short-term)	To be completed
					PADEP to update Tables 4-1 and 4-2 in the Phase III WIP with the revised FPGs in a future WIP addendum (medium-term)	To be completed
New York	Phase III WIP	Jurisdiction	• Use of Protocol, which is based on outdated Model	Not assessed	N/A	N/A
Virginia	Phase III WIP	Jurisdiction	• There are not mechanisms to quantify or track federal agency progress toward Phase III WIP goals not related to the Developed or Natural source sectors	Reduction targets from the Developed and Natural source sectors are equitable; progress toward other goals cannot be tracked	VDEQ and CBP to encourage federal agencies to report BMPs across all source sectors through the BMP Warehouse (short-term)	To be completed
					VDEQ/CBP to raise possibility for discussion of adding other sector loads during development of the Phase 7 model (long-term)	To be completed
					VDEQ and CBP to consider methods to assess federal agency progress toward other source sector goals through additional data collection (e.g., use of state or federal data related to septic systems, data request to federal agencies) or CAST scenarios to estimate load reductions (short-term). Additional data requests requiring federal agency input is a long-term action item.	To be completed
					VDEQ to update the BMP Warehouse to designate federal BMPs imported from the jurisdiction's separate database of BMPs implemented under a Stormwater Construction General Permit.	To be completed
Washington, D.C.	Phase III WIP	Jurisdiction	• Payment of the stormwater utility fee and the assignment of FPGs is inequitable with the expectations of non-federal entities	Potentially equitable, pending outcome of action items	DOEE to provide a description of how stormwater utility fee revenue is used within the District with the intent to demonstrate it is not used for Chesapeake Bay TMDL compliance	To be completed
West Virginia	Phase III WIP	N/A	• No FPGs assigned	Not assessed	N/A	N/A

Section 5

Level of Effort Evaluation

This section will evaluate the level of effort needed to meet the FPGs for federal agencies that met the minimum completeness criterion (discussed in Section 3) and in jurisdictions where there is consensus on equitable FPGs (discussed in Section 4).

5.1 Evaluation Criteria

Inclusion in the level of effort evaluation is determined based on the completeness of the BMP record and the equitability of the jurisdiction FPGs.

As discussed in Section 3, at least 95 percent of a federal agency's BMP records that are eligible for federal TMDL credit must be present in the 2021 Progress scenario to have evaluated the federal agency's pollutant loads. DoD in Maryland, New York, and Pennsylvania and NPS in Pennsylvania and Virginia met this criterion.

To evaluate the remaining level of effort from the 2021 Progress loads to the FPGs, the FPGs must also be considered equitable by consensus with the jurisdictions, federal agencies, and EPA. The equity of the FPGs in Maryland, Pennsylvania, Virginia, and Washington, D.C. was discussed in Section 4.

Because the Phase III WIP documents do not include numeric FPGs, DoD's remaining level of effort in Maryland and New York will not be evaluated. The remaining level of effort for DoD and NPS in Pennsylvania will be based on the revised EPA Default Method target loads developed in 2019, which are considered equitable and will eventually be incorporated in the Pennsylvania Phase III WIP. The remaining level of effort for NPS in Virginia will be assessed against numeric FPGs provided in the Phase III WIP; as stated previously, the 2021 Progress scenario cannot track federal loads toward other source sector goals.

Table 5-1 summarizes the criteria upon which the level of effort evaluation is based.

Table 5-1. Level of Effort Evaluation Criteria

Agency	Jurisdiction	BMP Record Completeness	Phase III WIP FPG Equity	EPA Default Method
DoD	MD	97%	Not quantified	Equitable
	NY	100%	Not quantified	Equitable
	PA	96%	Equitable	Equitable
NPS	PA	100%	Equitable	Equitable
	VA	100%	Equitable	Equitable

5.2 Level of Effort Evaluation

This section will summarize the remaining level of effort toward the FPGs as load reductions required and percent reduction required. Additional tables with the results of the Level of Effort evaluation are also included in Appendix C.

5.2.1 Department of Defense

Tables 5-2, 5-3, and 5-4 summarize the load reductions required to reach the EPA Default Method state-basin FPGs relative to the 2021 Progress loads for DoD. The tables quantify the load reductions needed to achieve the FPG as the difference between the 2021 Progress loads and the EPA Default Method FPG. If the 2021 Progress loads are less than the EPA Default Method FPG, meaning that the goal has been achieved in that state-basin, the tables also include the excess load reductions achieved beyond the FPG. Federal agencies are encouraged to trade excess reductions within a state-basin to achieve the state-basin FPG. As the Chesapeake Bay TMDL proceeds, EPA may also consider allowing federal agencies to exchange excess credit between state basins using the state basin conversion factors in CAST.

As noted in Section 3, DoD loads include loads from USACE land as well as reductions from USACE BMPs credited to the DoD agency code. Therefore, the remaining load reductions needed represent effort for both DoD through the DoD Chesapeake Bay Program and USACE.

Table 5-2. DoD Remaining Level of Effort (TN) – EPA Default Method

State-Basin Name	2021 Progress Loads (lbs/yr EOT)	EPA Default Method FPG (lbs/yr EOT)	Load Reductions Needed to Achieve FPG (lbs/yr EOT)	Excess Load Reductions Achieved Beyond FPG (lbs/yr EOT)
MD Eastern Shore of Chesapeake Bay	18,935	19,033	0	98
MD Patuxent River Basin	77,972	75,525	2,447	0
MD Potomac River Basin	124,798	124,468	330	0
MD Susquehanna River Basin	970	970	0	0
MD Western Shore of Chesapeake Bay	170,666	167,597	3,069	0
Maryland - Total	393,341	387,594	5,846	
NY Susquehanna River Basin	7,647	6,318	1,329	0
New York - Total	7,647	6,318	1,329	
PA Potomac River Basin	38,138	38,169	0	31
PA Susquehanna River Basin	266,529	266,146	383	0
Pennsylvania - Total	304,668	304,315	383	

Table 5-3. DoD Remaining Level of Effort (TP) – EPA Default Method

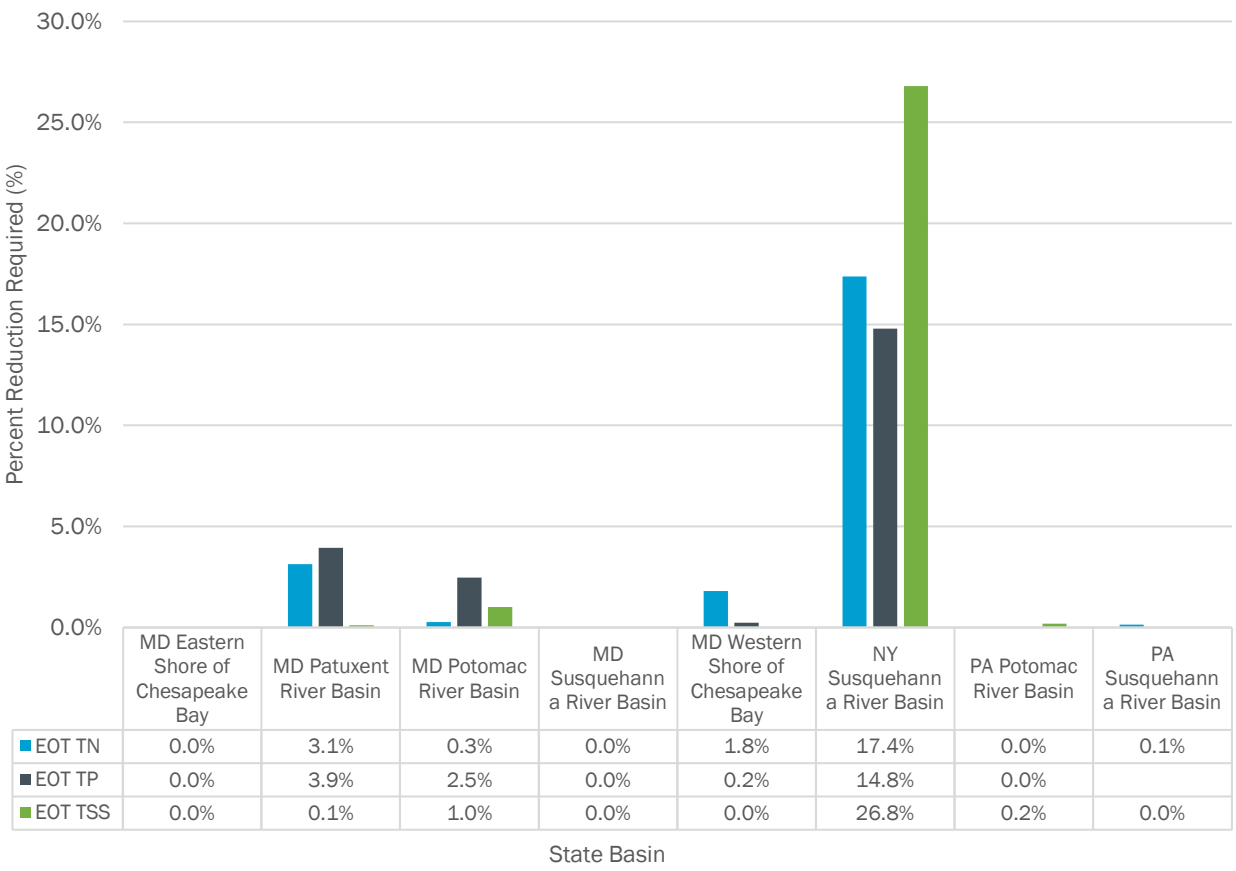
State-Basin Name	2021 Progress (lbs/yr EOT)	EPA Default Method FPG (lbs/yr EOT)	Load Reductions Needed to Achieve FPG (lbs/yr EOT)	Excess Load Reductions Achieved Beyond FPG (lbs/yr EOT)
MD Eastern Shore of Chesapeake Bay	6,663	6,803	0	140
MD Patuxent River Basin	15,148	14,552	596	0
MD Potomac River Basin	32,195	31,400	796	0
MD Susquehanna River Basin	42	42	0	0
MD Western Shore of Chesapeake Bay	53,872	53,745	127	0
Maryland – Total	107,921	106,541	1,520	
NY Susquehanna River Basin	818	697	121	0
New York – Total	818	697	121	
PA Potomac River Basin	3,486	3,490	0	4
PA Susquehanna River Basin	10,709	10,855	0	147
Pennsylvania – Total	14,195	14,346	0	

Table 5-4. DoD Remaining Level of Effort (TSS) – EPA Default Method				
State-Basin Name	2021 Progress (lbs/yr EOT)	EPA Default Method FPG (lbs/yr EOT)	Load Reductions Needed to Achieve FPG (lbs/yr EOT)	Excess Load Reductions Achieved Beyond FPG (lbs/yr EOT)
MD Eastern Shore of Chesapeake Bay	29,533,747	30,018,983	0	485,236
MD Patuxent River Basin	45,154,614	45,108,139	46,475	0
MD Potomac River Basin	129,092,153	127,788,184	1,303,969	0
MD Susquehanna River Basin	60,778	61,407	0	629
MD Western Shore of Chesapeake Bay	206,475,651	208,805,221	0	2,329,570
Maryland - Total	410,316,942	411,781,933	1,350,444	
NY Susquehanna River Basin	853,496	624,793	228,703	0
New York - Total	853,496	624,793	228,703	
PA Potomac River Basin	5,947,436	5,936,109	11,327	0
PA Susquehanna River Basin	9,331,563	9,626,087	0	294,524
Pennsylvania - Total	15,278,999	15,562,196	11,327	

Based on these results, which are consolidated at the jurisdiction scale in Table 5-5, DoD and USACE have achieved the TSS FPGs in Maryland and Pennsylvania and the TP FPG in Pennsylvania.

Table 5-5. DoD FPG Level of Effort Summary (2021 Progress Loads to FPGs)				
Jurisdiction	FPG Source	TN - Load Reductions Required (lbs/yr EOT)	TP - Load Reductions Required (lbs/yr EOT)	TSS - Load Reductions Required (lbs/yr EOT)
MD	EPA Default Method	5,846	1,520	1,350,444
NY	EPA Default Method	1,329	121	228,703
PA	EPA Default Method/Phase III WIP	383	0	11,327

Based on load reductions, the largest effort for DoD remains in Maryland. However, based on percent reduction, which is shown in Figure 5-1, the largest effort remains in New York where the percent reduction needed for TP is 14.8 percent, 17.4 percent for TN, and 26.8 percent for TSS.



	MD Eastern Shore of Chesapeake Bay	MD Patuxent River Basin	MD Potomac River Basin	MD Susquehanna River Basin	MD Western Shore of Chesapeake Bay	NY Susquehanna River Basin	PA Potomac River Basin	PA Susquehanna River Basin
EOT TN	0.0%	3.1%	0.3%	0.0%	1.8%	17.4%	0.0%	0.1%
EOT TP	0.0%	3.9%	2.5%	0.0%	0.2%	14.8%	0.0%	
EOT TSS	0.0%	0.1%	1.0%	0.0%	0.0%	26.8%	0.2%	0.0%

Figure 5-1: Level of effort as percent reduction to the EPA Default Method FPGs for DoD (including USACE).

5.2.2 National Park Service

Tables 5-6, 5-7, and 5-8 summarize the load reductions required to reach the EPA Default Method state-basin FPGs relative to the 2021 Progress loads for NPS with the exception of Maryland that did not upload NPS BMP records by October 2021 for inclusion in CAST. Omission of BMP data from Maryland TMDL loads for NPS were erroneously inflated for the 2021 Progress scenario. The tables quantify the load reductions needed to achieve the FPGs as the difference between the 2021 Progress loads and the EPA Default Method FPG. If the 2021 Progress loads are less than the EPA Default Method FPGs, meaning that the goal has been achieved in that state-basin, the tables also include the excess load reductions achieved beyond the FPGs. Federal agencies are encouraged to trade excess reductions within a state-basin to achieve the state-basin FPG. As the Chesapeake Bay TMDL proceeds, EPA may also consider allowing federal agencies to exchange excess credit between state basins using the state basin conversion factors in CAST.

Table 5-6. NPS Remaining Level of Effort (TN) – EPA Default Method				
State-Basin Name	2021 Progress (lbs/yr EOT)	EPA Default Method FPG (lbs/yr EOT)	Load Reductions Needed to Achieve FPG (lbs/yr EOT)	Excess Load Reductions Achieved Beyond FPG (lbs/yr EOT)
PA Potomac River Basin	17,778	17,796	0	18
PA Susquehanna River Basin	14,129	14,056	73	0
Pennsylvania - Total	31,906	31,851	73	
VA James River Basin	54,734	50,955	3,779	0
VA Potomac River Basin	184,166	170,732	13,434	0
VA Rappahannock River Basin	72,876	69,788	3,088	0
VA York River Basin	27,078	25,079	1,999	0
Virginia - Total	338,853	316,554	22,300	

Table 5-7. NPS Remaining Level of Effort (TP) – EPA Default Method				
State-Basin Name	2021 Progress (lbs/yr EOT)	EPA Default Method FPG (lbs/yr EOT)	Load Reductions Needed to Achieve FPG (lbs/yr EOT)	Excess Load Reductions Achieved Beyond FPG (lbs/yr EOT)
PA Potomac River Basin	3,305	3,305	0	0
PA Susquehanna River Basin	592	592	0	0
Pennsylvania - Total	3,897	3,897	0	
VA James River Basin	8,149	7,682	467	0
VA Potomac River Basin	36,390	34,031	2,359	0
VA Rappahannock River Basin	13,232	12,966	266	0
VA York River Basin	6,380	6,192	188	0
Virginia - Total	64,150	60,871	3,279	

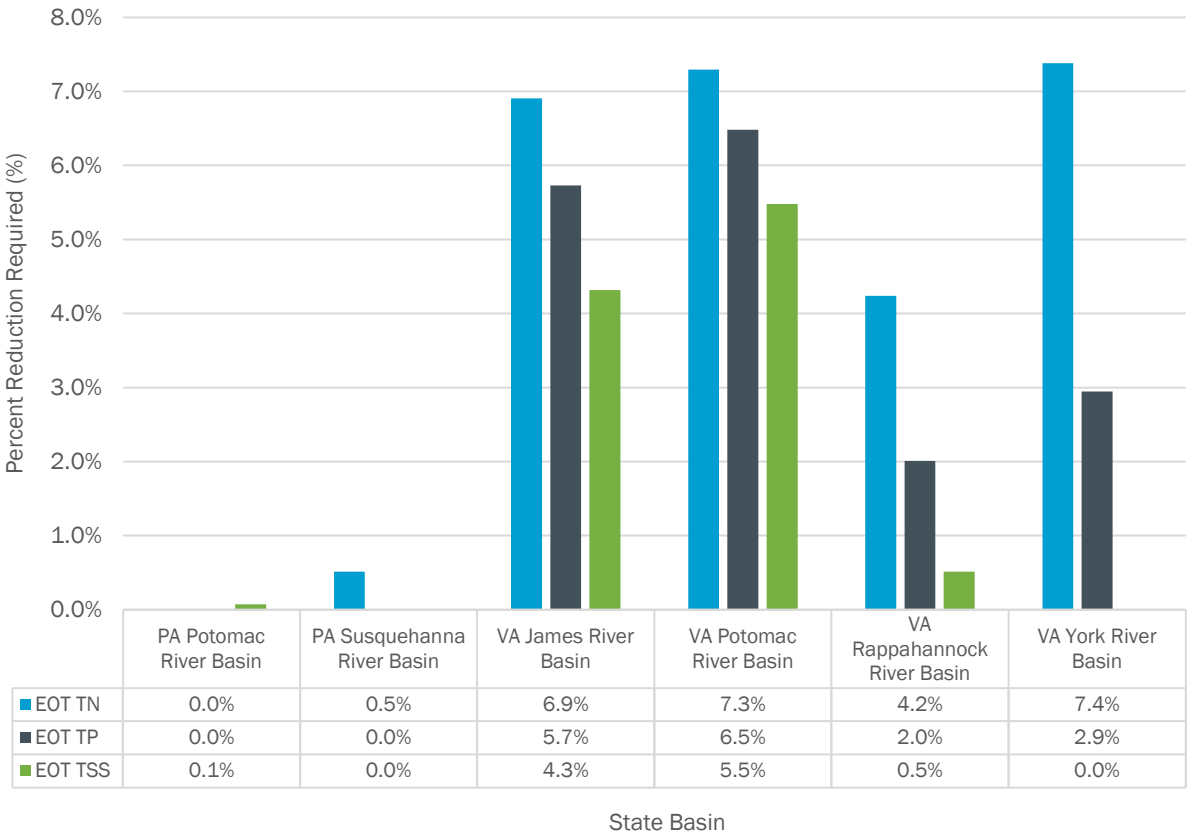
Table 5-8. NPS Remaining Level of Effort (TSS) – EPA Default Method				
State-Basin Name	2021 Progress (lbs/yr EOT)	EPA Default Method FPG (lbs/yr EOT)	Load Reductions Needed to Achieve FPG (lbs/yr EOT)	Excess Load Reductions Achieved Beyond FPG (lbs/yr EOT)
PA Potomac River Basin	2,657,366	2,655,484	1,882	0
PA Susquehanna River Basin	510,621	510,621	0	0
Pennsylvania - Total	3,167,987	3,166,104	1,882	
VA James River Basin	17,855,176	17,113,583	771,593	0
VA Potomac River Basin	101,158,304	95,615,615	5,542,689	0
VA Rappahannock River Basin	29,474,714	29,323,089	151,625	0
VA York River Basin	10,125,725	10,282,049	0	156,324
Virginia - Total	158,643,919	152,334,336	6,465,907	

Based on these results, which are consolidated at the jurisdiction scale in Table 5-9, NPS has achieved the FPG for TP in Pennsylvania. This table also includes the load reductions required to achieve the FPGs from the Virginia Phase III WIP, which are quantified at the jurisdiction rather than state-basin scale.

Table 5-9. NPS FPG Level of Effort Summary (2021 Progress Loads to FPGs)				
Jurisdiction	FPG Source	TN - Load Reductions Required (lbs/yr EOT)	TP - Load Reductions Required (lbs/yr EOT)	TSS - Load Reductions Required (lbs/yr EOT)
PA	EPA Default Method/Phase III WIP	73	0	1,882
VA	EPA Default Method	22,300	3,279	6,465,907
	Phase III WIP	8,594	4,114	N/A

In terms of load reductions required, the largest effort remains to achieve the revised EPA Default Method FPGs in Virginia. Because the Phase III WIP FPGs do not include reductions from regulated developed land (i.e., land regulated by an MS4 permit), the load reductions required underestimate the actual load reductions NPS must achieve to reach the FPGs.

Based on percent reduction, a larger effort remains in the Virginia state-basins, particularly for TN in the James, Potomac, and York state-basins. Figure 5-2 summarizes the percent reduction required by state-basin based on the revised EPA Default Method.



	PA Potomac River Basin	PA Susquehanna River Basin	VA James River Basin	VA Potomac River Basin	VA Rappahannock River Basin	VA York River Basin
EOT TN	0.0%	0.5%	6.9%	7.3%	4.2%	7.4%
EOT TP	0.0%	0.0%	5.7%	6.5%	2.0%	2.9%
EOT TSS	0.1%	0.0%	4.3%	5.5%	0.5%	0.0%

Figure 5-2: Level of effort as percent reduction to the EPA Default Method FPGs for NPS.

Section 6

Recommendations

The federal community holds a unique position in the watershed as significant landholders that are accountable directly to EPA; however, their contributions to the Chesapeake Bay TMDL are mediated by the jurisdictions, which set federal agency pollutant load goals through the WIPs and oversee the reporting of stormwater BMP information to CAST. Therefore, mutual success requires meaningful coordination and consensus between the federal agencies and jurisdictions. This report is intended to support improvement of the federal BMP data in CAST and agreement on equitable load goals for federal agencies.

6.1 Federal BMP Data

In the 2019 Report, federal agencies indicated that the accuracy and completeness of their BMP data in CAST was low or medium. To assess why federal BMPs were not present in CAST, BC developed BMP Credit Evaluations for 2021 progress data, which analyzed the BMP records present in the jurisdiction database, NEIEN, and CAST. The evaluation results found a large range in the percentage of BMPs present in CAST that were eligible for TMDL credit for federal agencies. For federal agencies, the most common reasons why BMPs are not present in CAST are because the BMPs are not eligible for TMDL credit, BMPs are not eligible for TMDL credit with a federal agency code, or data reporting issues related to inspection, maintenance, or incorrect metrics. Also, some federal agencies have ongoing efforts to collect and validate BMP information, the results of which have not yet been reported to the jurisdictions. In some cases, characteristics of the jurisdictions' reporting processes also impede the ability to identify and track federal BMPs.

Some of the BMP records currently not present in the CAST 2021 Progress scenario may be credited in future progress years with action from federal agencies. The following are actions recommended for federal agency staff:

- Report BMPs not found in the jurisdiction database that are eligible for TMDL credit in the jurisdiction template
- Report a new inspection for BMPs with an expired lifespan or where the last inspection was failed
- Provide required information that is missing or not reported in the correct metric or format
- Coordinate with the jurisdictions to determine corrective actions for BMPs where an explanation is not provided in the BMP Credit Evaluations
- Implement feedback loops to notify federal agencies of BMP entry errors in NEIEN with enough time for agencies to correct issues before the EPA deadline

To improve the BMP record, federal agencies are also encouraged to review BMP records that are present in the jurisdiction database and not the federal agency dataset to determine if the records are valid or should be removed.

As the entity that maintains the BMP data reports to NEIEN and CAST, the jurisdictions can also improve federal BMP data with the results of BMP Credit Evaluations. The following are actions recommended for jurisdiction staff:

- Coordinate with federal agencies to identify and validate BMPs that are in the jurisdiction database but not in the federal agency data record
- Coordinate with federal agencies to address reporting issues for records where an explanation is not provided in the BMP Credit Evaluations
- Share State Unique IDs with federal agencies to facilitate future analyses of federal agency BMP data

Some of the proposed actions and initiatives from the BMP Credit Evaluation results may require multiple years to fully implement. The EPA Chesapeake Bay Program Office can offer support to maintain momentum around these recommendations in future years. In addition, EPA can support federal agencies and jurisdictions by ensuring jurisdiction staff understand how to report BMPs to NEIEN with a federal agency code and how to report BMPs in source sectors not applicable for federal agencies.

6.2 FPGs

For this Report, BC facilitated meetings between jurisdiction staff in Maryland, Virginia, Pennsylvania, and Washington, D.C. regarding FPGs. Those conversations yielded multiple action items, which are summarized by jurisdiction in Table 4-1 of this report.

- The Maryland FPGs, which are required by MS4 permits, are considered equitable. However, the FPGs are not expressed as load reductions because they are tracked at the facility level based on acres of impervious acres treated.
- The Pennsylvania FPGs must be updated in order to be considered equitable. PADEP staff will work with EPA to calculate new FPGs based on the revised EPA Default Method and the state's latest Phase III WIP.
- The methodology used to develop the Washington D.C. FPGs is equitable. However, DOEE should address concerns about equity related to the use of stormwater utility fee revenue for the Chesapeake Bay TMDL.
- The Virginia Phase III WIP FPGs include obligations that cannot be tracked in the current suite of model tools because federal agencies are assigned loads from the Developed and Natural load source groups. While multiple action items were identified that may provide interim measures to track federal progress toward those goals, the decision to require load reductions from other source sectors should be revisited during development of the Phase 7 Chesapeake Bay Watershed Model. The jurisdiction's expectations for federal agencies in the Developed and Natural sector are considered equitable.

As the current end date of the Chesapeake Bay TMDL approaches in 2025, it is important to reach consensus regarding equitable FPGs. Therefore, it is recommended that the EPA Chesapeake Bay Program Office prioritize updates to the Pennsylvania FPGs and ongoing discussions with DOEE to resolve concerns regarding the District FPGs.

6.3 Conclusion

The analyses and efforts described in this Report acted on several recommendations from the 2019 Report, including (1) the development of the BMP Credit Evaluations, which advanced the effort to improve the completeness of the federal BMP dataset in CAST and (2) discussions with the jurisdictions to reach consensus around equitable FPGs. As noted in this section, there are additional actions identified for federal agencies, the jurisdictions, and EPA to make further progress toward these goals. The FFWG, EPA Chesapeake Bay Program Office, jurisdictions, and federal agencies are encouraged to continue to work toward the recommended actions included in this Report as part of

the annual BMP reporting, two-year milestones, development of the Phase 7 Chesapeake Bay Watershed Model, and additional planning and decisions made by other Chesapeake Bay Program workgroups.

Section 7

Limitations

This document was prepared solely for U.S. Environmental Protection Agency in accordance with professional standards at the time the services were performed and in accordance with the contract between U.S. Environmental Protection Agency and Brown and Caldwell dated December 15, 2021. This document is governed by the specific scope of work authorized by U.S. Environmental Protection Agency; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by U.S. Environmental Protection Agency and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Section 8

References

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NYSDEC. *Final Phase III Watershed Implementation Plan for New York's Chemung and Susquehanna River Basins.* 2019.

PA DEP. *Pennsylvania Chesapeake Bay Watershed Implementation Plan Phase 2.* 2012.

PA DEP. *Pennsylvania Phase 3 Chesapeake Bay Watershed Implementation Plan.* 2019.

VA DEQ. *Commonwealth of Virginia Chesapeake Bay TMDL Phase III Watershed Implementation Plan*. 2019.

WV DEP. *West Virginia's Phase 3 Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load.* 2019.

Appendix A: List of Creditable BMPs for Federal Agencies (Official BMPs Only)

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
Developed	Advanced Grey Infrastructure Nutrient Discovery Program (IDDE)	advancedgi	Illicit discharge detection and elimination credits are only available to localities that show empirical monitoring for each eligible individual discharge. Enter unit of total acres treated or percent of acres treated.
Developed	Advanced Sweeping Technology - 1 pass/12 weeks	scp6	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass the same street every twelve weeks. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - 1 pass/2 weeks	scp3	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass the same street once every two weeks. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - 1 pass/4 weeks	scp4	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass the same street every four weeks. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - 1 pass/8 weeks	scp5	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass the same street every eight weeks. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - 1 pass/week	scp2	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass the same street once a week. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - 2 pass/week	scp1	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass the same street twice a week. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - fall 1 pass/1-2 weeks else monthly	scp8	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass once every week from March to April, October to November, and monthly otherwise. Enter units of acres or miles.
Developed	Advanced Sweeping Technology - spring 1 pass/1-2 weeks else monthly	scp7	Sweeper is equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper or sweeper is equipped with a high power vacuum to suction debris from street surface. Must pass once every week from March to

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
			April, and monthly otherwise. Enter units of acres or miles.
Developed	Bioretention/raingardens - A/B soils, no underdrain	bioretnoudab	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has no underdrain and is in A or B soil. Enter unit of total acres treated or percent of acres treated.
Developed	Bioretention/raingardens - A/B soils, underdrain	bioretudab	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil. Enter unit of total acres treated or percent of acres treated.
Developed	Bioretention/raingardens - C/D soils, underdrain	bioretudcd	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in C or D soil. Use this BMP where the specific design is unknown. Enter unit of total acres treated or percent of acres treated.
Developed	Bioswale	bioswale	With a bioswale, the load is reduced because, unlike other open channel designs, there is now infiltration into the soil. A bioswale is designed to function as a bioretention area. Enter unit of total acres treated or percent of acres treated.
Developed	Conservation Landscaping Practices	conservlandscape	The conversion of managed turf into actively maintained perennial meadows, using species that are native to the Chesapeake Bay region. Enter unit of total acres treated or percent of acres treated.
Developed	Dirt & Gravel Road Erosion & Sediment Control - Driving Surface Aggregate + Raising the Roadbed	dirtgraveldsa	Reduce the amount of sediment runoff from dirt and gravel roads through the use of driving surface aggregates (DSA) such as durable and erosion resistant road surface and raising road elevation to restore natural drainage patterns. Where specific design is unknown, use the BMP with outlets only. Enter units of feet.
Developed	Dirt & Gravel Road Erosion & Sediment Control - Driving Surface Aggregate with Outlets	dirtgraveldsaout	Reduce the amount of sediment runoff from dirt and gravel roads through the use of driving surface aggregates (DSA) such as durable and erosion resistant road surface and through the use of additional Drainage Outlets (creating new outlets in ditchline to reduce channelized flow). Where specific design is unknown, use the BMP with outlets only. Enter units of feet.

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
Developed	Dirt & Gravel Road Erosion & Sediment Control - Outlets only	dirtgravelnodsa	Reduce the amount of sediment runoff from dirt and gravel roads through the use of additional Drainage Outlets (creating new outlets in ditchline to reduce channelized flow). Where specific design is unknown, use this BMP with outlets only. Enter units of feet.
Developed	Dry Detention Ponds and Hydrodynamic Structures	dryponds	Dry Detention Ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Hydrodynamic Structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micropools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff. Enter unit of total acres treated or percent of acres treated.
Developed	Dry Extended Detention Ponds	extdryponds	Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness. Enter unit of total acres treated or percent of acres treated.
Developed	Filter Strip Runoff Reduction	urbfilterrr	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.4 design ratio of filter strip length to impervious flow length is recommended for runoff reduction urban filter strips. Enter unit of total acres treated or percent of acres treated.
Developed	Filter Strip Stormwater Treatment	urbfilterst	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.2 design ratio of filter strip length to impervious flow length is recommended for stormwater treatment urban filter strips. Enter unit of total acres treated or percent of acres treated.
Developed	Filtering Practices	filter	Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require annual inspection and maintenance to receive pollutant reduction credit.

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
			Enter unit of total acres treated or percent of acres treated.
Developed	Floating Treatment Wetland 10% Coverage of Pond	ftw1	Floating treatment wetlands are rafts of wetland vegetation deployed in existing wet ponds with a drainage area of <400 acres. First report wet ponds or stormwater performance standard-stormwater treatment (ST), then report the BMP according to the percent of pond area covered in the wetland rafts. Report units of acres treated by the wet pond.
Developed	Floating Treatment Wetland 20% Coverage of Pond	ftw2	Floating treatment wetlands are rafts of wetland vegetation deployed in existing wet ponds with a drainage area of <400 acres. First report wet ponds or stormwater performance standard-stormwater treatment (ST), then report the BMP according to the percent of pond area covered in the wetland rafts. Report units of acres treated by the wet pond.
Developed	Floating Treatment Wetland 30% Coverage of Pond	ftw3	Floating treatment wetlands are rafts of wetland vegetation deployed in existing wet ponds with a drainage area of <400 acres. First report wet ponds or stormwater performance standard-stormwater treatment (ST), then report the BMP according to the percent of pond area covered in the wetland rafts. Report units of acres treated by the wet pond.
Developed	Floating Treatment Wetland 40% Coverage of Pond	ftw4	Floating treatment wetlands are rafts of wetland vegetation deployed in existing wet ponds with a drainage area of <400 acres. First report wet ponds or stormwater performance standard-stormwater treatment (ST), then report the BMP according to the percent of pond area covered in the wetland rafts. Report units of acres treated by the wet pond.
Developed	Floating Treatment Wetland 50% Coverage of Pond	ftw5	Floating treatment wetlands are rafts of wetland vegetation deployed in existing wet ponds with a drainage area of <400 acres. First report wet ponds or stormwater performance standard-stormwater treatment (ST), then report the BMP according to the percent of pond area covered in the wetland rafts. Report units of acres treated by the wet pond.
Developed	Forest Buffer	forestbufurban	Forest buffers are linear wooded areas that help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. The recommended buffer width is 100 feet, with a 35 feet minimum width required. Enter units of acres of buffer or percent.
Developed	Forest Planting	urbanforplant	Urban forest planting includes trees planted in a contiguous area to establish forest-like conditions, with minimal mowing as needed to aid tree and understory establishment. Do not include plantings used to establish riparian forest buffers. Trees are planted on pervious areas. Enter units of acres or percent.
Developed	Grass Buffers	urbgrassbuffers	This BMP changes the land use from pervious urban to pervious urban. Therefore, there is no change and no reduction from using this BMP.

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
Developed	Impervious Disconnection to amended soils	imperviousdisconnection	Disconnecting existing impervious area runoff from stormwater drainage systems such as directing rooftops and/or on-lot impervious surfaces to pervious areas with amended soils. Report disconnect to un-amended soils as Urban Filter Strip. Submit units of impervious acres or percent.
Developed	Impervious Surface Reduction	impsurred	Reducing impervious surfaces to promote infiltration and percolation of runoff storm water. Enter units of acres or percent.
Developed	Infiltration Practices w/ Sand, Veg. - A/B soils, no underdrain	infiltwithsv	A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. A sand layer and vegetation are required. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in A or B soil types. Use the other BMP without sand or vegetation where the specific design is unknown. Enter unit of total acres treated or percent of acres treated.
Developed	Infiltration Practices w/o Sand, Veg. - A/B soils, no underdrain	infiltration	A depression to form an infiltration basin where sediment is trapped, and water infiltrates the soil. Sand layers and vegetation are not required. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in A or B soil types. This BMP without sand or vegetation is used where the specific design is unknown. Enter unit of total acres treated or percent of acres treated.
Developed	Mechanical Broom Technology - 1 pass/4 weeks	scp11	Sweeper is equipped with water tanks, sprayers, brooms, and a vacuum system pump that gathers street debris. Must pass the same street every four weeks. Use this BMP where the specific technology type or frequency is unknown. Enter units of acres or miles.
Developed	Mechanical Broom Technology - 1 pass/week	scp10	Sweeper is equipped with water tanks, sprayers, brooms, and a vacuum system pump that gathers street debris. Must pass the same street every week. Enter units of acres or miles.
Developed	Mechanical Broom Technology - 2 pass/week	scp9	Sweeper is equipped with water tanks, sprayers, brooms, and a vacuum system pump that gathers street debris. Must pass the same street twice every week. Enter units of acres or miles.
Developed	Nutrient Management Maryland Commercial Applicators	urbannmmdca	This BMP credits nitrogen reductions to urban lawns based upon Maryland legislation and regulations that: 1) limit the N content and establishes slow release content for fertilizer products sold in retail outlets; 2) sets upper limit on the maximum amount of N fertilizer that commercial applicators can apply in any one application (0.9 lbs/acre/year); 3) prohibits application on paved surfaces, water features, or during the dormant season, and 4) has verifiable procedures for commercial applicator training,

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
			certificate, and application record-keeping, including fines for non-compliance. This BMP specifically credits a reduction in N application by commercial applicators in Maryland. Enter units of acres or percent.
Developed	Nutrient Management Maryland Do It Yourself	urbannmmddiy	This BMP credits nitrogen reductions to urban lawns based upon Maryland legislation and regulations that: 1) limit the N content and establishes slow release content for fertilizer products sold in retail outlets; 2) sets upper limit on the maximum amount of N fertilizer that commercial applicators can apply in any one application (0.9 lbs/acre/year); 3) prohibits application on paved surfaces, water features, or during the dormant season, and 4) has verifiable procedures for commercial applicator training, certificate, and application record-keeping, including fines for non-compliance. This BMP specifically credits a reduction in N application by do-it-yourselfers (DIYs) in Maryland. Enter units of acres or percent.
Developed	Nutrient Management Plan	urbannmplan	An urban nutrient management plan is a written, site-specific plan which addresses how the major plant nutrients (nitrogen, phosphorus, and potassium) are to be annually managed for expected turf and landscape plants and for the protection of water quality. The goal of an urban turf and landscape nutrient management plan is to minimize adverse environmental effects, primarily upon water quality, and avoid unnecessary nutrient applications. It should be recognized that some level of nutrient loss to surface and groundwater will occur even by following the recommendations in a nutrient management plan. The impacts of urban nutrient management plans will differ from lawn-to-lawn depending on nutrient export risk factors. This BMP is the default for lawns with an unknown risk type. Enter units of acres or percent.
Developed	Nutrient Management Plan High Risk Lawn	urbannmplanhr	An urban nutrient management plan is a written, site-specific plan which addresses how the major plant nutrients (nitrogen, phosphorus, and potassium) are to be annually managed for expected turf and landscape plants and for the protection of water quality. The goal of an urban or turf and landscape nutrient management plan is to minimize adverse environmental effects, primarily upon water quality, and avoid unnecessary nutrient applications. It should be recognized that some level of nutrient loss to surface and groundwater will occur even by following the recommendations in a nutrient management plan. The impacts of urban nutrient management plans will differ from lawn-to-lawn depending on nutrient export risk factors. This BMP is for lawns with a high risk of nutrient export. Enter units of acres or percent.
Developed	Nutrient Management Plan Low Risk Lawn	urbannmplanlr	An urban nutrient management plan is a written, site-specific plan which addresses how the major plant nutrients (nitrogen, phosphorus, and potassium) are to be annually managed for expected turf and

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
			landscape plants and for the protection of water quality. The goal of an urban or turf and landscape nutrient management plan is to minimize adverse environmental effects, primarily upon water quality, and avoid unnecessary nutrient applications. It should be recognized that some level of nutrient loss to surface and groundwater will occur even by following the recommendations in a nutrient management plan. The impacts of urban nutrient management plans will differ from lawn-to-lawn depending on nutrient export risk factors. This BMP is for lawns with a low risk of nutrient export. Enter units of acres or percent.
Developed	Permeable Pavement w/ Sand, Veg. - A/B soils, no underdrain	permpavsvnoudab	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, has sand and/or vegetation, and is in A or B soil. Enter unit of total acres treated or percent of acres treated.
Developed	Permeable Pavement w/ Sand, Veg. - A/B soils, underdrain	permpavsvudab	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation, and is in A or B soil. Enter unit of total acres treated or percent of acres treated.
Developed	Permeable Pavement w/ Sand, Veg. - C/D soils, underdrain	permpavsvudcd	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation, and is in C or D soil. Enter unit of total acres treated or percent of acres treated.
Developed	Permeable Pavement w/o Sand, Veg. - A/B soils, no underdrain	permpavnosvnoudab	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, no sand or vegetation, and is in A or B soil. Enter unit of total acres treated or percent of acres treated.
Developed	Permeable Pavement w/o Sand, Veg. - A/B soils, underdrain	permpavnosvudab	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or

Table A-1. Official BMPs That Can Be Credited to Federal Agencies

Sector	BMP Full Name	BMP Short Name	BMP Description
			vegetation, and is in A or B soil. Enter unit of total acres treated or percent of acres treated.
Developed	Permeable Pavement w/o Sand, Veg. - C/D soils, underdrain	permpavnosvudcd	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation, and is in C or D soil. Use this BMP where the specific design is unknown. Enter unit of total acres treated or percent of acres treated.
Developed	Storm Drain Cleaning	stormdrainclean	Removal of sediment and organic matter from catch basins in a targeted manner that focuses on water quality improvements. Enter units of pounds of TN, TP and TSS.
Developed	Stormwater Performance Standard-Runoff Reduction	rr	Total post-development runoff volume that is reduced through canopy interception, soil amendments, evaporation, rainfall harvesting, engineered infiltration, extended filtration, or evapo-transpiration. Stormwater practices that achieve at least a 25% reduction of the annual runoff volume are classified as providing runoff reduction, and therefore earn a higher net removal rate. Enter units of acres treated, impervious acres, and acre-feet. Credit is only received if all three amounts are entered.
Developed	Stormwater Performance Standard-Stormwater Treatment	st	Total post-development runoff volume that is reduced through a permanent pool, constructed wetlands, or sand filters have less runoff reduction capability, and their removal rate is lower than runoff reduction. Enter units of acres treated, impervious acres, and acre-feet. Credit is only received if all three amounts are entered.
Developed	Tree Planting - Canopy	urbantreeplant	Tree plantings on developed land (turf grass or impervious) that result in an increase in tree canopy but are not intended to result in forest-like conditions. If source data are in a count of trees, consider 300 trees equivalent to one acre. Enter units of acres or percent.
Developed	Vegetated Open Channels - A/B soils, no underdrain	vegopchannoudab	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in A or B soil. Use this BMP where specific design is unknown. Enter unit of total acres treated or percent of acres treated.
Developed	Vegetated Open Channels - C/D soils, no underdrain	vegopchannoudcd	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in C or D soil. Enter unit of total acres treated or percent of acres treated.

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
Developed	Wet Ponds and Wetlands	wetpondwetland	A water impoundment structure that intercepts stormwater runoff then releases it to an open water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients/toxics. There is little or no vegetation living within the pooled area. Outfalls are not directed through vegetated areas prior to open water release. Nitrogen reduction is minimal. Enter unit of total acres treated or percent of acres treated.
Natural	Abandoned Mine Reclamation	abanminerec	Abandoned mine reclamation is the planting of forests to stabilize the soil on lands mined for coal or affected by mining, such as wastebanks, coal processing, or other coal mining processes. Enter units of acre or percent.
Natural	Algal Flow-way Non-Tidal Monitored	nontideaftmon	Algal flow-way technologies are inclined race-ways in non-tidal waters that receive nutrient-laden water so natural algal assemblages can accumulate and then be harvested for an end use. Inflow/outflow biomass monitoring is required. Enter units of acres and pounds of TN, TP, or TSS.
Natural	Algal Flow-way Non-Tidal	nontideaft	Algal flow-way technologies are inclined race-ways in non-tidal waters that receive nutrient-laden water so natural algal assemblages can accumulate and then be harvested for an end use. Where tidal conditions are not known, use this BMP. Enter units of acres only.
Natural	Algal Flow-way Tidal	tideaft	Algal flow-way technologies are inclined race-ways in tidal waters that receive nutrient-laden water so natural algal assemblages can accumulate and then be harvested for an end use. Enter units of acres only.
Natural	Algal Flow-way Tidal Monitored	tideaftmon	Algal flow-way technologies are inclined race-ways in tidal waters that receive nutrient-laden water so natural algal assemblages can accumulate and then be harvested for an end use. Inflow/outflow biomass monitoring is required. Enter units of acres and pounds of TN, TP, or TSS.
Natural	Diploid Oyster Aquaculture 2.25 Inches	diploidoysters2.25	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Diploid Oyster Aquaculture 3.0 Inches	diploidoysters3	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Diploid Oyster Aquaculture 4.0 Inches	diploidoysters4	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
			substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Diploid Oyster Aquaculture 5.0 Inches	diploidoysters5	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Diploid Oyster Aquaculture Greater 6.0 Inches	diploidoysters6	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Non Urban Shoreline Erosion Control Non-Vegetated	shoreagnoveg	Practices without a vegetated area along agriculturally-dominated tidal shorelines that prevent and/or reduces tidal sediments to the Bay. Shoreline practices can include living shorelines, revetments and/or breakwater systems and bulkheads and seawalls. Only report practices installed after 12/31/2007. Shoreline BMPs before 2008 are automatically credited. Input units of feet and acres. If only feet are known, use the Shoreline Management BMP that does not specify vegetative conditions.
Natural	Non Urban Shoreline Erosion Control Vegetated	shoreagveg	Practices with a vegetated area along agriculturally-dominated tidal shorelines that prevent and/or reduces tidal sediments to the Bay. Shoreline practices can include living shorelines, revetments and/or breakwater systems and bulkheads and seawalls. Only report practices installed after 12/31/2007. Shoreline BMPs before 2008 are automatically credited. Input units of feet and acres. If only feet are known, use the Shoreline Management BMP that does not specify vegetative conditions.
Natural	Non Urban Shoreline Management	shoreag	Any practice along agriculturally-dominated tidal shorelines that prevents and/or reduces tidal sediments to the Bay. Shoreline practices can include living shorelines, revetments and/or breakwater systems and bulkheads and seawalls. Only report practices installed after 12/31/2007. Shoreline BMPs before 2008 are automatically credited. Use this BMP if the specific design is not known. Input units of feet.
Natural	Non Urban Stream Restoration	nonurbstrmrest	Stream restoration is a change to the stream corridor that improves the stream ecosystem by restoring the natural hydrology and landscape of a stream, and helps improve habitat and water quality conditions in degraded streams. Use this BMP if the specific project design is not known. Feet must be specified.

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
Natural	Non Urban Stream Restoration Protocol	nonurbstrmrestpro	Stream restoration is a change to the land stream corridor that improves the stream ecosystem by restoring the natural hydrology and landscape of a stream, and helps improve habitat and water quality conditions in degraded streams. Multiple protocols are defined to characterize different pollutant load reductions associated with individual projects. Feet must be specified. To receive credit for a specific protocol, also specify the pounds reduced for TN, TP, and/or TSS.
Natural	Site-Specific Monitored Oyster Aquaculture	monitoredoysters	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Operators must provide the state with the average tissue dry weight of subsample of 50 oysters per oyster size class category within two seasons that are at least six months apart. These dry tissue estimates can then be multiplied by a default nitrogen content of 8.2% and a default phosphorus content of 0.9%, and averaged to determine the total nutrients reduced by the harvested oysters. Enter units of number of oysters harvested and the pounds of TN and TP.
Natural	Triploid Oyster Aquaculture 2.25 Inches	triploidoysters2.25	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Triploid Oyster Aquaculture 3.0 Inches	triploidoysters3	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Triploid Oyster Aquaculture 4.0 Inches	triploidoysters4	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Triploid Oyster Aquaculture 5.0 Inches	triploidoysters5	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Triploid Oyster Aquaculture Greater than 6.0 Inches	triploidoysters6	Private oyster aquaculture that is on- or off-bottom using hatchery-produced oysters or on-bottom using substrate addition. Use diploid if oyster type is

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
			unknown. The location is the finishing location if moved when shell < 2 inches; otherwise report the initial location. Enter units of number of oysters harvested.
Natural	Urban Shoreline Erosion Control Non-Vegetated	shoreurbnoveg	Practices without a vegetated area along urban-dominated tidal shorelines that prevent and/or reduce tidal sediments to the Bay. Shoreline practices can include living shorelines, revetments and/or breakwater systems. and bulkheads and seawalls. Only report practices installed after 12/31/2007. Shoreline BMPs before 2008 are automatically credited. Input units of feet and acres. If only feet are known, use the Shoreline Management BMP that does not specify vegetative conditions.
Natural	Urban Shoreline Erosion Control Vegetated	shoreurbveg	Practices with a vegetated area along urban-dominated tidal shorelines that prevent and/or reduce tidal sediments to the Bay. Shoreline practices can include living shorelines, revetments and/or breakwater systems, and bulkheads and seawalls. Only report practices installed after 12/31/2007. Shoreline BMPs before 2008 are automatically credited. Input units of feet and acres. If only feet are known, use the Shoreline Management BMP that does not specify vegetative conditions.
Natural	Urban Shoreline Management	shoreurb	Any practice along urban-dominated tidal shorelines that prevents and/or reduces tidal sediments to the Bay. Shoreline practices can include living shorelines, revetments and/or breakwater systems, and bulkheads and seawalls. Only report practices installed after 12/31/2007. Shoreline BMPs before 2008 are automatically credited. Use this BMP if the specific design is not known. Input units of feet.
Natural	Urban Stream Restoration	urbstrmrest	Stream restoration is a change to the stream corridor that improves the stream ecosystem by restoring the natural hydrology and landscape of a stream, and helps improve habitat and water quality conditions in degraded streams. Use this BMP if the specific project design is not known. Feet must be specified.
Natural	Urban Stream Restoration Protocol	urbstrmrestpro	Stream restoration is a change to the land stream corridor that improves the stream ecosystem by restoring the natural hydrology and landscape of a stream, and helps improve habitat and water quality conditions in degraded streams. Multiple protocols are defined to characterize different pollutant load reductions associated with individual projects. Feet must be specified. To receive credit for a specific protocol, also specify the pounds reduced for TN, TP, and/or TSS.
Natural	Wetland Enhancement	wetlandenhance	Enhance wetlands by manipulation of the physical, chemical, or biological characteristics of a site with the goal of heightening, intensifying, or improving functions of a wetland. Provides a load reduction to the acres draining to the wetland. Enter unit of total acres or percent of acres enhanced.

Table A-1. Official BMPs That Can Be Credited to Federal Agencies			
Sector	**BMP Full Name**	**BMP Short Name**	**BMP Description**
Natural	Wetland Rehabilitation	wetlandrehabilitate	Rehabilitate wetlands by manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a degraded wetland. Provides a load reduction to the acres draining to the wetland. Enter unit of total acres or percent of acres rehabilitated.

Appendix B: 2021 Progress Evaluation Results

Table B-1. DoD 2021 Progress Loads (lbs/yr)						
State-Basin Name	EOS TN	EOS TP	EOS TSS	EOT TN	EOT TP	EOT TSS
MD Eastern Shore of Chesapeake Bay	10,542	707	47,476	18,935	6,663	29,533,747
MD Patuxent River Basin	80,377	7,923	9,837,230	77,972	15,148	45,154,614
MD Potomac River Basin	115,141	11,149	24,402,086	124,798	32,195	129,092,153
MD Susquehanna River Basin	1,031	55	176,051	970	42	60,778
MD Western Shore of Chesapeake Bay	138,942	19,592	24,580,203	170,666	53,872	206,475,651
NY Susquehanna River Basin	17,222	2,141	3,498,999	7,647	818	853,496
PA Potomac River Basin	43,804	5,256	11,382,748	38,138	3,486	5,947,436
PA Susquehanna River Basin	401,077	32,195	55,179,668	266,529	10,709	9,331,563

Table B-2. DoD 2019 Progress Loads (lbs/yr)						
State-Basin Name	EOS TN	EOS TP	EOS TSS	EOT TN	EOT TP	EOT TSS
MD Eastern Shore of Chesapeake Bay	10,572	710	48,817	19,225	6,851	30,030,580
MD Patuxent River Basin	80,045	7,914	10,377,115	77,807	15,261	45,796,378
MD Potomac River Basin	117,583	12,227	27,966,624	125,769	32,244	128,785,173
MD Susquehanna River Basin	1,044	56	178,199	982	43	61,513
MD Western Shore of Chesapeake Bay	138,515	19,696	25,559,392	171,888	55,031	209,851,307
NY Susquehanna River Basin	17, 229	2,142	3,501,038	7,651	819	853,797
PA Potomac River Basin	43,839	5,263	11,384,829	38,169	3,490	5,948,541
PA Susquehanna River Basin	402,429	32,568	56,308,266	267,523	10,855	9,626,087

Table B-3. DoD Change in Loads, 2019 to 2021 Progress (lbs/yr)						
State-Basin Name	EOS TN	EOS TP	EOS TSS	EOT TN	EOT TP	EOT TSS
MD Eastern Shore of Chesapeake Bay	-30	-3	-1,341	-290	-188	-496,833
MD Patuxent River Basin	+332	+9	-539,885	+165	-113	-641,764
MD Potomac River Basin	-2,442	-1,078	-3,564,538	-971	-49	+306,980
MD Susquehanna River Basin	-13	-1	-2,148	-13	-1	-735
MD Western Shore of Chesapeake Bay	+427	-104	-979,189	-1,222	-1,159	-3,375,656
NY Susquehanna River Basin	-7	-1	-2,039	-4	-1	-301
PA Potomac River Basin	-35	-7	-2,081	-31	-4	-1,105
PA Susquehanna River Basin	-1,352	-373	-1,128,598	-994	-146	-294,524

Table B-4. NPS 2021 Progress Loads (lbs/yr)						
State-Basin Name	EOS TN	EOS TP	EOS TSS	EOT TN	EOT TP	EOT TSS
PA Potomac River Basin	27,679	5,494	6,345,307	17,778	3,305	2,657,366
PA Susquehanna River Basin	22,572	1,565	3,127,523	14,129	592	510,621
VA James River Basin	108,025	15,490	37,944,092	54,734	8,149	17,885,176
VA Potomac River Basin	249,226	35,199	81,333,823	184,166	36,390	101,158,304
VA Rappahannock River Basin	126,018	17,820	38,514,658	72,876	13,232	29,474,714
VA York River Basin	53,314	11,385	16,465,862	27,078	6,380	10,125,725

Table B-5. NPS 2019 Progress Loads (lbs/yr)						
State-Basin Name	EOS TN	EOS TP	EOS TSS	EOT TN	EOT TP	EOT TSS
PA Potomac River Basin	27,708	5,495	6,354,348	17,796	3,305	2,661,045
PA Susquehanna River Basin	22,572	1,565	3,127,523	14,129	592	510,621
VA James River Basin	108,239	15,558	37,974,540	54,901	8,199	17,889,952
VA Potomac River Basin	249,300	35,222	81,369,722	184,220	36,402	101,174,531
VA Rappahannock River Basin	126,018	17,820	38,514,656	72,876	13,232	29,474,712
VA York River Basin	53,314	11,385	16,465,862	27,212	6,475	10,282,049

Table B-6. NPS Change in Loads, 2019 to 2021 Progress (lbs/yr)						
State-Basin Name	EOS TN	EOS TP	EOS TSS	EOT TN	EOT TP	EOT TSS
PA Potomac River Basin	-29	-1	-9,041	-18	0	-3,679
PA Susquehanna River Basin	0	0	0	0	0	0
VA James River Basin	-214	-68	-30,448	-167	-50	-4,776
VA Potomac River Basin	-74	-23	-35,899	-54	-12	-16,227
VA Rappahannock River Basin	0	0	+2	0	0	+2
VA York River Basin	0	0	0	-134	-95	-156,324

Appendix C: Level of Effort Evaluation Results

Table C-1. DoD Maryland EOT TN Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed to Achieve FPG	Excess Load Reductions Achieved Beyond FPG
MD Eastern Shore of Chesapeake Bay	18,935	19,033	0	98
MD Patuxent River Basin	77,972	75,525	2,447	0
MD Potomac River Basin	124,798	124,468	330	0
MD Susquehanna River Basin	970	970	0	0
MD Western Shore of Chesapeake Bay	170,666	167,597	3,069	0
Maryland - Total	393,341	387,594	5,846	

Table C-2. DoD Maryland EOT TP Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
MD Eastern Shore of Chesapeake Bay	6,663	6,803	0	140
MD Patuxent River Basin	15,148	14,552	596	0
MD Potomac River Basin	32,195	31,400	795	0
MD Susquehanna River Basin	42	42	0	0
MD Western Shore of Chesapeake Bay	53,872	53,745	127	0
Maryland - Total	107,921	106,541	1,518	

Table C-3. DoD Maryland EOT TSS Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
MD Eastern Shore of Chesapeake Bay	29,533,747	30,018,983	0	485,236
MD Patuxent River Basin	45,154,614	45,108,139	46,475	0
MD Potomac River Basin	129,092,153	127,788,184	1,303,969	0
MD Susquehanna River Basin	60,778	61,407	0	629
MD Western Shore of Chesapeake Bay	206,475,651	208,805,221	0	2,329,570
Maryland - Total	410,316,942	411,781,933	1,350,444	

Table C-4. DoD New York EOT TN Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
NY Susquehanna River Basin	7,647	6,318	1,329	0
New York - Total	7,647	6,318	1,329	

Table C-5. DoD New York EOT TP Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
NY Susquehanna River Basin	818	697	121	0
New York - Total	818	697	121	

Table C-6. DoD New York EOT TSS Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
NY Susquehanna River Basin	853,496	624,793	228,703	0
New York - Total	853,496	624,793	228,703	

Table C-7. DoD Pennsylvania EOT TN Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
PA Potomac River Basin	38,138	38,169	0	31
PA Susquehanna River Basin	266,529	266,146	383	0
Pennsylvania – Total	304,668	304,315	383	

Table C-8. DoD Pennsylvania EOT TP Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
PA Potomac River Basin	3,486	3,490	0	4
PA Susquehanna River Basin	10,709	10,855	0	147
Pennsylvania - Total	14,195	14,346	0	

Table C-9. DoD Pennsylvania EOT TSS Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
PA Potomac River Basin	5,947,436	5,936,109	11,327	0
PA Susquehanna River Basin	9,331,563	9,626,087	0	294,524
Pennsylvania - Total	15,278,999	15,562,196	11,327	

Table C-10. NPS Pennsylvania EOT TN Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
PA Potomac River Basin	17,778	17,796	0	18
PA Susquehanna River Basin	14,129	14,056	73	0
Pennsylvania - Total	31,906	31,851	73	

Table C-11. NPS Pennsylvania EOT TP Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
PA Potomac River Basin	3,305	3,305	0	0
PA Susquehanna River Basin	592	592	0	0
Pennsylvania – Total	3,897	3,897	0	

Table C-12. NPS Pennsylvania EOT TSS Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
PA Potomac River Basin	2,657,366	2,655,484	1,882	0
PA Susquehanna River Basin	510,621	510,621	0	0
Pennsylvania - Total	3,167,987	3,166,104	1,882	

Table C-13. NPS Virginia EOT TN Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
VA James River Basin	54,734	50,955	3,779	0
VA Potomac River Basin	184,166	170,732	13,434	0
VA Rappahannock River Basin	72,876	69,788	3,088	0
VA York River Basin	27,078	25,079	1,999	0
Virginia - Total	338,853	316,554	22,300	

Table C-14. NPS Virginia EOT TP Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
VA James River Basin	8,149	7,682	467	0
VA Potomac River Basin	36,390	34,031	2,359	0
VA Rappahannock River Basin	13,232	12,966	266	0
VA York River Basin	6,380	6,192	188	0
Virginia - Total	64,150	60,871	3,279	

Table C-15. NPS Virginia EOT TSS Loads (lbs/yr)				
State-Basin Name	2021 Progress	EPA Default Method FPG	Load Reductions Needed	Excess Load Reductions Achieved Beyond FPG
VA James River Basin	17,855,176	17,113,583	771,593	0
VA Potomac River Basin	101,158,304	95,615,615	5,542,689	0
VA Rappahannock River Basin	29,474,714	29,323,089	151,625	0
VA York River Basin	10,125,725	10,282,049	0	156,324
Virginia - Total	158,643,919	152,334,336	6,465,907	