West Virginia's

Phase 3 Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load

2019

Contents

A Message from West Virginia's Chesapeake Bay Tributary Team

Balance. It holds us up, keeps us from falling down. Lose our balance and we lose our ability to move forward. The Chesapeake Bay is out of balance. Its waters receive too many nutrients that pollute its mainstem and many of its tributaries.

Nitrogen and phosphorus are common nutrients found in fertilizers which accelerate the natural vegetative growth process, both on the land and in our waters. Throughout the Chesapeake Bay watershed, our culture introduces nutrients to the environment well above natural and necessary amounts. Nutrients applied to land in modest quantities and under thoughtful management can benefit agricultural and residential lands. But when land receives more nutrients than its vegetation needs or can use, the excess is exported as waste to the streams and rivers that flow to the Bay. Those waters receive additional nutrients in the wastewater from the millions of people that live in the watershed. Excessive plant growth can impair the recreational uses of our waters and when large algal blooms die they consume oxygen in the deep waters of the Bay making them unfit for aquatic life.

The Chesapeake Bay TMDL is a budget of nutrient loads that is similar to a diet for the watershed, under which the harmful impacts will not occur. With the other partnering states of Delaware, Maryland, New York, Pennsylvania, Virginia, and the District of Columbia and with the support of the U.S. Environmental Protection Agency (EPA), West Virginia is working to bring balance to the impaired tidal waters of the Chesapeake Bay and at the same time improve local waters. This third generation Watershed Implementation Plan explains the actions that West Virginia plans to take between now and 2025 to achieve these goals.

Restoring and sustaining balance in the Bay will depend on achieving nutrient reductions, while understanding how population growth, economic growth, and quality of life will all function together moving forward. West Virginia has identified strategies which should receive attention for implementation because they address our local issues, while also reducing the Bay's pollutants of concern.

Introduction

The Chesapeake Bay TMDL is a collection of TMDLs developed in 2010 for the impaired main-stem Chesapeake Bay and 92 other impaired tidal segments. The TMDL prescribes the nitrogen, phosphorus and sediment reductions needed to attain Maryland, Virginia and Delaware Water Quality Standards and allocates load reduction responsibilities across the watershed. Implementation of the TMDL is accommodated by a partnership of the watershed States of Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia, the District of Columbia and the Environmental Protection Agency. Jurisdiction implementation plans were developed concurrently with the issuance of the TMDL and shortly thereafter. Phase 1 and Phase 2 Watershed Implementation Plans (WIPs) are now being replaced with the Phase 3 Watershed Implementation Plans (WIP3s) of all partnership jurisdictions. The basic role of the Phase 3 WIPs is to prescribe management actions that will place practices on the ground between now and 2025 that will result in the attainment of water quality standards. This document describes the management activities that West Virginia plans and has the capability to implement between 2018 and 2025. It also describes the activities that were implemented to engage and address the needs and goals of local, regional, and federal partners in WIP3 planning and development.

Phase 2 WIPs have primarily guided implementation to date. But shortly after their finalization, the Partnership began planning for a Midpoint Assessment (MPA) in 2017 in which the progress toward interim goals would be evaluated and new information and methods would be incorporated to support management in the second half of the implementation period. In the time leading up to the MPA, the partnership considered new science and input and updated its suite of modeling tools. The tools incorporated new modeling techniques, new high-resolution land cover, new Best Management Practices (BMPs) and revised BMP efficiencies vetted through panels of experts. The new Phase 6 suite of models and the revised inputs were shown to be superior to previous tools and were approved by the Partnership for use in developing the new planning targets upon which jurisdictions were to develop their Phase 3 WIPs.

West Virginia performed well with respect to its Phase 2 WIP and the interim pollutant reduction goals that were to be achieved by 2017. All interim goals were achieved and reductions are already approaching 2025 targets. Improvements in the wastewater segment are particularly notable where significant facility upgrading has been accomplished and future implementation is largely a matter of maintenance. In addition to the large investments made in wastewater treatment, past success is attributable to multiple factors including the sustained voluntary implementation of agricultural BMPs and greater than expected implementation

rates of post construction stormwater BMPs on new urban lands in developing areas. Continued emphasis is needed not only with respect to the quality of downstream tidal waters, but also to further improve the quality of West Virginia waters and address local concerns and make improvements with respect to other goals and outcomes envisioned in the 2014 Chesapeake Bay Watershed Agreement.

The Chesapeake Bay Partnership divided the needed nutrient reductions among the jurisdictions by allocating total nitrogen and total phosphorus jurisdictional planning targets. When all jurisdictions achieve those planning targets, the partnership expects attainment of water quality standards in the impaired waters addressed by the TMDL. Planning targets are in terms of total nitrogen and total phosphorus loads contributed by jurisdictions and delivered to the fall lines of major basins ("edge-of-tide loads"). The management actions proposed in the WIP3 scenario, coupled with the BMPs and wastewater treatment technologies already implemented, will allow West Virginia to achieve WIP3 planning targets. This is substantiated by the model input deck prepared for the West Virginia WIP3 scenario. Table 1 displays the results of the most recent available progress and WIP3 model scenarios contrasted with the West Virginia WIP3 planning target loads and the loads that will result from a level of effort similar to that proposed in the Phase 2 WIP.

Table 1: Planning Targets, Current Progress and WIP3 Nutrient Loads

Scenario	TN (#/yr) Edge of Tide	TP (#/yr) Edge of Tide
WV WIP3 Planning Targets	8.22	0.432
WV 2017 Progress	7.77	0.429
WV WIP3	7.51	0.383
WV WIP2 Level of Effort	7.62	0.387

Table 1 shows that both 2017 progress and WIP3 scenario loads are less than the prescribed WIP3 planning targets. West Virginia has decided to pursue water quality improvements at a level of effort that is at least consistent with its WIP2. This is not to imply that the exact suite of WIP2 practices are replicated, but rather that the loading results from the WIP2 scenario are approximated by the management actions proposed in WIP3. Additional implementation to achieve load reductions beyond (below) the targets is prudent for a host of reasons. Primarily, local TMDLs and water quality assessments show that more implementation of many of the same management activities that are important to restoring Chesapeake Bay tidal water quality are needed to improve West Virginia waters. Secondly, West Virginia is aware that all Chesapeake Bay jurisdictions may be asked to further reduce loads with respect to climate change impacts, beginning in 2022. Execution of the WIP3 scenario will accommodate the

additional climate change pollution reduction responsibility initially determined for West Virginia by the Partnership in the MPA. Uncertainty also exists with respect to the future crediting of BMPs and efficiency revisions that may increase West Virginia delivered loads. Finally, any realized West Virginia performance beyond targets will be positively reflected in the Partnership's 2025 comprehensive assessment of success by all jurisdictions.

The activities proposed in the WV WIP3 address many available management actions. Certain BMPs are more important to West Virginia than others, either because they most efficiently reduce nutrient loads delivered to tidal waters and/or they provide great benefits to West Virginia waters and citizens. The West Virginia WIP3 places continued emphasis on:

- Livestock exclusion and forest buffers on pastures - This practice is one of the most efficient available in terms of $/mass of nutrients reduced. It is also the primary agricultural activity needed to address pollutant reductions in the multitude of local sediment and bacteria TMDLs already developed for West Virginia waters. West Virginia relies heavily upon the highly incentivized Conservation Reserve Enhancement Program (CREP) to deliver this important practice. CREP assists economically in practice installation and also pays rent to producers for the use of their riparian land. An additional 250 acres/yr are planned through 2025.
- Nutrient Management Planning and Manure Transport - West Virginia is committing to the maintenance of more than 90,000 acres of agricultural land voluntarily enrolled under three-year Nutrient Management Plans. Nutrient Management Plans communicate manure application targets to producers for the efficient use of nitrogen to achieve desired yields and are also the foundation for discouraging phosphorus application in excess of agronomic need. The latter is especially important to the prevention of algal impacts to West Virginia waters. Manure transport is needed from counties with excess manure nutrients (Hardy, Pendleton) and particularly from areas within those counties with highly elevated soil phosphorus.
- Stormwater BMPs on new developed lands – For developing areas, newly created impervious surfaces and other impacts must be managed if receiving streams are to maintain their quality and functions. New development in the West Virginia Potomac basin has occurred mostly in Berkeley and Jefferson counties. Through the Municipal Separate Storm Sewer System (MS4) program administration in Berkeley County and in response to the enactment of local ordinances in Jefferson County and its municipalities, very positive implementation rates of Chesapeake Bay Program runoff reduction and/or stormwater treatment performance standard BMPs have been documented. The WIP3 encourages post construction stormwater controls universally on new development and in Berkeley and Jefferson Counties, includes specific goals for controls to be implemented at rates at least equal to those experienced over the recent past.
- Streambank restoration - In the Phase 2 WIP, streambank restoration via Natural Stream Design was characterized as an "evolving technology" that West Virginia supported and for which it would promote funding opportunities. Implementation has been very successful and through 2018, West Virginia has accomplished more than twice the WIP2 goal of 20,000 linear feet by 2025. In addition, in-stream projects have often incorporated upland management practices that magnify benefits. Streambank restoration strongly co-benefits the Vital Habitats, Brook Trout, and Healthy Watersheds Chesapeake Bay Watershed Agreement goals/outcomes,

enhances local aquatic life, assists flood control/mitigation and increases opportunities for recreational activity. Even though past performance has already exceeded WIP2 goals, West Virginia desires accelerated implementation of this BMP and the WIP3 plans 75,000 more linear feet through 2025.

In addition, the WIP3 encourages focused implementation of nutrient-reducing practices in the Lost River and the Cacapon River watersheds to address local water quality.

More detailed discussion of planned management actions and rates of implementation are described in the sector descriptions that follow.

Accounting for Growth

The partnership decided that jurisdictions will develop and implement Phase 3 WIPs on projected 2025 land uses and animal and human populations. This approach was deemed favorable to that utilized in WIP2, where WIPs were based upon past conditions and jurisdictions were expected to regularly assess and account for growth in the two-year milestone process. The use of future conditions in WIP development lessens but does not completely eliminate growth accounting concerns.

Two base scenarios for 2025 conditions were generated by the CBPO's land use change model and made available to the jurisdictions for WIP3 development. Both scenarios ("Historic Trends" and "Current Zoning") suggest lower nutrient loadings are associated with changing conditions in the West Virginia portion of the Chesapeake Bay watershed. West Virginia initially chose to base its WIP3 on the "Current Zoning" scenario (the PSC-approved baseline 2025 scenario) as it makes more plausible predictions of the future population splits using septic systems and centralized sewer systems for wastewater treatment.

West Virginia also coordinated with the CBPO to create a custom scenario under which the Current Zoning scenario was modified to include planned conservation of agricultural and forest lands. Forest and farmland preservation in West Virginia occurs under various programs and trusts. Under West Virginia's Farmland Protection Program, Farmland Protection Boards have been created in all West Virginia Potomac Basin counties. County boards purchase conservation easements for productive agricultural lands which protects those lands from development. Conservation is also provided through the Forest Legacy Program of the US Forest Service, the Cacapon & Lost Rivers Land Trust, the Land Trust of the Eastern Panhandle, Potomac Conservancy, and The Nature Conservancy.

West Virginia provided the county-specific areal extent of conservation that has occurred since 2013 and estimates of planned additional conservation through 2025. Rural land conservation is valued by West Virginia and WIP3 is now based upon the custom future thereby making conservation of agricultural and forested lands WIP3 priorities. Conservation of more than 14,000 new acres of forest and farmland across the West Virginia Potomac watershed is planned. West Virginia will track progress toward established conservation goals and report accomplished conservation annually.

With respect to wastewater, the WV WIP3 includes 2025 nutrient loadings that are consistent with TMDL wasteload allocations. The cumulative wastewater loadings reflected in the most recent progress scenario are less than those allocations and are expected to remain so in the

short-term future. This is primarily because allocations were based upon the design flows of treatment plants and many West Virginia significant facilities are now operating nutrient reduction technologies at existing wastewater flows that are less than design flows. As time goes on, wastewater flows and loadings in developing areas are anticipated to grow. All wastewater allocations are fixed as are the loading limits in NPDES permits. The permitting process will be used to ensure that growing systems plan necessary offsetting actions in advance. All WV/NPDES permits for Publicly Owned Treatment Works (POTWs) include a requirement that permittees develop plans of action to address growth when the average flow of treated wastewater reaches 90% of design flow. The plans must analyze current and expected future loadings and include a schedule of tasks necessary to maintain required treatment levels.

The partnership will update future growth forecasts every two years using the best available data to coincide with the development of the two-year milestones. Jurisdictions will have the opportunity to factor in updated future growth projections and adjust milestone commitments as necessary. West Virginia recognizes that market forces and other factors may result in 2025 conditions that are different than those in the initial forecasts. The West Virginia WIP3 approach targeted edge-of-tide nutrient loadings commensurate with those that would result from the level of effort proposed in WIP2. That level of effort results in edge-of-tide loads that are substantively less than West Virginia planning targets. The WV WIP3 therefore provides freeboard that can compensate for future conditions that are different than currently forecasted and that may cause greater nutrient loadings.

Wastewater

For the purposes of this document, "wastewater" refers to the wastewater discharges from municipal and industrial point sources that contribute nutrients to surface waters and are controlled via National Pollutant Discharge Elimination System (NPDES) permits. This sector includes Significant and Nonsignificant Municipal Facilities, Combined Sewer Overflows (CSO), and Significant and Nonsignificant Industrial Facilities.

Plans and expectations with respect to the wastewater sector have not changed appreciably from those described in the West Virginia WIP2. With limited exceptions, the West Virginia wastewater sector has accomplished TMDL 2025 goals.

- All WV/NPDES permits have effluent limitations consistent with TMDL wasteload allocations and self-monitoring and reporting requirements of sufficient rigor to reasonably assess compliance with annual load limitations
- Senate Bill 245 (SB 245) was enacted by the 2011 West Virginia Legislature and provided a new funding source that was utilized by significant POTWs in the Chesapeake Bay watershed to install nutrient reduction treatment technology
- Where needed, all significant facilities have installed and are now operating nutrient reduction treatment technologies that allow attainment of prescribed TMDL wasteload allocations
- The City of Martinsburg and the Town of Moorefield have accomplished adequate Combined Sewer Overflow control
- Cumulatively, wastewater sources delivered loads to tidal waters in 2018 that are lower than the prescribed TMDL allocation for the sector

One of the most prominent accomplishments involves the new treatment plant operated by the Moorefield Regional Wastewater Authority that now treats combined wastewater from the Town of Moorefield and two poultry processing significant industrial facilities to state of the art nutrient concentrations. Alone, this accomplished a significant share of the required nitrogen and phosphorus reductions for the wastewater sector, but maybe more importantly has resolved the filamentous algae impairment identified for the South Branch Potomac River on the West Virginia Clean Water Act Section 303(d) List. The project was highlighted on EPA's website.

Given the above accomplishments, the minimum expected new implementation by the sector through 2025 consists of:

- Maintaining permit compliance by significant facilities
- POTWs monitoring growth in their service areas and advanced planning for expansion needs
- Offsetting new nutrient loads from new or expanding wastewater facilities

- Achieving CSO controls in accordance with the requirements of the National CSO policy and the WV/NPDES permits of Keyser and Piedmont

The wastewater input deck for the Chesapeake Bay Watershed model has been updated from that which was prepared for the West Virginia WIP2. The revised input deck includes site-specific characteristics that are consistent with both existing NPDES permit terms and conditions and the wasteload allocations of the TMDL. Modification was necessary to correct errors and address changes that occurred over time. Examples of reasons for needed changes include:

- New permits that were pending at the time of TMDL development and granted wasteload allocations did not come to fruition
- Existing individual facilities were assimilated by larger or regional facilities and their wasteload allocations were transferred to the receiving facility
- New/expanded facilities secured WV/NPDES permits contingent upon offset conditions
- Individual home aeration units (HAUs) with surface discharges and registrations under a General NPDES permit have been installed to remedy failing on-site septic systems
- Existing non-negligible, nonsignificant facilities that were not represented in TMDL modeling were identified and permitted

The West Virginia WIP2 model input deck included point source discharge characteristics that were consistent with the wasteload allocations of the TMDL. When accommodating changed source information for the WV WIP3 wastewater input deck, care was taken to ensure that overall sector loads were not increased. In fact, the source-specific revisions made for WV WIP3 result in lower overall total nitrogen and total phosphorus loads for the wastewater sector as compared to WIP2. As such, West Virginia has reserved small TN and TP edge-of-tide loadings equal to the difference between WIP2 and WIP3. Those loadings are generally intended to be retired but may also be used by WVDEP to address unforeseen permitting issues that may arise.

Prior offsets/trades that occurred during the period of WIP2 implementation were tracked by the WVDEP. Those offsets/trades have been accounted for in WIP3 (i.e., each facility's revised allocations are identified in the WIP3 wastewater input deck). The tracking of WIP2 offsets/trades is no longer necessary, but the WVDEP will track all future offsets/trades. Most past offsets/trades involved point source to point source transfers of allocations that are now reflected in WIP3 and in the WV/NPDES permits of involved entities. The only prior-approved nonpoint source to point source offset is that associated WV/NPDES Permit # WV0105856. Approval of the expanded discharge from that facility, as represented in WIP3, is contingent upon the continued annual transport of a minimum of 3400 dry tons of horse manure out of the Chesapeake Bay watershed.

It is important to recognize that the current loadings from the wastewater sector are less than those allocated by the TMDL and included in the model input deck. This is in part attributed to the major investments in treatment technology that have occurred at significant facilities and the operation of the new technologies at current flows that are less than design flows. At some point in the future, sector loadings are expected to increase as growth occurs in the service areas of POTWs. So long as a facility complies with its permit limitations, no immediate nutrient reduction action is needed during grow out. But monitoring growth and advance planning for facility expansion is needed at all POTWs to ensure allocations are sustained through time.

As in WIP2, Appendices to this document are provided that describe the individual allocations provided for significant facilities and the components of the grouped allocations for nonsignificant facilities. The information contained in the Appendices mirror that of the wastewater model input deck for the West Virginia WIP3 CAST scenario.

The descriptions, plans and protocols in the remainder of this Section generally reiterate those contained in prior WIPs.

Definitions:

Significant Municipal Facilities - Sewage treatment systems with existing permitted flows greater than or equal to 0.4 million gallons per day (MGD). Appendix W1 provides a list of facilities and includes pertinent location and loading information.

Significant Industrial Facilities- Industrial facilities that contributed more than 27000 #/yr. TN and 3800 #/yr. TP under No Action model conditions prior to TMDL development. Appendix W2 provides a list of significant industrial facilities and provides pertinent location and loading information.

Nonsignificant Municipal Facilities- Sewage treatment systems with existing permitted flows less than 0.4 MGD. Appendix W3 displays the nonsignificant municipal facilities in the Chesapeake Bay Watershed and provides pertinent location and loading information.

Nonsignificant Industrial Facilities- Industrial facilities estimated to discharge non-negligible loads of nitrogen and phosphorus less than the thresholds defining significant industrial facilities. Appendix W4 provides a list of facilities and provides pertinent location and information.

Combined Sewer Overflows (CSOs) – Discharges from collection systems of POTWs designed to transport both sewage and stormwater. Within the West Virginia Chesapeake Bay drainage, Keyser, Martinsburg, Moorefield and Piedmont operate combined sewer systems. Appendix W5 displays Combined Sewer Overflow (CSO) facilities in the Chesapeake Bay Watershed and provides location and loading information.

Negligible Industrial Wastewater Discharges- Discharges from industrial facilities that are estimated to contain negligible nitrogen and phosphorus loadings. Classification is made by permit type and/or by discharge quality.

Significant Facilities

Significant wastewater facilities were granted individual wasteload allocations in the Chesapeake Bay TMDL that required substantive nutrient reductions. Current NPDES permits contain effluent limitations that are consistent with the wasteload allocations and detailed self-monitoring and reporting requirements that allow regular assessment of compliance and reporting of discharged loads. All significant facilities have now installed the necessary treatment technology that allow compliance with permit limitations and TMDL allocations. Significant facilities are expected to maintain permit compliance.

Over the period of WIP2 implementation, West Virginia has consistently reported significant facility wastewater progress data based upon permittee self-monitoring results contained in Discharge Monitoring Reports (DMRs). Appendix W6 displays example permit conditions for self-monitoring and reporting pursuant to the nitrogen and phosphorus effluent limitations resulting from the Chesapeake Bay TMDL. For most of the past implementation period, progress report data was assembled manually by WVDEP. For 2018 progress reporting, West Virginia accommodated data submission under the protocols of the new Point Source Application developed by the Partnership. This tool improves efficiency by extracting significant facility self-monitoring data directly from the Integrated Compliance Information System (ICIS). At this time, report generation is not entirely automated as details related to nutrient speciation and other factors require manual inputs. West Virginia will continue to coordinate with the Chesapeake Bay Program Office to improve the tool and refine procedures as necessary to ensure that timely wastewater progress reporting is most efficiently and accurately accomplished.

WVDEP regularly assesses the compliance status of significant facilities via multiple mechanisms. Protocols are in place to ensure DMRs contain accurate information. Upon submission, automated validation is provided by West Virginia's Electronic Submission System

that prohibits processing of reports with omissions and glaring mistakes. WVDEP also reviews DMRs for significant facilities quarterly through an ICIS custom report that compares report results to TN and TP trends and flags outliers. This mechanism provides a second check for errors and also allows prompt identification of potential noncompliance. The Office of Environmental Enforcement conducts Compliance Evaluation Inspections and Compliance Sampling Inspections to ensure permittees are adhering to NPDES permit requirements, including those related to self-monitoring and reporting. Significant facility performance is formally evaluated quarterly by WVDEP and EPA under the protocols associated with the Quarterly Noncompliance Report (QNCR).

If noncompliance is identified through any mechanism, WVDEP will initiate enforcement actions and escalate those actions as necessary to compel a return to compliance in the shortest time period possible.

Nonsignificant Facilities

The West Virginia WIP3 does not expect nutrient reductions from nonsignificant facilities because the majority of the facilities are small and lack the financial and technical capacity to install and operate necessary treatment technologies or perform self-monitoring and reporting of sufficient rigor to reasonably characterize loads annually discharged. Some facilities in this classification operate pursuant to individual WV/NPDES permits but most are regulated under two General WV/NPDES permits. General Permit WV0103110 regulates small, privately owned sewage treatment plants ("package plants") that have a design flow of less than 50,000 gpd and General Permit WV0107000 regulates home aeration units (HAUs), with typical design flows less than 1000 gpd. The TMDL provides grouped wasteload allocations for nonsignificant facilities. The allocations generally represent the summation of loads determined by the design flows of the individual facilities and the "no action" nutrient concentrations applied in the watershed model.

Because existing facilities are provided wasteload allocations that do not require pollutant reductions, individual performance tracking and load reporting are not intended for existing facilities. WVDEP will continue to track the operating status of individual facilities annually and report nutrient loads in progress scenarios under a default approach. The default approach reports loads for individual facilities that remain operational equal to their component loadings of the grouped wasteload allocations. If new or expanded nonsignificant sources secure offsets and are permitted, permits will contain self-monitoring and reporting requirements consistent with the provisions for existing significant facilities and progress reports will report loads based

directly upon monitoring results. Appendices W3 and W4 provide information regarding nonsignificant municipal and industrial facilities, respectively.

Negligible Industrial Waste Discharges

There are NPDES permitted industrial wastewater discharges that are not expected to contain substantive nutrient loadings and as such are not represented in the watershed model. Negligible industrial waste discharges may be classified by permit type, wastestream type or discharge quality. Facilities registered under the Hydrostatic Testing, Groundwater Remediation and Water Treatment Plant general NPDES permits are classified as negligible as are boiler blow down, water softener and filter backwash, once through cooling water, and cooling tower blow down waste streams regulated in any permit. Other discharges that are estimated to contain maximum concentrations less than 1.3 mg/l total nitrogen and 0.04 mg/l total phosphorus are also considered negligible. Discharges classified as negligible are not addressed in the TMDL or this WIP. Continued discharge from existing sources in accordance with permit requirements is authorized and new discharges of similar types/characteristics may be permitted without specific TMDL wasteload allocations.

Growth Considerations

No TMDL wasteload allocations are provided for new or expanded discharges from sewage treatment facilities or new industrial facilities that do not meet the above described Negligible Industrial Wastewater Discharges criteria. All such discharges must offset 100% of new loadings. Offsetting mechanisms may take many forms but must involve new nutrient reduction activity sufficient to offset planned increased wastewater loadings. Existing facilities may expand and be permitted to discharge increased flow if also upgraded with new nutrient reduction technology sufficient to maintain allocated loads. All offsets should be based upon delivered loads rather than edge-of-stream loads to ensure accurate accounting. WV/NPDES permits will include enforceable provisions to implement offsets.

Combined Sewer Overflows

WVDEP implements the national Combined Sewer Overflow Control Policy and the state Combined Sewer Overflow Strategy to control discharges from CSOs. Under those protocols, facilities must ultimately implement controls to ensure that CSOs do not cause or contribute to any violation of water quality standards. The policies recognize that comprehensive CSO control

may require significant resources and provide mechanisms for permitting an extended period of time to accomplish necessary controls.

All CSO facilities are required to implement six "minimum controls" and to develop Long Term Control Plans that lead to compliance. The Long Term Control Plans include dates for achieving control milestones. Many facilities pursue an "assumptive approach" with interim goals of 85% CSO reduction and/or controls that result in less than six overflows per year. After attainment of interim goals, facilities assess water quality impacts and pursue further controls if necessary. The Chesapeake Bay TMDL provided individual wasteload allocations for CSOs based upon an 85% reduction of the loads represented in the 2010NA scenario.

WV/NPDES Permits also require submission of quarterly reports regarding CSO control performance and overflow activity that may be used for tracking and reporting. Because of the episodic nature of overflows and lack of flow monitoring capability, measurement of actual CSO nutrient loadings is not practical. Reporting of CSO loadings will continue under the simplified approach adopted in the prior WIPs. It is based upon an assumption that control that achieves six or less overflows per year is commensurate with an 85% reduction of CSO load. Facilities that report six or less overflows per year will be reported at the wasteload allocation loads displayed in Appendix W5. Zero loads will be reported if a facility reports zero overflows during the reporting period. 2010NA loads will be reported if more than six overflows are reported.

CSO controls meeting TMDL expectations have been accomplished at Martinsburg and Moorefield, but not at Keyser and Piedmont. Through the permitting and enforcement programs, WVDEP will ensure that those facilities implement necessary controls in accordance with schedules established in Long Term Control Plans.

No growth is anticipated with respect to CSO loading. WVDEP will not authorize construction of combined collection systems nor permit overflows from newly constructed systems.

Local Engagement

In the summer of 2018, West Virginia hosted several meetings with local authorities to provide opportunities to contribute to WIP3 development and gain insight on local priorities. Below is a list of priorities identified by wastewater representatives during those meetings:

- Assistance with Asset Management Programs and Capital Improvement Planning for existing infrastructure
- Assistance with analyzing and reducing inflow and infiltration rates.

- Assistance with financing sanitary sewer projects which can reduce existing nutrient loads, which may include but not be limited to centralized collection system extensions to assimilate failing onsite systems and redirecting flows from small sewage treatment facilities to the newly upgraded higher nutrient reducing POTWs.

West Virginia DEP encourages such activities and will provide guidance and support under established programs that are intended to improve wastewater treatment and collection systems. The identified priorities are eligible activities for projects funded by the Clean Water State Revolving Loan Fund administered by WVDEP. Additionally, the West Virginia Infrastructure Council serves as a clearinghouse that coordinates many state and federal funding programs (exs. Small Community Development Block Grants, Appalachian Regional Council, USDA and the Army Corps of Engineers) and facilitates project implementation.

Developed Lands

A. Regulated Sector – Multi-Sector Stormwater General Permit and Industrial Activity
B. Regulated Sector – Construction Stormwater General Permit (CSGP)
C. Regulated Sector – Municipal Separate Storm Sewer System (MS4)
D. Regulated Sector – Local Stormwater Ordinances
E. Non-Regulated Sector – Developed Lands
F. Onsite Sewer Systems

Developed Lands at a Glance

For the purposes of this document, Developed Lands constitutes that portion of the load from developed lands that does not include the "wastewater" load. Wastewater is described in a separate section. Developed lands includes stormwater from regulated sources subject to NPDES permits, including: industrial, construction stormwater, and Municipal Separate Storm Sewer Systems (MS4s). It also includes loads delivered from developed lands not regulated by the state. The developed lands section includes residential lawns and onsite sewer systems.

The WV portion of the Chesapeake Bay Watershed (CBW) that is expected to experience the most growth is covered by both construction and post-construction stormwater management regulations. The developed lands sector utilizes several regulations and voluntary efforts to reduce stormwater runoff and to minimize its adverse impact on water quality.

The WV WIP3 was developed on land uses projected to 2025. Although there will be an increase in the area of developed land uses, the land use change is expected to result in loading decreases. This is because a large percentage of development is expected to occur on agricultural lands which have higher loading rates than their future urban land use counterparts.

Summary Actions:

Regulated Stormwater

- Stormwater Associated with Industrial Activity
    - N/P loads similar to urban/residential land use (because of SWPP, GPP, SPCC permit requirements)
    - No reduction required for existing developed areas
    - New development in this category is accounted for in 2025 land use

    - Post construction controls on new development mandated in MS4 areas and in municipalities with local ordinances; low impact development encouraged via Construction General Permit administration

- Construction Stormwater
    - Significantly decreased permitted construction acreage over time since TMDL implementation started
    - West Virginia's Construction Stormwater General Permit is being reissued in 2019.
    - Concurrently disturbed areas are tracked and reported at county scale in annual progress reports
    - Pre- and post-construction land uses are tracked, and qualified post-construction BMPs are verified and reported

- Municipal Separate Storm Sewer Systems (MS4)
    - NPDES General permit will be renewed in 2019
    - Existing = Martinsburg, Berkeley County, WVDOH
    - No reduction required for existing developed areas
    - Stormwater management requirements for new and redevelopment expected to partially offset new urban stormwater loads from development within MS4 and elsewhere in Potomac watershed
    - Track location, drainage area, and pre/post-development land uses and BMPs associated with new/redevelopment through MS4 annual reports
    - Future (depending upon 2020 census) – population growth could result in Ranson, Charles Town, and/or Shepherdstown MS4 designations

Locally regulated stormwater ordinances

- No reduction required for existing developed areas
- Jefferson County and several municipalities within the Eastern Panhandle voluntarily adopted stormwater ordinances with construction and post-construction requirements similar to MS4s
- From 2015 – 2018, over 90% of stormwater management BMPs implemented in this category meet the CBP approved runoff reduction and stormwater treatment design and performance standards. Future implementation is anticipated to be similar

Non-regulated Developed Lands

- No reduction required for existing developed areas
- Except for Berkeley County (regulated), Jefferson County (voluntarily regulated locally), and Morgan County (partially regulated), the CBWS Model 6.0 predicts very little development in West Virginia with an overall statewide population decrease (i.e. negative growth)
- Low-Impact Development (LID) encouraged via CSGP administration

A. Regulated Sector – Multi-Sector Stormwater General Permit and Industrial Activity

Point source discharges of stormwater associated with industrial activity are regulated by the Multi-Sector Stormwater General Permit (WV0111457) and by individual WV/NPDES permits issued to industrial facilities. Whether individually permitted or controlled by registration under the general permit, industrial facilities are required to develop and implement Groundwater Protection Plans, Stormwater Pollution Prevention Plans and Spill Prevention Control and Countermeasure Plans. Proper implementation renders stormwater discharges of quality similar to urban stormwater. Pollutant reductions were not prescribed by the TMDL wasteload allocations for any existing facilities in this subcategory.

Significant growth in this category is not expected. During construction, new stormwater loads will be controlled via the Construction Stormwater General Permit. All new sources in this category located in MS4 jurisdictions or in Jefferson County will be subject to the one inch onsite stormwater management requirements. Regardless of size or location, WVDEP will encourage implementation of post-construction Stormwater Control Measures (SCM) and will track location, developed area, pre-and post-construction land use, and implemented qualified BMPs for post-construction control through mechanisms in place under the Construction Stormwater General Permit. WVDEP Stormwater Specialists will also track post-construction BMPs and perform verification and reporting.

B. Regulated Sector – Construction Stormwater General Permit

The Construction Stormwater General Permit (CSGP) (WV0115924) is used to regulate point source discharges of stormwater associated with construction activity. The general permit is reissued every five years. The latest CSGP became effective in 2019.

Operators of construction sites that disturb one (1) acre or greater, including smaller sites that are part of a larger common plan of development, register under the general permit and maintain permit coverage through the construction and reclamation period. The permit requires the development of Stormwater Pollution Prevention Plans (SWPPPs) that identify site-specific sediment and erosion controls that will be implemented to achieve the following goals:

- Limiting the amount of total disturbance
- Diverting upslope water around disturbed areas of the site
- Limiting the exposure of disturbed areas to the shortest duration possible
- Controlling internal water and runoff
- Removing sediment from stormwater before it leaves the site

- Incorporating the five Watershed Protection elements such as protecting sensitive soils, steep slopes, and established vegetation

SWPPPs for all sites that are three acres or larger are individually reviewed and approved. When construction activities are complete and all disturbed areas are stabilized, registrants are required to submit a Notice of Termination (NOT) to end permit coverage.

As part of the CSGP renewal, WVDEP intends on making minor revisions to the Construction Stormwater Guidance Manual, including reduction of fertilizer application rates, and potentially phasing application of nutrients. This will reduce the amount of nutrient runoff from construction sites.

WVDEP annually submits information on the level of activity under the Construction Stormwater General Permit. Monthly concurrently registered area is provided by county and those actual levels of activity are reflected in progress scenarios. This practice will be continued over the WIP3 implementation period. The Construction Stormwater permitting program data will also be used to gather valuable information to monitor urban stormwater sector growth. Information regarding pre-development land use is provided in the application for registration under the permit. Site identification through the CSGP in combination with Notices of Termination enable the Stormwater Specialists to perform site visits to identify post construction land uses and to identify, inspect and verify any potential post-construction stormwater control BMPs.

In future model scenarios, specifically the 2025 Current Zoning upon which the WV WIP3 is based, construction land use areas are projected based upon a Bay-wide relationship to impervious cover. This process has consistently under-predicted construction area for West Virginia. The 2025 scenario predicts 684 acres of construction will be present in the West Virginia Potomac watershed, in sharp contrast to historic observed values (~6,000 acres). The effect of this modeling constraint is that 2025 nutrient loads associated with a fully implemented WV WIP3 are likely to be higher than those predicted by CAST currently because it is also likely that the amount of construction land in 2025 will be greater than projected. In 2018, this discrepancy resulted in an underestimation of approximately 50,000 pounds TN and 10,000 pounds TP for the developed lands section overall. With this discrepancy, it is anticipated that the developed lands loads will increase by 2025 instead of decreasing like the WV WIP3 input deck suggests. This issue is not anticipated to adversely impact West Virginia's ability to attain established WV WIP3 planning targets; it is mentioned here for transparency.

C. Regulated Sector – Municipal Separate Storm Sewer Systems (MS4s)

West Virginia has an established NPDES program that governs discharges of waste into waters of the state. West Virginia's Municipal Separate Storm Sewer System (MS4) program is funded

through NPDES permit fees and regulates small MS4s under a General Permit. The General permit was first issued in 2003 and will next be reissued in 2019. The MS4 General Permit represents a strong effort to address existing and potential water quality issues.

There are no Phase I MS4 municipalities in West Virginia. The MS4 General Permit regulates three Phase II MS4s in the Chesapeake Bay Watershed: the City of Martinsburg, Berkeley County, and the West Virginia Division of Transportation. The MS4 permit aims to manage the runoff from the first inch of rain from new development and redevelopment in MS4 areas to counter increased urban stormwater loads from growth throughout the watershed.

West Virginia's MS4 General Permit requires that MS4s develop (or evaluate/revise) and submit stormwater management programs (SWMPs) to WVDEP for approval near the beginning of each 5-year permit cycle. The SWMP includes minimum control measures in each of six categories outlined in the Federal Phase II stormwater rule [40 CFR § 122.32(a)], along with measurable goals and milestones for each measure. The minimum control measure categories are public education and outreach, public involvement and participation, illicit discharge detection and elimination, controlling runoff from construction sites, controlling post-construction runoff from new development and redevelopment, and pollution prevention and good housekeeping for municipal operations. New MS4s must fully implement their SWMPs by the end of their first permit cycle.

The post-construction minimum control measure of the General Permit directs MS4s to develop ordinances requiring all new development and redevelopment of one acre or greater to manage the first one inch of rainfall by utilizing runoff reduction and stormwater treatment practices. Runoff reduction practices include, for example, canopy interception, soil amendments, evaporation, rainfall harvesting infiltration, and evapotranspiration. Stormwater treatment practices include filtration, wet ponds, and wetlands.

In certain situations, the one inch rainfall stormwater runoff management requirement may be reduced by up to 0.75 inch. To incentivize the minimization of adding new impervious surfaces, redevelopment, high density, vertical density, mixed use, and transit oriented developments may qualify for a lower stormwater runoff management requirement. Meeting one of the above qualifiers reduces the amount of runoff to manage by 0.2" to the first 0.80 inch of rainfall. Each incentive will allow the developer to reduce the amount of stormwater that is required to be managed on site by 0.2 inch. A maximum reduction of 0.75 inch is allowed (Permit section Part II.C.7.e.13.b.), leaving a minimum of 0.25-inch precipitation event to be managed.

The MS4 General Permit also contains a section with strong watershed protection elements that includes non-structural practices to protect water quality. For the most difficult sites, MS4 permittees can develop a payment-in-lieu program or offset mitigation to address runoff reduction and stormwater treatment requirements.

EPA Region 3 inspectors and WVDEP inspectors perform audits of our local MS4s in the Chesapeake Bay Watershed (CBWS). West Virginia's current MS4 permit program includes the WV NPDES MS4 General Permit and two full-time staff persons who oversee statewide implementation of that permit, along with all the programmatic elements of the MS4 program. Additional permitting staff reviews SWMPs submitted to WVDEP for approval as needed. A part-time employee is used for MS4 permitting special projects. WVDEP employs EPA's Compliance Monitoring Strategy (CMS) to determine the number and type of facilities that will be targeted for inspections. The number and frequency of inspections performed will be in conformance with the guidance provided by the CMS. WVDEP has several Environmental Enforcement inspectors that ensure permittees are in compliance with their permit requirements. Permit noncompliance identified in audits is addressed through appropriate enforcement actions.

WVDEP employs two stormwater specialists who provide technical and compliance assistance to MS4 communities in the Chesapeake Bay watershed. The two stormwater specialists promote utilization of stormwater management practices that include Low Impact Development (LID), Green Infrastructure (GI), infiltration, extended filtration, canopy interception, soil amendments, evaporation, evapotranspiration, reuse and any other practices that reduce stormwater volume and improve water quality. The employees assist the existing MS4s, counties, and consulting engineers in meeting MS4 permit criteria for stormwater management. The two employees, plus the Eastern Panhandle Planning and Development Council (Region 9) Chesapeake Bay coordinator, assist other local entities and interested organizations with identifying stormwater problem areas and options for how/where to address the issues, refining potential stormwater management projects, developing stormwater regulations, and identifying funding resources inside and outside of MS4 permit covered areas.

Regulated MS4s in West Virginia have been granted authority by state law to form stormwater utilities in order to finance the implementation and management of their MS4 programs. The City of Martinsburg, the only municipally operated MS4 located in the Chesapeake Bay Watershed, and Berkeley County, the only countywide MS4 in the entire state and Bay Watershed, are in the process of establishing utility and stormwater fees. Berkeley County is also implementing a capital improvement campaign.

Throughout the past two years, both Berkeley County and Martinsburg MS4s have increased staffing to enable proper implementation and compliance with the MS4 permit. Martinsburg added three full-time positions to the existing one part-time position. The Berkeley County MS4 has added two full-time positions. WVDEP has and continues to provide training and technical guidance to permittees which supplements the MS4s' own training efforts.

The Blue Ridge Community and Technical College in Martinsburg, WV has been developing an Environmental Technician program aimed to increase the talent pool for local stormwater and other NPDES permit programs. West Virginia will provide assistance to this program to ensure that BMPs being installed today will have a qualified "Green Collar" workforce able to maintain them in the future.

WVDEP contracted the Center for Watershed Protection to develop the statewide *West Virginia Stormwater Management and Design Guidance Manual* that was released in 2012. This manual is accompanied by an MS4 compliance spreadsheet tool that simplifies calculating the runoff reduction BMP and treatment train impacts on runoff quantity. WVDEP also encourages usage of resources developed by the Chesapeake Bay Partnership, including valuable guides prepared by the Chesapeake Stormwater Network. West Virginia will continue to dedicate resources to research and development of innovative techniques and materials, such as Biochar, to be included in future versions of the Manual.

The West Virginia Department of Transportation (WVDOT) has a statewide MS4 program and permit that is up for renewal in 2019. The WVDOT permit is administered by the WV Division of Highways (WVDOH). An EPA inspection in 2014 found that there were areas in need of improvement which WVDOH has attempted to address. WVDEP's CB stormwater specialist has provided training materials to the environmental coordinator for use in regional trainings. In upcoming years, WVDEP will work with WVDOH to provide more opportunities for regional and statewide stormwater management training. WVDEP will also work with WVDOH headquarters in Charleston to integrate better stormwater management into planning, design and maintenance. WVDEP will work with WVDOH to improve communication with other MS4s in areas where there is overlap to ensure appropriate coordination.

The 2010 Census did not trigger MS4 designation for the City of Ranson, City of Charles Town, or the Corporation of Shepherdstown. However, population growth may require these communities to develop local stormwater programs after 2020. If this should occur, additional resources and technical assistance will be needed, in addition to the Region 9 Chesapeake Bay Coordinator and WVDEP Stormwater Specialists, during the infancy of these programs.

Resources developed during the Phase 2 WIP will be used to smooth the transition from unregulated to regulated stormwater programs. The City of Charles Town, and Shepherdstown have already adopted 1" stormwater treatment ordinances voluntarily.

Berkeley County has implemented a stormwater ordinance in accordance with MS4 permit requirements, effectively managing the runoff from the first one inch of rainfall at any sites being developed or redeveloped. Analysis of BMP implementation data indicates that 73% of acres developed between 2014 and 2017 in Berkeley County are managed by BMPs that meet the preferred design and performance standards established by the CBP. The remaining 27% are managed through Dry (Extended) Detention Ponds.

New development in Berkeley County generally constitutes a decrease in nutrient and sediment loads due to conversion of agricultural land use to urban land use. This was confirmed through WVDEP's 2015 comprehensive analysis of land use change. The Chesapeake Bay Watershed Model (CBWM) Version 6 predicts that most new development will occur on agricultural land. Modeled pollutant loading rates for many agricultural land uses are higher than urban land use loading rates. West Virginia is therefore confident that, between land use changes and application of post construction BMPs on newly developed areas, growth in West Virginia will not substantively increase pollutant contributions to the Chesapeake Bay.

The efforts put forth by WVDEP and partners have contributed to substantial progress toward our MS4 WIP2 goals. The gaps identified in WIP2 have been filled. Even though WVDEP does not regulate Jefferson County post-construction stormwater management, the county and most municipalities therein have voluntarily adopted and implemented regulations that require the first one inch of rain be managed using LID and BMPs (see Local Stormwater Ordinances Section D). The WV portion of the CBW that is expected to experience the most growth is covered by post-construction stormwater management regulations.

West Virginia will continue to provide assistance to existing MS4s and new MS4 communities designated by future Census data. The local government input session held during the summer of 2018 indicated the need for specific assistance in:

- Stormwater Management BMP Operations and Maintenance assistance, including higher staffing capacity, training, model covenants/restrictions language
- Conversion of legacy SWM practices to provide water quality benefits
- Increased public engagement
- Litter control, open dumping, and other solid waste issues
- Green infrastructure planning, design, and implementation
- Asset management assistance

D. Regulated Sector – Local Stormwater Ordinance

During Phase 2 WIP development, West Virginia anticipated that the 2010 census would result in additional urbanized areas in Jefferson County and in turn mandate additional MS4 permitting. The Phase 2 WIP provided a contingency to explore MS4 designation for additional areas if not effectuated by the Census. In fact, the Census did not result in new urbanized areas in Jefferson County, but the county and the incorporated towns of Charles Town, Harpers Ferry, and Shepherdstown voluntarily adopted stormwater ordinances like those implemented by MS4s and have accomplished post-construction control with rigor similar to that which occurs in MS4s.

The Phase 6 model predicts that the majority of development in Jefferson County will occur on agricultural land, including row-crop fields. WV anticipates that the net change in nutrient loadings due to acres changing sectors will result in nutrient reductions overall.

In Jefferson County 96% of acres developed between 2014 and 2017 are being managed by preferred high efficiency BMPs that meet the design and performance standards established by the CBP. For WIP3 planning purposes we are using this percentage to predict BMP implementation on new development in Jefferson County. Local governments in the Eastern Panhandle of WV are also investigating potential Urban Tree Canopy (UTC) ordinances to increase utilization of this long-term, simple, beneficial, and cost effective BMP.

Currently WVDEP tracks and reports BMPs installed on development disturbing 1 acre or more. WVDEP also requests a listing of new BMPs from local jurisdictions. For Jefferson County, our goal is to develop an efficient tracking and reporting system that allows Jefferson County to keep track of BMPs and report this data to WVDEP annually.

E. Non-regulated Sectors – Developed Lands

This section describes how WV plans to address nutrient and sediment runoff from non-point sources in areas not regulated by local ordinances or the state. This includes non-regulated pervious and impervious urban land uses as well as septic systems. Successful reduction of priority pollutants from the non-regulated developed lands sector depends on voluntary adoption of stormwater Best Management Practices (BMPs), continued adoption of new laws and ordinances by state and local governments, and an increase in both personnel and financial resources to enable implementation.

The CBWS Model 6.0 predicts five of the eight WV counties in the CBWS to have no growth or a decrease in population. Therefore, we do not anticipate a nutrient and sediment load increase for developed lands in Mineral, Hampshire, Hardy, Grant, and Pendleton counties. Only the

three counties in the Eastern Panhandle, Berkeley, Jefferson, and Morgan, will realize population increases by 2025.

The CBWS Model 6.0 predicts significant growth only for Berkeley and Jefferson Counties. Berkeley County's "urban area," as defined by the US Census, more than doubled in size between the 2000 and 2010 census (30 square miles in 2000 to 70 in 2010). The "Hagerstown Urban Area," including the I-81 corridor of Berkeley County has the fastest rate of urban land cover growth in the Chesapeake Bay Watershed (Cacapon Institute, 2015). Berkeley County is an MS4 and therefore has a stormwater ordinance. Jefferson County, and several municipalities therein, have voluntarily adopted stormwater ordinances that address new and re-development runoff during Phase 2 WIP Implementation.

The CBWS model predicts Morgan County to experience minor growth by 2025. Morgan County does not, however have a stormwater ordinance that fully addresses water quality. Voluntary BMP implementation and stormwater education efforts carried out by local watershed associations have been quite successful in Morgan County. We anticipate that voluntary BMPs implemented by 2025 will offset most of the nutrient and sediment load increases occurring due to development.

West Virginia is well suited to enable success through voluntary action. It is very effective at building partnerships across the spectrum of government and non-government organizations. The relatively small size of West Virginia's Potomac Basin facilitates outreach as well. WV continues to stress voluntary BMP implementation to help offset nutrient load from new and redevelopment.

West Virginia's Land Use Planning regulations provide for regional planning entities that cross jurisdictional boundaries. The Eastern Panhandle Regional Planning and Development Council (Region 9) was organized on June 20, 1972 in response to enabling legislation passed by the West Virginia Legislature and approved by the Governor on November 17, 1971. This enabling legislation is known as the Regional Planning and Development Act of 1971 and re-enacted Article 25, Chapter 8, of the West Virginia Code. Region 9 exists to assist local governments in resolving their common problems; engage in area-wide comprehensive and functional planning; identify, apply for, and administer certain federal and state grants; and provide a regional focus regarding multiple programs undertaken on an area-wide basis. Since 2011, Region 9 has supported a Chesapeake Bay Coordinator position focused on providing technical assistance to local governments in the region with developing projects and polices to meet their responsibilities in the Bay restoration effort. West Virginia will continue to fully support this program with Chesapeake Bay Implementation Grant Local Implementation Funding.

Currently Hampshire, Morgan, Berkeley, and Jefferson County are enrolled in the FEMA Community Rating System (CRS). This program provides discounts on flood insurance premiums to local governments and their citizens who implement floodplain management programs over and above the basic National Standards. The CRS Program provides discounts for green infrastructure and riparian area conservation practices. Opportunities for using GI to improve the CRS rating are detailed in the CRS Green Infrastructure Guide available at https://www.floodsciencecenter.org/products/crs-community-resilience/green-guide/

Region 9 developed a Regional Multi-Hazard Mitigation Plan in 2017, later followed by a Jefferson County Hazard Mitigation Plan. These Hazard Mitigation Plans were developed for:

- Providing a blueprint for reducing property damage and saving lives from the effects of future natural and human-caused disasters;
- Qualifying the county for pre-disaster and post-disaster grant funding;
- Complying with state and federal legislative requirements related to local hazard mitigation planning;
- Demonstrating a firm local commitment to hazard mitigation principles; and improving community resiliency following a disaster event.

The Mitigation Plans have identified actions to reduce the effects of each hazard. These mitigation techniques include:

- Plans and regulation development
- Natural systems protection
- Education and awareness, and
- Structure and infrastructure projects

The Regional Plan is located at http://www.region9wv.com/plans---studies.html
The Jefferson County Plan can be viewed at http://www.jeffersoncountywv.org/county-government/departments/homeland-security-and-emergency-management/plans

The Region 9 CB Coordinator will continue to work to identify and locate funding strategies for projects addressing local Hazard Mitigation with the co-benefits of nutrient and sediment reduction.

In 2012, the West Virginia Legislature required all drinking water utilities to prepare and implement Source Water Protection Plans. Region 9 Communities have identified strategies that not only protect this valuable resource, but also can improve the health of the Potomac River and Chesapeake Bay. West Virginia will support strategies found within Bay communities' local Source Water Protection Plans that also reduce the flow of nutrients and sediments into

our waterways. For more information on the Eastern Panhandles' Source Water Protection Plans please visit: http://www.region9wv.com/plans---studies.html

Professionals from a wide range of state and local governments and NGOs are instrumental in developing and implementing our WIP. These include the WV Department of Environmental Protection, WV Conservation Agency, WV Department of Agriculture, WV Division of Natural Resources, WV Division of Forestry, WV Division of Highways, Regions 8 and 9 Planning and Development Councils, Cacapon Institute, Canaan Valley Institute, Alliance for the Chesapeake Bay, WV Rivers Coalition, Berkeley County Solid Waste Authority, watershed associations, as well as county/municipality planning and engineering staff. General activities include promotion of green infrastructure and stormwater BMPs, identifying retrofit opportunities, recommending solutions for stormwater runoff issues, and participating in CB related meetings and conference calls. School facilities management should be encouraged to engage more in WIP implementation. Currently, Tributary Team leaders are engaging schools in stormwater runoff mitigation and schools should be encouraged to develop internal capacity, especially within facilities management, to implement CBP BMPs. When schools invest in infrastructure, especially roof and pavement runoff reduction, opportunities will be pursued for providing matching funds and technical support through the Chesapeake Bay Local Implementation grant.

The WVDEP Potomac Basin Coordinator, funded by the Chesapeake Bay Implementation Grant, facilitates the partnership of agencies, non-profits, and other entities that implement these strategies, and reports progress to the Chesapeake Bay Program Office. Two stormwater specialists, funded through the Chesapeake Bay Regulatory and Accountability Grant, focus on providing technical assistance, implementing and inspecting stormwater BMPs, as well as tracking and reporting nutrient and sediment reductions from developed lands.

The Region 9 Planning and Development Council Chesapeake Bay Program Coordinator promotes WIP implementation and provides technical assistance to Jefferson, Berkeley, and Morgan counties. Cacapon Institute works with schools, subdivisions, and local governments to increase tree canopy and provide hands-on educational opportunities to promote green infrastructure.

WVDOH county staff and the Environmental Coordinator often coordinate with West Virginia's Chesapeake Bay Tributary Team members on WIP-related projects. Some partnerships, including training workshops and rain garden and permeable paver installations on WVDOH properties and other public sites, have made use of Chesapeake Bay Implementation funds. Other projects were part of 319 grants, such as small, site-specific culvert replacement projects

that reduced erosion and sedimentation in streams. The projects have benefited from the local match (in-kind work) from WVDOH to leverage federal funding.

WVDOH staff have pursued training on Pennsylvania's Center for Dirt and Gravel Road Studies methods. One particularly successful dirt road repair demonstration project WVDOH implemented in Morgan County using these techniques has resulted in far fewer road closings due to flooding. During WIP3 implementation, WV's Tributary Team looks forward to working with WVDOH to continue this type of training.

Another area where the Tributary Team will continue to pursue partnership opportunities with WVDOH is aquatic organism passage projects, or "fish-friendly culverts." These projects achieve co-benefits for fish habitat and in some cases, specifically brook trout habitat, as well as improved hydraulics and water quality benefits from reduced erosion and sedimentation. Adding an additional co-benefit of thermal improvements, WVDOH creatively implemented culvert changes on a trout stream in Hardy County to divert warmer road runoff away from the creek. Partnering with WVCA and Trout Unlimited in 2015, they used the site for a benthic macroinvertebrates monitoring workshop and to promote similar practices on other trout streams. More recently, an engineer from WVDOH's Hydraulic & Drainage Unit presented a talk and field trip on the topic of good and bad culverts at the CBP's Habitat Goal Implementation Team (GIT) meeting in 2018. He has also provided technical support for the GIT-funded project in Opequon Creek watershed wherein culverts will be rated for their potential for aquatic organism passage according to the North Atlantic Aquatic Connectivity Collaborative (NAACC) methodology.

West Virginia's current programs include voluntary outreach, education, and implementation assistance. Technical assistance is provided through two WVDEP stormwater specialists (mentioned above), partner organizations like Cacapon Institute, and contractors. There is limited financial support to get developed lands BMPs on the ground. However, throughout WIP2, West Virginia has created programs that meet the needs and budgets of our state. Specific examples are outlined below. The BMPs installed with these programs and the associated load reductions will help offset nitrogen, phosphorus, and sediment loads from new development in WV.

The Region 9 Chesapeake Bay Coordinator has assisted the Town of Bath (Morgan County) with developing a Dig Once approach, which incorporates green infrastructure into upcoming Capital Improvement Projects. This concept was also highlighted during the Alliance for the Chesapeake Bay's June 9, 2016 "Streamlining Integrated Infrastructure Implementation "Dig Once" Strategy Development Workshop.

https://www.chesapeakebay.net/documents/GI_Integration_Final_Workshop_Report.pdf. To develop the Capital Improvement Plans, communities must understand the infrastructural needs by locating and assessing the condition of their existing infrastructure. Infrastructure Asset Management Planning will:

- Provide continued adequate levels of service;
- Manage risks and reduce potential failures;
- Extend service life of existing assets;
- Maximize opportunities to incorporate green infrastructure into their existing landscape during routine replacement and rehabilitation projects of their current infrastructure for a "Dig Once" approach;
- Save resources, maintain infrastructure integrity and reduce potential sewer overflows and pollution.

Moving Forward the Region 9 Chesapeake Bay Coordinator, with support from WV Chesapeake Bay Implementation Grant funding, will assist communities in developing Infrastructure Asset Management Planning programs, drafting capital improvement plans, and incorporating green infrastructure into public projects and spaces such as schools, parks, roadways, and trails.

WVDEP employs two Stormwater Specialists that provide technical assistance for design and implementation projects and assist local communities in identifying solutions to stormwater runoff problems. Working with local governments, NGOs, Homeowner Associations, businesses, fire departments, and others, WV did and will continue to implement BMPs and GI not only in regulated areas, but also in unregulated areas.

WVDEP has a volunteer monitoring coordinator who conducts several workshops and special monitoring projects in the Potomac Basin annually. The outreach to school groups, watershed associations, and communities results in better understanding about best practices for landscapes and stream corridors. Portions of WV's 319 Base grants are periodically made available by WVDEP to groups through an Announcement of Grant Opportunity (AGO). These do not have to be linked to TMDLs or Watershed Based Plans. The 319 program also funds nonpoint source pollution reduction projects in streams that have Watershed Based Plans, through watershed project grants and other opportunities described below. Back Creek is not on West Virginia's 303d list, but has an approved Watershed Protection Plan and is therefore also eligible for 319 project funds. The Potomac Basin Coordinator (WVDEP) and Conservation Specialists (WVCA) are the local representatives for 319 projects in the Potomac Basin.

In several priority watersheds, fecal coliform bacteria TMDLs have enabled agencies and partners to continue offering 319 watershed project funding as incentives for homeowners to

pump, repair and replace septic systems. These watersheds include Sleepy Creek, Mill Creek and Tuscarora Creek of Opequon, and Elks Run. These actions are reducing nitrogen reaching surface water in some cases. Note: to the extent that these actions rehabilitate drainfields, they may reduce nitrogen in groundwater as well, but in areas with limestone geology, we believe failures to groundwater pose a difficult challenge. Participating agencies and partners include WVCA, CVI, Potomac Valley and Eastern Panhandle Conservation Districts and WVDEP.

The 319 Watershed Projects in the eastern panhandle have resulted in several stormwater BMP demonstrations, including:

- a rain garden at the South Berkeley Recycling Center (Mill Cr. of Opequon)
- a wetland treatment system at the South Berkeley Recycling Center (Mill Cr. of Opequon)
- permeable pavers demonstrations at a residential development (Sleepy Cr.) and a public river access site (Back Cr.)

These activities are included in the 319 projects because they reduce sediment and bacteria, the local TMDL impairments, from developed lands. They have the added effect of reducing nutrients in runoff and educating the public about best practices for residential and commercial areas.

Public schools provide an opportunity for urban runoff mitigation that has practical stormwater management implications and public education potential. Cacapon Institute (CI) has inventoried all public school facilities in the WV Potomac Basin and conducted a “schoolyard-watershed” survey. The inventory reflects a uniform listing of rain water management facilities (such as storm drains and culverts, etc.). CI also developed a school yard and urban tree canopy inventory. The resulting inventories, and dissemination of information on stormwater management BMPs, including tree plantings, provide a foundation for comprehensive planning and implementation of future BMPs for stormwater runoff and nonpoint source pollution mitigation at each school.

Cacapon Institute also offers the online Potomac Highlands Watershed School that is used by tens of thousands of students. CI also operates the Potomac Headwaters Leaders Of Watersheds– PHLOW program, which builds synergy between federal, state, and local programs to enhance K-12 environmental education that fosters an environ-mentally literate generation of youth. Another strong program administered by CI is the Carla Hardy WV Project CommuniTree (CTree), which aims to increase tree canopy in our communities.

CI’s Community Environmental Management (CEM) program provides selected communities, mostly subdivisions with Home Owner Associations, with a comprehensive analysis on how to reduce stormwater runoff and reduce nuisance flooding. Solutions offered include tree

plantings, buffers, Stormwater Control Measures, and more. CI also assists with implementing BMPs in these communities.

WVDEP collaborates with Cacapon Institute to capture Homeowner BMP information through CIs' What's Your BMP? Tool that is placed prominently on their website at http://www.cacaponinstitute.org/index.htm

The Potomac Valley Audubon Society (PVAS) includes stormwater management and environmental education in their Master Naturalists program and works with schools to enhance environmental literacy with their 4th Grade Watershed Program. Currently, PVAS delivers this curriculum to every public 4th grade class in Morgan, Berkeley, and Jefferson County. West Virginia will continue to support this program.

Another effort by WV WIP partners to promote better stormwater management and focus on restoring the health of land and water in a collaborative effort is the Potomac Watershed Partnership http://www.potomacpartnership.org/.

The Advancing Green Infrastructure Technical Assistance program provides local communities with GI planning opportunity assessments as well as conceptual design plans. Working with Tetra Tech as contractor, communities may also obtain full GI project engineering designs, and receive assistance in identifying and applying for implementation funding. This is a pilot program in 2019, funded through WV's Chesapeake Bay Implementation Grant.

Eastern Panhandle regional communities desire to increase public engagement and agricultural engagement through various platforms, networks, and events. The region also seeks to provide additional safe points of access to local waterways and along the Potomac River to fully appreciate these waters West Virginia is working to restore and protect.

Most of our programs are funded through temporary Chesapeake Bay related funding sources. That includes grants through CBRAP, CBIG, Local Implementation Funding, NFWF, CB Trusts' Green Streets, Green Jobs, Green Towns, to name a few. The WV Conservation Agency, WVDEP, WV Division of Forestry, and the WV Division of Natural Resources also provide funding for BMP design and implementation. These funds include USDA grants and Clean Water Act Section 319 grants. Long-term dedicated funding streams for BMP implementation, operation, and maintenance in unregulated areas unfortunately does not exist. While not cash, WVDOH has been instrumental by providing labor and equipment at no cost during the implementation of numerous projects throughout the Potomac watershed in WV.

The WV WIP implementation team continues to attract new partners for voluntary stormwater education and BMP implementation. The efforts to improve water quality both locally and in the Chesapeake Bay are starting to show. Increased media (print, electronic, social, radio, TV) coverage of BMP implementation, citizen awareness, and extreme rain events over the past few years have turned stormwater into a mainstream issue. Great performance of demonstration BMPs at chronically flooded locations received positive attention.

F. Onsite Sewer Systems

WV works with local health departments to keep track of annual septic system installations. WV will continue to document annual installation counts to accurately reflect growth on septic systems. WV also tracks the connection of existing septic systems by POTWs. Most new development occurring in the West Virginia Potomac basin directs wastewater to POTWs. With respect to downstream waters, the nutrient loading associated with on-site systems is not significant and the cost of upgrading is high. West Virginia is not planning specific activity in relation to onsite systems but will track and report upgrades that occur.

Agriculture

West Virginia's agricultural sector has undertaken an unprecedented, voluntary effort to meet the demanding nutrient and sediment reductions required by EPA's Chesapeake Bay TMDL. As a result of this intense effort by agricultural producers along with the efforts of other sectors, West Virginia was able to meet its targets by the Chesapeake Bay mid-point assessment in 2017. In essence, the State is now required to "hold the line" in perpetuity and ensure that best management practices continue to achieve, at minimum, the Chesapeake Bay nutrient and sediment targets set for West Virginia.

Ongoing educational efforts will continue to deliver information to West Virginia agricultural producers. The objectives of these efforts are to inform producers of West Virginia's current progress and look at future opportunities for conservation work designed to achieve targets.

Along with stakeholder input, the following agencies convened to develop West Virginia's Phase 3 WIP:

- *West Virginia Department of Agriculture*
- *West Virginia Conservation Agency*
- *USDA Natural Resources Conservation Service*
- *USDA Farm Service Agency*
- *West Virginia Department of Environmental Protection*
- *Trout Unlimited*
- *Tetra Tech, Inc.*

This group will continue to coordinate, implement, track and adapt the agricultural section of West Virginia's WIP3 through 2025.

SECTION A. Summary Actions - Phase 3 WIP Highlights

West Virginia's Phase 3 WIP is based on WV's Phase 2 WIP "Level of Effort" and the result, as it was in Phase 2, is a realistic plan that continues to include agriculture BMPs such as nutrient management, animal waste storage, litter transfer, cover crops, riparian buffers, and limiting livestock access to streams. With continued funding for agency staff and funding for cost-share programs for producers, West Virginia has a high level of confidence that it can accomplish the goals that are set in the Phase 3 WIP.

With respect to future activity, West Virginia is focused on the subset of available agriculture BMPs that are desired by producers and critically important to both our Chesapeake Bay success and the improvement of local waters. Table 2 summarizes future goals for those BMPs that West Virginia will pursue over the 2019-2025 implementation period. Additional activity is planned for other BMPs and information for all past credited and planned future agricultural BMPs contained in the West Virginia WIP3 scenario is available in CAST.

Table 2: Priority Planned Agriculture BMPs

Agriculture BMP	Units	New Activity	2025 Goal
Forest Buffers on Fenced Pasture Corridor	Acres in buffers	Add 250/yr.	5,691
Poultry Waste Management Systems	% of animals	Maintain/apply to new operations	85
Nutrient Application Management Core Nitrogen	acres	Maintain under 3-yr. plans	90,000
Cover Crops/Commodity Cover Crops (annual practice)	acres	5,375	5,375
Prescribed Grazing	acres	Add 5,000/yr.	65,432
Manure transport Out of Area (annual practice)	Dry tons poultry litter	7000	7000
Non-Urban Stream Restoration	Feet of stream	Add 10,560/yr.	114,227

In addition to the numerical goals for BMP implementation, a number of other actions and tactics were included in the development and implementation of WV's Phase 3 WIP:

- **Ag Sector Stakeholder Meetings** – Led by the West Virginia Conservation Agency and the West Virginia Department of Agriculture, multiple meetings were held in the summer of 2018 to discuss progress and goals of the Chesapeake Bay Program. The feedback provided by stakeholders was utilized in the development of the Phase 3 WIP.
- **Cover Crops** – West Virginia is committed to increased implementation of cover crops. The accuracy of the selected type of crop and planting method will also be improved.
- **Nutrient Management** - West Virginia is committed to maintaining significant acreage under Nutrient Management Plans. The WVDA has increased staffing for this effort.

- **Animal Waste Storage Systems** – West Virginia is committed to work with poultry integrators to determine which operations are utilizing the in-house built-up litter option. This proposed BMP is an effective system to limit the tonnage of poultry litter spread on agricultural land within the Bay watershed.
- **Poultry Litter Amendments** – West Virginia plans to work with poultry integrators to determine the impact of amendments being applied. This proposed BMP alters the nutrient content of the litter prior to its removal from the building.
- **Alternative Uses of Poultry Litter** – West Virginia has several ongoing projects that are exploring alternative uses of poultry litter. One of the most promising projects focuses on developing compost for application to unfertile soils outside of the Chesapeake Bay watershed.
- **Grass and Forest Riparian Buffers** – Often paired with fencing on pastures, West Virginia is committed to protect significant acreage with grass and forested buffers.
- **Stream Restoration** – With assistance from Trout Unlimited, West Virginia is expanding efforts to restore native trout streams to optimal conditions.
- **Additional 319 Grant Funding Acquisition** – West Virginia Conservation Agency is committed to obtaining additional 319 grant funding to target priority watersheds for agricultural implementation within the Chesapeake Bay watershed.
- **Agricultural Enhancement Program** – The Agricultural Enhancement Program, which provides funding for several agricultural best management practices is active in all WV Conservation Districts.
- **Verification** – West Virginia is committed to verifying agricultural best management practices that are currently on the landscape. This commitment will include cost-share and non-cost-share practices. West Virginia, along with other Bay watershed states is exploring viable options to fulfill this commitment.

SECTION B. Stakeholder Engagement

B.1 Working Locally with Conservation Districts

West Virginia's Chesapeake Bay Watershed consists of two Conservation Districts: the Potomac Valley Conservation District which includes Grant, Hampshire, Hardy, Mineral, and Pendleton Counties, and the Eastern Panhandle Conservation District which includes Berkeley, Jefferson and Morgan Counties. During the development of the Phase 3 WIP, meetings were held with Supervisors in both Districts to get feedback and direction for the WIP3.

B.2 Agricultural Agency Input

A meeting was convened on October 23rd, 2018 at the West Virginia Department of Agriculture Regional Agriculture Center in Moorefield to solicit input from managers representing all West Virginia agricultural agencies. The purpose of the meeting was to discuss goals and program

capacity to aid in developing a WIP3 “input deck” that includes the agricultural best management practices to be implemented in West Virginia’s Chesapeake Bay drainage by 2025. The outputs of that meeting formed the basis for management actions planned for the agriculture sector and have been incorporated in the CAST scenario for the Draft West Virginia WIP3.

SECTION C. Agency Capacity

TABLE 3: Current West Virginia Agricultural Agency Staffing Levels in support of implementation of West Virginia’s Phase 3 WIP

Agency	Position	Total
NRCS	Soil Conservationist	2
	Soil Conservation/Eng. Technician	2
	District Conservationist	3
	Soil Scientist serving 8 counties	1
	Part Time FRPP serving 8 counties	1
	Additional Soil Conservation Technician/	3
	Resource Con./Soil Con. serving 8 counties	1
	Additional Soil Con./ serving 8 counties	1
FSA	CED	6
	PT	6
	Temporary	1
	Loan Mgr/of CR	2
	FLPT	2
WVDA	Nutrient Management Specialist	4.5
	Verification / Nutrient Management Specialist	1
	Environmental Technician	1.5
	Assistant Director – Environmental Programs	1
	Assistant Director – Environmental Laboratories	1
	Poultry Specialist / Nutrient Management Program Supervisor	1
	Chemist	1
	Microbiologist	2
WVCA	Conservation Specialist	5
	Outreach Specialist (Morgan, Jefferson and Berkeley Counties)	1
	District Managers	2
	District Crew	1
	Conservation District Supervisors	17
	Associate Supervisors	5
	Conservation Services Manager	1
	TOTAL	76

SECTION D. Agency Involvement and Participation

D.1 USDA-Natural Resources Conservation Service

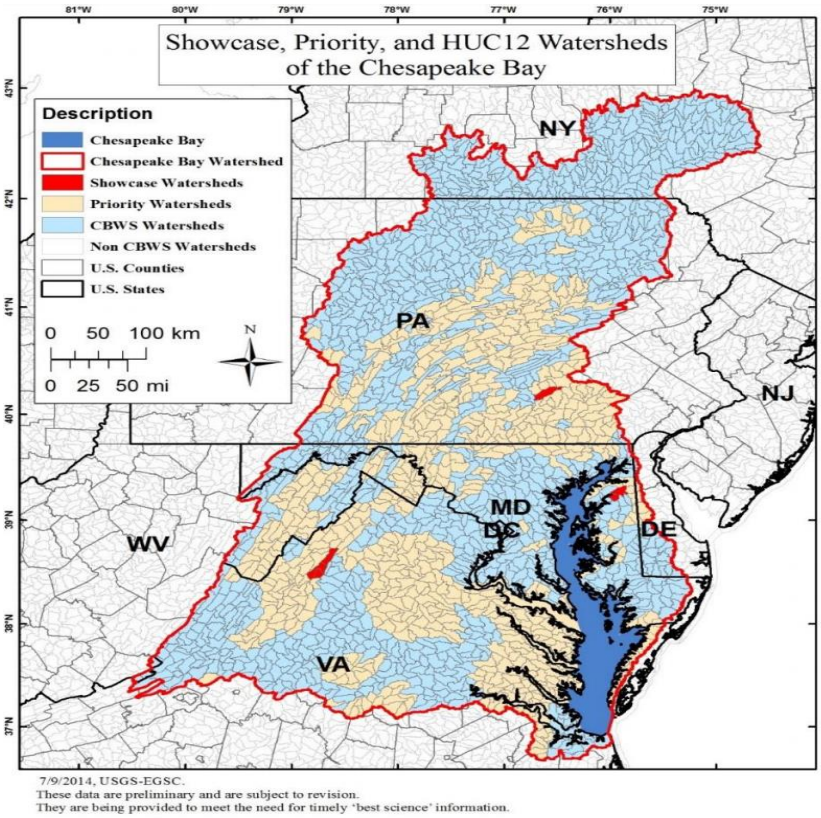
The Focused Conservation Approach (FCA) of NRCS, launched in FY2017 in West Virginia, is already proving to be an important driver of successful best management practices. In this framework, Long Range Plans were developed cooperatively by Local Work Groups (LWG) through a locally-led process. The LWGs were comprised of local agriculture producers and interest groups, Conservation District supervisors, and USDA and state agency representatives. The meetings were convened by the soil conservation districts and the NRCS District Conservationists. Specific project plans that evolved from each district's Long-Range Plan were submitted to the state technical committee for approval. The Environmental Quality Incentives Program (EQIP) and leveraged resources from partners are used to implement each plan's conservation objectives. Some of the resulting project plans have successfully directed funding to stream restoration projects in the North Fork of the South Branch River and New Creek/Patterson Creek watersheds. These projects are gaining momentum from lining up adjacent stream reaches for improvement projects. This makes communities excited about the work and allows partners to document increases in brook trout numbers.

The USDA-Natural Resources Conservation Service (NRCS) is supporting West Virginia's goal of improved nutrient management in the Chesapeake Bay. NRCS staff and technical expertise complements the efforts of the other state and local conservation partners who are committed to meeting West Virginia's WIP goals. NRCS has committed substantial funds and staff to ongoing and accelerated efforts in the Bay. Since 2010, approximately $8 million in financial assistance funds have been committed through Farm Bill Programs such as the Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Agricultural Management Assistance (AMA) and Chesapeake Bay Watershed Initiative (CBWI). These programs help to implement many of the high priority BMPs identified by the state as goals in the WIP such as nutrient management planning, animal waste storage facilities and cover crops. An additional $3.8 million dollars in technical assistance funds have been committed to support staff and technical expertise to agricultural producers in the area, which is equivalent to 19 additional staff members. It is anticipated that funding will continue to be available through federal conservation programs as long as the Chesapeake Bay remains a national priority. NRCS will continue to support and assist the State of West Virginia in meeting their stated 2-year milestone goals.

A recent report, "Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Chesapeake Bay Region", suggests that conservation practices in the Chesapeake Bay are

working. Through partnerships with local landowners, good progress has been made to reduce sediment, nutrient and pesticide losses from farm fields by the implementation of various conservation approaches. Adoption of erosion-control practices has reduced edge-of-field losses for sediment by 64 percent, for nitrogen by 36 percent, and for phosphorus by 43 percent. Despite these accomplishments, more work remains to be done to ensure that producers are implementing complete and consistent nutrient management measures on cropland in the Chesapeake Bay basin. Data collected on the effects of conservation practices will assist the NRCS and its federal, state, local and private partners in identifying and treating critical areas that will yield maximum results and achieve a cleaner and healthier watershed. NRCS and the State of West Virginia anticipate a continued partnership to identify where and how much assistance, both technical and financial, is needed to help agricultural producers manage sediment and nutrients on-farm and limit their movement to waters of the state. NRCS will pay for or develop with its own staff an estimated 30 Nutrient Management Plans per year. These plans include new plans as well as updated plans. The cost ranges from $3,100 to $8,700 per plan depending on the size and type of operation. It is further anticipated that comprehensive nutrient management and enhanced nutrient management will be key practices promoted for cropland in the state. Cultivated cropland on farms will be a target of increased program and technical assistance.

There has been a coordinated effort between NRCS and other agricultural partners to target Chesapeake Bay funding to the most crucial areas identified by the state. For FY 2018 the NRCS has identified targeted funds from EQIP to support the installation of crucial practices in the selected priority watersheds. The following graphic displays priority watersheds across the Chesapeake Bay drainage.



D.1.a Farm Bill Program funding for West Virginia

Environmental Quality Incentives Program (EQIP) funding is anticipated to double by FY 2018 and additional funds may be available by request to support accelerated practice implementation in the Bay region and in West Virginia. The NRCS is poised to work with landowners through EQIP to augment streamside buffers and natural stream stabilization techniques to reduce soil loss from critically eroding streambanks in the watershed. As mentioned above, NRCS is committed to increased planning and application of nutrient management on lands of the watershed with participating farmers. Additional staff is being sought by NRCS to assist with the increased planning, contracting, and implementing to meet the producers' needs.

D.1.b Animal Waste Management Facilities

Animal waste storage facilities are present and being fully utilized on many cattle operations in West Virginia's Potomac Basin. However, herd sizes have increased over the years, making these facilities less able to hold manure for the prescribed number of storage days in the Nutrient Management Plans. While there will be continued work on poultry operations,

capacity at poultry operations was largely addressed by the Potomac Headwaters Watershed Plan in the 1990's.

NRCS will seek additional funding and staffing to serve the needs of the Chesapeake Bay. Their ability to deliver technical services to the public is dependent upon adequate funds and staff.

D.1.c Soil Health / Cover Crops

From NRCS Long Range Plan:

Additional education is needed for both producers and agency/district staff in many facets of soil health. Crop fields show evidence of compaction throughout the growing season, and cover crops can serve a dual purpose of scavenging excess nutrients and improving tilth of the soil. Many farms lack proper fencing to exclude cattle from woodlot and wet areas susceptible to compaction issues. Improper grazing management leads to a lack of soil structure and improvement of soil organic matter. Pasture fertility is often neglected, and dollars spent on the more visible return associated with cropland. Compaction is a concern from a soil health standpoint on woodland, pastures and crop fields on many district farms. Cattle still have access to many woodlots, creating compaction around tree roots and limiting regrowth. Pasture soils are often compacted around heavy use areas but also entire fields due to overstocking and improper grazing management. Crop fields experience compaction due to tillage methods and heavy equipment passage. There is still a need to promote complete no-till systems on cropland and multi-species cover crop usage. Many producers utilize rye or barley cover crops, but harvest for silage in the spring. Additional benefit could be realized by roller crimping or killing with herbicide and tilling under prior to spring planting. NRCS is using the "Focused Conservation Approach" for multi-species cover crops in the Eastern Panhandle District. As a result, it is expected that producers in this area will implement 300-400 acres of cover crops each year for the next 3 years.

Building organic matter in the soil holds multiple benefits, such as improving water holding capacity for resilience during times of drought and increasing productivity and quality since nutrients are more readily available. A district wide field day event should be pursued to educate producers and landowners about the importance of soil health. Encouraging soil health will assist us in addressing a myriad of other resource concerns. NRCS has a soil health team to assist local field offices.

Due to the high concentration of poultry in the district, many soils (especially in cropland) have high or excessive levels of soil phosphorus. High levels of soil P can limit plant uptake of

essential nutrients, particularly iron and zinc. P, usually bound in the soil, becomes mobile when in excess and can contribute to nutrient loadings to waterways. Many best management practices (BMP's) can be encouraged to help alleviate this problem in the Potomac Valley, including cover crops to pull excess nutrients, sound nutrient management planning and installation of conservation buffers. NRCS has assisted many poultry producers with the installation of waste storage structures. When combined with proper nutrient management, these systems have greatly reduced over-application and nutrient loading in the streams.

D.2 USDA – Farm Service Agency

The Farm Service Agency (FSA) originated during the mid-1930s and provides America's farmers with a variety of support and assistance programs. FSA provides a strong safety net through the administration of farm commodity programs, implements and carries out various agricultural disaster programs, provides credit to agricultural producers with special emphasis on providing loans to beginning, minority, women farmers and ranchers, and continues the long-standing tradition of conserving the nation's natural resources through the Conservation Reserve Program (CRP).

D.2.a Conservation Reserve Program (CRP)

Across the nation, CRP protects millions of acres of topsoil from erosion and is designed to safeguard the nation's natural resources. By reducing water runoff and sedimentation, CRP protects groundwater and helps improve the condition of lakes, rivers, ponds, and streams. Acreage enrolled in the CRP is planted to resource-conserving vegetative covers and numerous benefits are attained through this process.

D.2.b Conservation Reserve Enhancement Program (CREP)

CREP is a unique part of the Conservation Reserve Program where State and Federal agencies may partner together to improve the natural resources of a given watershed or other environmentally sensitive or environmentally important area/s. FSA administers CREP, while technical support is provided by NRCS, state forestry (WVDOF), local Conservation Districts, and other federal and state partnering agencies. Contracts are available for 10 to 15 years and the requirement to maintain the established practice (lifespan) is for the duration of the contract. Participation in CREP enables a contract holder to obtain extra incentives and other benefits that may not be available through other CRP opportunities.

Specific to West Virginia, the CRP Conservation Practice (CP) of Riparian Buffer (CP22) on cropland and marginal pastureland is proving to be the most popular among the available CRP practices. The livestock exclusion and forested buffers on pasture provided by CP22 is one of the most cost effective practices to reduce nutrient loadings to the Chesapeake Bay and provides countless co-benefits to West Virginia waters. It is the most critical nonpoint source practice for West Virginia to continue and advance to achieve Chesapeake Bay goals.

It is anticipated that with the permanency and popularity of the tree planting practice, producers will continue maintaining the practice and associated components for many years into the future. Although not required, the benefits offered through and beyond the contract period heavily outweigh the alternatives to returning to conventional agricultural uses. Table 4 reflects the increased acceptance of this program over the years.

Table 4: Historical CREP Implementation

CREP Acceleration Riparian Buffers (CP22), Filter Strips (CP21), Hardwood tree planting (CP3A), Establish permanent introduced grasses & legumes (CP1)									
		Hardy	Grant	Hampshire	Mineral	Pendleton	Berkeley	Jefferson	Morgan
2003	Contracts	0	1/*	13	0	0	0	0	0
	Acres	0	0	513.5	0	0	0	0	0
2004	Contracts	1/	1/	30	1/	0	1/	0	0
	Acres	0	0	239.1	0	0	0	0	0
2005	Contracts	1/	0	23	0	0	3	0	0
	Acres	0	0	228	0	0	9.6	0	0
2006	Contracts	4	1/	30	0	0	1/	0	0
	Acres	47	0	472.8	0	0	0	0	0
2007	Contracts	1/	21	19	0	1/	1/	1/	0
	Acres	0	486.8	178.2	0	0	0	0	0
2008	Contracts	10	12	8	0	6	0	1/	0
	Acres	30.2	432.8	40.2	0	53	0	0	0
2009	Contracts	4	14	4	0	0	0	0	0
	Acres	6.7	276.8	15.4	0	0	0	0	0
2010	Contracts	8	6	5	1/	0	1/	0	0
	Acres	32.8	23.6	21.5	0	0	0	0	0
2011	Contracts	7	9	5	0	0	0	1/	0
	Acres	73.8	69.5	43.6	0	0	0	0	0
2012	Contracts	1/	5	0	1/	1/	1/	1/	0
	Acres	0	177.9	0	0	0	0	0	0

2013	Contracts	1/	6	1/	0	1/	1/	1/	0
	Acres	0	26.2	0	0	0	0	0	0
2014	Contracts	1/	1/	1/	1/	0	3	0	0
	Acres	0	0	0	0	0	18.9	0	0
2015	Contracts	3	1/	0	0	1/	1/	0	0
	Acres	16.9	0	0	0	0	0	0	0
2016	Contracts	1/	1/	3	1/	1/	4	1/	0
	Acres	17.6	0	14	4.11	1.6	56.19	7.53	0
2017	Contracts	1/	0	13	1/	4	4	0	0
	Acres	4.12	0	115.4	1.30	27.97	33.5	0	0

*1/ indicates less than 3 contracts. Data not available due to privacy restrictions required by the farm Security and Rural Investment Act of 2002.

Other agencies are also able to achieve environmental benefits through CRP/CREP. An example includes USFWS. USFWS's partnership in West Virginia with FSA through CREP has afforded USFWS a unique opportunity to enroll CRP/CREP acres into their environmental program, Partners for Fish and Wildlife (PFW). Furthermore, USFWS' partnering with Trout Unlimited (outside of CREP), has resulted in more agencies working together to increase the environmental benefits of their activities.

While implementing WIP2, partners advocated for more incentive funding to encourage producers to apply for CREP. Once this was obtained, local partners made a special effort to convey information to landowners via postcards, letters and news articles of the riparian buffer effort in the Chesapeake Bay. Also included in this outreach effort were a radio interview and a targeted mailing in Bullskin Run watershed in Jefferson County.

Component practices to help establish the Riparian Buffer cover include tree and shrub plantings, buffer/stream fencing, heavy use area protection, stream crossing, and water developments/facilities for "out of stream" livestock watering. Other popular practices for the state include Filter Strip (CP21), Hardwood Tree Planting (CP3A), and the Establishment of Permanent Introduced Grasses and Legumes (CP1).

Fencing within the topographical and geographical complexities of WV is difficult. In WV, the US Fish and Wildlife Service (USFWS, a strong CREP partner) has joined forces with Trout Unlimited (TU) to offer a special service to build fence for our CREP contract recipients, as well as with the many NRCS contract recipients (EQIP, WRP, AMA, etc.). Working through the PFW program, USFWS and TU have strategized and are now employing 2 fencing crews, purchased extensive

fencing equipment, and are currently completing fencing jobs for our riparian buffers and other program practices.

This special arrangement between USFWS and TU has created the ability for our County Offices to more easily promote CREP and ease the burden on the landowner to comply with keeping livestock out of the buffer area (and away from the stream).

D.3 West Virginia Conservation Agency (WVCA), Potomac Valley Conservation District (PVCD), and Eastern Panhandle Conservation District (EPCD)

The West Virginia Conservation Agency (WVCA) provides resources to local communities and land users to address a broad range of priority conservation issues. The WVCA provides administrative, technical and financial assistance to the citizens of West Virginia through the 14 Conservation Districts. The counties of the Eastern Panhandle Conservation District (EPCD) and Potomac Valley Conservation District (PVCD) make up 98% of West Virginia's Chesapeake Bay watershed. The James River accounts for 2 percent of West Virginia's Chesapeake Bay drainage and entails a small section of Monroe County.

The EPCD is comprised of Morgan, Jefferson and Berkeley counties and has a seven-person Board of Supervisors with three Associate Supervisors, one Administrative Officer and one Outreach and Education Specialist. The EPCD offers no-till seeders, a lime spreader, a weed wiper, one cover crop roller and a litter spreader for lease to the producers within that area.

The PVCD is comprised of Hardy, Grant, Hampshire, Mineral and Pendleton Counties and has a ten-person Board of Supervisors with two Associate Supervisors and one Administrative Officer. The PVCD offers the following equipment for rental to cooperators: two no-till drills, two Brillion seeders, two litter spreaders, one manure spreader, one lime spreader, one poultry house cruster, one weed wiper, one litter elevator and one cover crop roller.

Currently WVCA employs five full-time Conservation Specialists in the Potomac Valley & Eastern Panhandle Conservation Districts which serve as technical staff for the Conservation Districts and are charged with providing technical assistance and implementing various programs and projects. These staff members are working with our local partners to prioritize high agricultural watersheds, develop additional watershed-based plans and seek funding to implement the plans. WVCA is currently reviewing field staff priorities with the goal of increasing efficiency.

Both the EPCD and PVCD rent litter spreader equipment to farmers for manure application as a fertilizer. Both Districts have instituted a policy to refrain from rental during the months of December through February to prevent agricultural runoff of manure from frozen ground.

West Virginia Conservation Districts offer technical and cost-share assistance through state and federal programming including but not limited to the Agricultural Enhancement Program (AgEP), the Non-Point Source (319) Program, CREP, and the Chesapeake Bay Program. The EPCD and PVCD manage the administrative and monetary components of the 319 and other cost-share programs within their respective counties.

WVCA, in cooperation with the Districts, employed two nutrient management interns during the summers of 2015 - 2018 to assist local producers and Nutrient Management Specialists with soil sampling for Nutrient Management Plan development. WVCA plans to continue hiring intern(s) for this purpose.

D.3.a Agricultural Enhancement Program

The purpose of the West Virginia Agricultural Enhancement Program (AgEP) is to assist agricultural land owners of West Virginia with the implementation of Best Management Practices to control erosion, conserve soil, and improve overall land quality, water quality and natural resource sustainability for the general welfare of the people of West Virginia. AgEP was developed as a pilot project in West Virginia in 2008. The EPCD and PVCD were selected to implement the program in the pilot phase. Due to the success in EPCD, PVCD and the other pilot districts, in 2012, AgEP was expanded to all Conservation Districts within WV and receives an annual allocation through the WVCA legislative budget.

Each Conservation District has developed a working group which has the responsibility of prioritizing the practices that will address concerns within their respective area. These working groups will continue to target high priority agricultural areas and areas where there are gaps in Farm Bill funding to increase implementation. Both districts have shown success with the program, which has been well received by landowners. It will continue to be an important part of making water quality improvements within the watershed as West Virginia moves forward with agricultural implementation and strives to make reductions in nutrient and sediment loading.

Conservation Districts have much latitude in implementing AgEP. Practices selected, cost-share rates, financial caps and other criteria are a decision of the Conservation District. WVCA has

formed a state AgEP committee to provide oversight to the Conservation Districts. The practices offered by the Conservation District vary and must be selected from the annually approved list. Practices currently offered are frost seeding, pasture and hay seeding, heavy use area protection, invasive species management, lime, pasture division fence, exclusion fence and alternative watering systems.

D.3.b Nonpoint Source 319 & Agricultural Technical Service Providers

The West Virginia Conservation Agency is the primary entity responsible for the implementation of the West Virginia agriculture and construction components of the Section 319 Nonpoint Source Program for coordinating and implementing water quality improvement projects. Much of the WVCA's work involves cooperation with a variety of other state, federal, and local agencies, as well as private sector citizens and businesses. This cooperative approach provides benefits such as: various funding sources for projects, technical expertise, and citizen input to help the WVCA identify and target problems in specific areas. This approach has been and will continue to be instrumental in addressing the nutrient and sediment resource concerns as West Virginia strives to further its reductions.

Section 319 funds are used to voluntarily target TMDL reduction of pollutants from nonpoint sources to meet the TDML. WVCA, EPCD, and PVCD have achieved great success through the years obtaining funds and implementing projects. Current and future projects include:

<u>Sleepy Creek</u>
Three 319 grant programs in Sleepy Creek (Morgan Co.) have been successfully completed leading to fecal coliform load reductions through projects such as septic repairs and pumpings, riparian and urban tree plantings, and stormwater management practices. Outreach and stream monitoring programs have also been put in place in partnership with the local watershed group and partner organizations. Additional 319 funding as well as a Chesapeake Bay Implementation Grant has been secured to target further Sleepy Creek and Chesapeake Bay TMDL reductions and continue the monitoring program, and the watershed based plan is in the process of being updated.

<u>Elks Run</u>
One 319 grant program in Elks Run (Jefferson Co.) has been completed, funding septic repairs, streambank assessments, a streambank stabilization project, and the refinement of a GIS and septic risk model that led to reductions in fecal coliform and sediment loads. Additional 319 funding has been awarded to pursue Phase II on Elks Run, which will support tree plantings, stormwater management practices, and additional septic repairs to further reduce TMDL loads.

Back Creek

A Back Creek Watershed Protection Plan (Berkeley and Morgan Co.) was finalized in June 2014. A 319-grant program was completed that included GIS land use analysis, stream assessments, forest prioritization, and stakeholder outreach. 319 funding was also secured for the successful installation of a porous paver parking lot and boat ramp at the DNR access point to Back Creek in Shanghai. Protection of Back Creek continues through the acquisition of two more 319 grants (Phase II and Phase III), which will fund the establishment of a monitoring program, 2 streambank restorations, the purchase of farmland to be placed into conservation easements, and the continuation of stream assessments and stakeholder outreach.

Anderson Run

Anderson Run is a stream that empties into the South Branch of the Potomac approximately six miles north of the city of Moorefield, WV (Hardy County). It enters the South Branch just before the river enters *The Trough*, a locally well-known area favored by canoeists and fishermen. *The Trough* is also known for its nesting Bald Eagles, a highlight for passengers on the tourist train the Silver Eagle. The two largest streams in the watershed include Anderson Run and Mudlick Run. The smaller tributaries of Turnmill Run, Long Hollow, Toombs Hollow, Walnut Bottom and several small unnamed tributaries are also found in this watershed. The entire watershed comprises 25,908 acres in the northwest corner of Hardy County. Old Fields is the only community located in the watershed. However, there are several housing developments in Old Fields. Anderson Run was initially placed on the 1996 303(d) list of impaired water quality streams. Mudlick Run and an unnamed tributary of Mudlick Run were placed on the 303(d) list in 1998. The cause of impairment was listed as fecal coliform bacteria. Since then, new TMDLs were developed for Anderson Run and its tributaries. In 2015, Anderson Run was listed for fecal coliform bacteria and iron. WVCA is in the process of updating the watershed based plan and requesting funding from the Section 319 Program.

D.3.c Alternative Uses of Poultry Litter

The Potomac Valley Conservation District, in cooperation with NRCS and the WVCA, established and continues to maintain a poultry litter composting demonstration site to showcase and study composting methods and the uniformity of the final product as a method to reduce nitrogen content, bacteria and viruses, and to stabilize the P content of the end product. Additionally, demonstrated is the value of creating consistent physical properties of the compost, an important consideration for uniform, calibrated spreading on land as a soil amendment. Technical assistance and support will continue to be directed toward these efforts as well as expanding into other innovative areas of alternative uses, including: pelletization, baling and energy conversion.

In 2008, the demonstration composting project entered into a partnership with the Hampshire County Special Services (HCSS) which operates out of Romney, WV and provides a day program to over 100 mentally disabled adults from the surrounding area. HCSS employs these clients to perform jobs within the community and allows for a sense of purpose and involvement while providing compensation for their services. The center has been providing shredded paper to the composting demonstration as a carbon source for many years and the clients are involved in the composting process. The composted poultry litter end-product is purchased by the center and is bagged and sold to local businesses as a stable soil amendment. As of 2018, this endeavor is continuing but the future of the project is unknown.

D.3.d Natural Stream Restoration

The intent of Natural Stream Restoration (NSR) design is to restore conditions that will allow natural fluvial processes to create a stream bed that is both stable and complex. Natural stream design allows a stream system to naturally "heal" itself by allowing more efficient water and sediment transport within the channel to reduce bank erosion problems and has the potential to provide a lower cost alternative to installation of rip-rap. West Virginia will continue to support this technology and promote funding opportunities that will have a significant impact upon sediment loading to the Bay.

D.3.e Outreach, Planning & Communication

The Eastern Panhandle Conservation District and Potomac Valley Conservation District will be conducting outreach meetings and workshops to promote soil health and water quality to agricultural producers. The Districts provide these opportunities by working cooperatively with other agencies to provide publications and workshops. EPCD and PVCD also collaborate with local watershed associations and regional community organizations to have consistent, clear messages both internally and externally as they work toward achieving the WIP3 goals.

The EPCD and PVCD both publish a quarterly newsletter which is distributed to area producers that informs them of the latest conservation opportunities available. Topics may include cost share programs available through state and federal agencies and educational opportunities. EPCD and PVCD are always available to answer questions pertaining to agriculture education and conservation and to strive to provide students and producers of the Eastern Panhandle with the educational tools they need to be successful conservationists. EPCD and PVCD cooperate with WVU Extension, USDA, WVCA, WVDOF, WVDA and other partners to provide educational demonstrations to local agriculturists and forest landowners.

The EPCD and PVCD strive to educate students about soil and water health. To do so, both districts take advantage of the use of the Soil Tunnel Trailer. The Soil Tunnel Trailer (STT) is a tandem axle box trailer that serves a mobile learning unit for soil, water, agricultural specialty crops and non-point source pollution. The STT is available to rent statewide through the West Virginia Conservation Agency and is 100% compliant with the Americans with Disabilities Act (ADA). The sculpted interior and ceiling are an illustration of the various ecosystems, and contain an agricultural specialty crops wall, soil health wall and a soil and water pollution control education wall. The topics of instruction may vary according to need but strive to cover the following areas: what makes up the soil and layers of the soil profile as well as the organisms in the soil, their benefits to soil and water quality, the effects of pollution and litter on fish, plants and wildlife and overall non-point source pollution.

The West Virginia Conservation Agency will continue to recognize poultry producers for environmental stewardship by nominating producers for the Family Farm Environmental Excellence Award through the U.S. Poultry & Egg Association.

West Virginia WIP3 partners continue to participate in monthly conference calls to better open the lines of communication on program updates and goals. The partners formed the WV Chesapeake Bay Communications Workgroup to build support and understanding for the Bay in WV as a partnership effort. This group publishes quarterly newsletters, brochures, handouts, webpage, undertakes activities and demonstrations, and produces videos to highlight announcements and success stories to showcase WV's efforts for the producers.

The West Virginia Conservation Agency houses and maintains the website for West Virginia's Chesapeake Bay Program. The site is intended to serve as a resource to all those interested in how West Virginia is doing its part to help restore local streams and the Chesapeake Bay.

D.4 West Virginia Department of Agriculture (WVDA)

The West Virginia Department of Agriculture has been actively involved in the Chesapeake Bay Program for many years but has lacked the necessary staff to cover every angle. Through various grants and additional State funding, the Department has been able to expand its staff to the size necessary to meet the challenges that the current TMDL presents.

The WVDA has worked with the agricultural community for years promoting educational opportunities and voluntary participation in programs that will benefit farming operations and water quality. The WVDA has participated in countless state and federal committee meetings,

workshops, webinars, and training sessions to better understand the needs of the Chesapeake Bay Program and pass this information on to agricultural producers.

D.4.a Education and Outreach

The WVDA will continue participating in outreach and education through the WV Poultry Association Newsletter, the Market Bulletin and various other publications. WVDA has and will continue to produce and distribute educational materials to inform the public about the Department's role in the Chesapeake Bay Program at various outreach opportunities. WVDA staff will assist and host educational programs presented at schools, 4-H youth summer camps, farmer and landowner forums, county fairs within the Bay Watershed, meetings with city and county officials, presentations to watershed groups, environmental fairs, and other public events to inform the public about what they can do to improve local water quality and the Chesapeake Bay. WVDA plans to continue to work with teachers to assist in introducing and implementing agricultural and environmental lessons to be taught to their students in a classroom or a lab setting. This goal will be accomplished by providing teachers with educational materials, lesson plans, and supplies that are specifically designed to meet current state science objectives. WVDA staff is committed to work with teachers and students one-on-one as often as permitted. Education and outreach will continue to be a priority for WVDA to ensure that the public within the Bay Watershed understands the importance of balancing sustainable agricultural and environmental goals.

D.4.b Nutrient Management

The WVDA manages a voluntary Nutrient Management Program that incorporates soil sampling, soil and manure analyses and plan writing at no cost to West Virginia agricultural producers. This program has grown rapidly over the last few years. During an average three-year cycle, Nutrient Management Specialists work with approximately 425 individual agricultural producers and complete Nutrient Management Plans on approximately 90,000 acres. There are currently 5.0 full-time equivalent (FTE) Nutrient Management Specialists, along with a few other certified plan writers in the State, who maintain West Virginia's goal of 90,000 acres under Nutrient Management Plans. Nutrient Management Specialists have the unique opportunity to spend time with farmers to help them understand the importance of their plan and the benefits that come with properly implementing their plan.

Nutrient Management Specialists attend educational seminars to stay informed on the most current science and to maintain Nutrient Management, Conservation Planning and Certified Crop Advisor certifications. By continuing their education, they are better prepared to serve

West Virginia's farmers and help make farming operations more productive while reducing nutrient leaching and soil erosion.

D.4.c Soil Laboratory

All soil samples collected by West Virginia Department of Agriculture Nutrient Management Specialists are submitted and analyzed by the WVDA's laboratory in Moorefield. The information obtained from the analysis is critical to the development of an accurate and site-specific Nutrient Management Plan. Soil sampling is performed every three years to maintain Nutrient Management Plans that accurately reflect the current conditions of the soil. Approximately 2,500 soil samples are analyzed annually at this laboratory.

D.4.d Nutrient Laboratory

The WVDA also has a Nutrient Management laboratory in Moorefield that analyzes manure and poultry litter for ammonia, phosphorus, total Kjeldahl nitrogen, calcium, magnesium, copper, potassium, and percent moisture. These results are a key component of Nutrient Management Plans written in West Virginia. Approximately 250 litter, manure, and compost samples are analyzed annually.

D.4.e Poultry and Environmental Specialist

WVDA's Poultry and Environmental Specialist focuses on informing the public about various issues that affect West Virginia's poultry industry including Chesapeake Bay restoration. WVDA's Poultry & Environmental Specialist serves as the primary contact between the poultry industry and the WVDA. The Poultry & Environmental Specialist focuses on issues regarding general poultry production relating to both West Virginia water quality and the Chesapeake Bay Program. The Specialist also aids with development, implementation and tracking of poultry litter movement and will continue to provide educational opportunities for producers on poultry issues. This employee also addresses all poultry concerns and is instrumental in keeping producers in compliance with local, state and federal regulations.

D.4.f Water Quality Monitoring

The West Virginia Department of Agriculture's water quality monitoring program, which began in 1998, includes collection of water samples three times per month on the South Branch of the Potomac River with 12 collection sites, three times per month on the Cacapon River with 8 collection sites, two times per month on Lost River with 9 collection sites, one time per month on Patterson Creek with 10 collection sites, one time per month on New Creek with 5 collection

sites, one time per month on the North Fork of the South Branch of the Potomac River with 5 collection sites, one time per month on the South Fork of the South Branch of the Potomac River with 10 collection sites, one time per month on Mill Creek (Grant County) with 11 collection sites, one time per month on Anderson Run with 7 collection sites, one time per month on Lunice Creek with 9 collection sites, one time per month on Opequon Creek with 7 collection sites, one time per month on Sleepy Creek with 6 collection sites, one time per month on Rocky Marsh Run with 3 collection sites, one time per month on Elks Run with 1 collection site, one time per month on Elk Branch with 2 collection sites and one time per month on Bullskin Run with 3 collection sites. With the current WVDA Water Quality sampling schedule, the WVDA collects and tests approximately 2,000 water samples each year.

All water samples are analyzed at the WVDA Moorefield Laboratory for the following parameters:

- pH
- Conductivity
- Temperature
- Dissolved Oxygen
- Nitrate
- Nitrite
- Ammonia
- Total Phosphorus
- Orthophosphate
- Turbidity
- Total Suspended Solids
- Fecal Coliform Bacteria

Data collected by this program has been used by a variety of groups including the WVDEP, Chesapeake Bay Program, watershed groups, West Virginia University and the Cacapon River WIP3 focus team, for assessing water quality trends over a long period of time as well as prioritizing installation of nutrient and sediment reducing BMPs.

An example of the usefulness of WVDA's water quality data is seen in the Mill Creek (Grant County) watershed. The WVDA collected baseline water quality monitoring samples in this watershed from 1998 to 2005. After a sufficient baseline was established, water quality monitoring was suspended. In 2008, this watershed was named as a priority for Chesapeake Bay restoration, so WVDA resumed water quality monitoring in the Mill Creek watershed to determine nutrient and sediment reductions as the result of increased installation of BMPs.

D.4.g Non-Tidal Monitoring

The WVDA, WVDEP, U.S. Geological Survey (USGS), and Chesapeake Bay Program Non-Tidal Water Quality Workgroup worked together to develop a list of representative sampling sites in West Virginia. The monitoring results from these sites are used to calibrate the Chesapeake Bay model with trend and load estimates. In June 2005, a cooperative program among WVDA, WVDEP, and the USGS West Virginia Water Science Center was initiated to collect and analyze

water samples at four sites, South Branch of the Potomac River, Patterson Creek, Cacapon River, and Opequon Creek. The sampling includes monthly samples as well as eight storm samples throughout the year. All samples are analyzed for nutrient and suspended sediment concentrations. Additionally, this program was expanded in July 2011 to include samples from Warm Springs Run, Mill Creek, and Rockymarsh Run.

D.4.h Agricultural Best Management Practice Verification Program

The West Virginia Department of Agriculture and West Virginia Conservation Agency are working together to verify agricultural best management practices to determine if the practices "are still in place" and "still functioning as originally intended." While verification protocols are already in place and being used for a number of practices such as cover crops and poultry litter transfer, there are also unique challenges such as lack of locational data for the majority of federally cost shared practices. Access to farms is completely dependent on farmer cooperation as all West Virginia best management programs are voluntary.

The WVDA plans to utilize current staff and college interns to perform verification on farms. Partnering agencies may also be called upon to support this program. West Virginia also continues to work with other Chesapeake Bay watershed states to develop creative solutions to manage programs that meet expectations while retaining flexibility.

D.5 Farmland Conservation Easements

West Virginia has an active and thriving Farmland Protection Board created in 1995 by the West Virginia Legislature with the passage of the Conservation and Preservation Easements Act which recognized "the importance and significant public benefit of conservation and preservation easements in its ongoing efforts to protect the natural, historic, agricultural, open-space and scenic resources of the state" (West Virginia Farmland Protection-Berkeley County). In 2000, the West Virginia Legislature passed the Voluntary Farmland Protection Act which:

> "declares that agriculture is a unique life support industry and that a need exists to assist those agricultural areas of the state which are experiencing the irreversible loss of agricultural land. The Act further authorized the creation of county farmland protection boards and programs and creation of the WV Agricultural Land Protection Authority; detailed the contents and requirements of the farmland protection programs; outlined the powers and duties of the farmland protection boards and the authority; detailed the methods of farmland protection; detailed the value of conservation easements; outlined the criteria for acquisition of easements; outlined the use of land after a conservation easement is acquired; outlined the funding for the farmland protection programs; and authorized the commission of agriculture to promulgate rules" (West Virginia Farmland Protection- Berkeley County).

The West Virginia Farmland Protection partners with NRCS's Farm and Ranch Land Protection Program (FRPP) which:

> "provides matching funds to help purchase development rights to keep productive farm and ranch land in agricultural uses. Working through existing programs, USDA partners with State, tribal, or local governments and non-governmental organizations to acquire conservation easements or other interests in land from landowners. USDA provides up to 50 percent of the fair market easement value of the conservation easement. To qualify, farmland must: be part of a pending offer from a State, tribe, or local farmland protection program; be privately owned; have a conservation plan for highly erodible land; be large enough to sustain agricultural production; be accessible to markets for what the land produces; have adequate infrastructure and agricultural support services; and have surrounding parcels of land that can support long-term agricultural production" (NRCS 2011).

West Virginia has 8 County Farmland Protection Boards actively working in the Potomac Basin to protect farms from development and helping to protect the natural, scenic, and source water protection value of agricultural lands. These acres have met all the specific criteria outlined by the Farmland Protection Board including environmental site assessments and the implementation of conservation plans developed by professionals which help to curb soil erosion and nutrient runoff as well as annual inspections to ensure compliance with the standards and criteria of the easement. From program inception through 2018 in the eight county Chesapeake Bay Watershed, there were 155 easements and 18901 acres protected. Table 5 displays the breakdown by county:

Table 5: Historical Farmland Conservation

County	**Number of Easements**	**Acreage**
Berkeley	53	5440
Grant	5	969
Hampshire	18	3816
Hardy	9	1611
Jefferson	43	4526
Mineral	8	1030
Morgan	18	1294
Pendleton	1	215

The Farmland Protection Program is expected to grow in the future as the state's agricultural lands are increasingly threatened by development, thus the need for protection of the state's waterways through programs like conservation easements will continue to grow. West Virginia's Farmland Protection Program is working to conserve our soils, protect the landscapes of the community, provide open space in rapidly developing areas, protect our natural resources and protect source waters.

In addition to County Farmland Protection Boards and the FRPP, several non-governmental land trusts provide valuable resources to West Virginia landowners by maintaining healthy rivers, protecting forests and farmland, and preserving rural heritage for the enjoyment and well-being of present and future generations. These organizations hold easements and often partner with FRPP or sister land-trusts to co-hold easements. They include:

- *Cacapon & Lost River Land Trust- www.cacapon.org*
- *Potomac Conservancy- www.potomac.org*
- *Land Trust of the Eastern Panhandle- www.landtrustepwv.org*

More information about forest and farmland protection can be found in the accounting for growth section.

D.6 NGO - Alternative Poultry Litter Use Programs & Technology

D.6.a Litter to Biochar

A fixed bed gasification unit has been constructed on a poultry farm owned by Joshua Frye in Wardensville, WV. The purpose of this demonstration project is to convert the litter produced in his poultry houses into energy and to prove the economic viability and feasibility of converting poultry litter into biochar. Biochar is a highly porous charcoal-like substance used as a soil amendment and in remediation that can hold carbon, boost food security, and increase soil biodiversity.

Since 2017, the Eastern West Virginia Community and Technical College (Eastern) Workforce Opportunity Regional Center and Services, Inc. conducts a monthly Mid-Atlantic Biochar Working Group call. Below is a list of the working group's goals:

Task 1: Collaborate to raise awareness of Biochar
Continue to form partnerships with various stakeholders including state, local and federal governments, other non-profit organizations and commercial companies to promote the education of the Biochar Research and Education Project. Collaborate with various researchers and universities to educate the public on the beneficial uses and applications of biochar.

Task 2: Outreach to poultry farmers.
Initiate a platform to transfer knowledge with the goal of creating a network of poultry carbon biochar suppliers to increase product supply volume in order to build a viable poultry carbon industry.

Task 3: Explore the commercialization and co-op models
Conduct research, focus groups, and interviews to determine various opportunities for commercialization of biochar as a product for use in a variety of capacities including: remediation and soil amendments. A cooperative model is also being explored to determine the feasibility for long term economic viability and sustainability.

Task 4: Educational workshop
Conduct a workshop on importance of biochar in sustainable farming practices and enumerate the potential sustainable entrepreneurial opportunities.

Task 5: Report out on small biochar field test
In 2017, Eastern announced the creation of The Biological and Environmental Technology program creating trained and knowledgeable people who will ensure responsible economic development, while protecting our water, air, and biological systems for our generation and future generations. This program will be field testing biochar. An AmeriCorps member will be coming on board to assist with the program.

Initial findings from the Mid Atlantic group shows that biochar is a very diverse material with significant potential in many areas which include but not limited to improved soil health, water retention, energy production, remediation, nutrient and waste management. However, more investigation, analysis, and testing is needed to fully ascertain biochar's full possibilities. West Virginia will support these research, development, and implementation projects.

D.6.b Region 9- Alternative Litter Uses Project

A partnership between the Eastern Panhandle Planning and Development Council (Region 9), WV Army National Guard (WVANG), and Potomac Valley Conservation District is slated to begin in early 2019. The initial phase will include studies to determine which type of poultry litter (i.e. turkey, broiler, breeder) and condition (i.e. raw litter, biochar, or pelletized) provides the most desirable final compost material. Once studies are completed, WVANG plans to transport litter to previously mined sites outside of the Chesapeake Bay watershed for mass composting. The end product will be land applied to these sites per a nutrient management plan to achieve desirable soil nutrients. West Virginia will support this "Patriot Guardens" effort and other alternative uses for Poultry Litter in the WIP3.

Forestry

Many of the specific details about the makeup and role of the WV Division of Forestry are described in the WV WIP2. WV realizes the value of forests and that they are critical to the health of the Chesapeake Bay. Large stands of trees perform ecological functions that can benefit all plants and animals, from cleaning our water and air to creating valuable habitat. Yet human activities have altered the watershed's forests, reducing tree cover and fragmenting forests that still exist. These activities come in the form of population and industry growth, especially in the eastern two counties of the WV eastern panhandle. It also comes through the expansion of farm crops and pasture. Conserving and expanding forest cover and establishing forest buffers are critical, cost-effective ways to reduce pollution and restore the Bay.

WV Division of Forestry's current programs

Landowner Assistance Programs in West Virginia now under the county service forester concept

The WV Division of Forestry (DOF) currently employs 7 foresters that work in the Bay drainage counties. This is four less than just three years ago, when the Division underwent a major reduction in force and realignment back to a county service forester concept. Instead of specialization into one of three areas, these 6, (the district forester as one of the 7), can more readily respond to wildfires, assist landowners and inspect harvest operations in a smaller geographical area. One of the 6 is also fulfilling the role of the Chesapeake Bay watershed forester.

As reported in the WIP2, WV still currently lacks a local NRCS forester to work directly with the Farm Bill forestry programs in the Bay counties. There is also not a statewide NRCS forester at this time. One gain in the past few years has been a Conservation Reserve Enhancement Program (CREP) forester working for Alliance for the Bay who specifically cooperates and assists with the implementation of CREP buffer program. Although not a DOF employee, this forester is indirectly supervised by the Chesapeake Watershed forester.

Landowner Assistance Programs

The eastern counties of WV in the Chesapeake Bay drainage have approximately 1 million acres of private non-industrial woodland. Landowners may choose from an offering of programs aimed as incentives for landowners wishing to manage their forest resource. These programs described in the WIP2 have not changed for the most part. The managed timber tax program, the stewardship program, and the tree farm program are all still very accessible to these woodland owners as WV understands the importance of a managed forest especially when it

comes to harvesting operations.

Other Program Benefits of the Service Forester

All service foresters receive regular training in the Environmental Quality Incentives Program (EQIP) which provides forestry incentives to carry out "on the ground" practices relating to water quality measures in riparian zones, forest stand improvement, and tree planting. They also receive training and are expected to provide technical assistance for CREP. Service foresters deal with many landowners and farmers and are in a better position to promote these programs as they meet and get to know the landowners in their county.

Sustainable Forestry Initiative (SFI) and Cooperative Forest Management (CFM) Programs are still major players in this area of WV.

Knowledge of a smaller geographical area and getting familiar with the local Fire departments are also benefits as the service forester can respond more quickly to wildfires in his project area.

Harvest BMPs and Harvesting Trends.

West Virginia is 78% forested, making WV the third most heavily forested state in the nation. The Eastern Panhandle's eight Potomac drain counties consist of 3,574 square miles, with roughly 1,600 square miles in the non-industrial forest land base. The Eastern Panhandle's forest industry contributes millions to the state economy. It is the harvesting operations that become the problem for water quality. Forestry's approach toward minimizing pollution from these operations consists in the continued enforcement of the **Logging Sediment Control Act (LSCA) -WV Code 19-1B-12**.

When the reduction-in-force occurred in 2016, routine logging inspections ceased statewide except in the Bay drain counties. Inspections were able to continue due to EPA funds already committed to these counties. Until the reorganization, WV did see a temporary rise in illegal harvest operations, even in the Bay counties. Today we are estimating and reporting 97% of harvest operations have BMP's installed in the 8 Bay counties.

When the WIP2 was submitted, there was an ongoing economic slowdown, which resulted in low annual harvested acreages. The trends for recovery toward higher harvest numbers did not materialize as quickly. An average of 16,000 harvested acres per year from 2007-2017 is 1,000 to 2,000 acres less than what was predicted in the WIP2. Data from June 30, 2018 shows even less harvested acreage. Going forward it is expected to remain low up to the early 2020's.

Urban tree planting

In past WIP's, WV has not committed to any urban tree planting acreage. The WV DOF Bay watershed forester continues to work in the urban environment with the assistance of many partners including Cacapon Institute (CI). CI conducts current and potential tree canopy studies with governments and schools using the latest high-resolution tree canopy data and tools like i-Tree and USGS surveys.

The WV DOF and CI emphasize actions with government partners to conserve existing canopy, as well as expand it through specific planting targets. We engage them to integrate established tree canopy goals into local planning, ordinances, and stormwater management. We are currently trying to hire 5 summer urban interns to address these issues.

In addition, we engage many partners in tree planting efforts through programs like WV Project CommuniTree and Trees for Bees. In reality, the net gain we hope to achieve is difficult when countered with population growth and development.

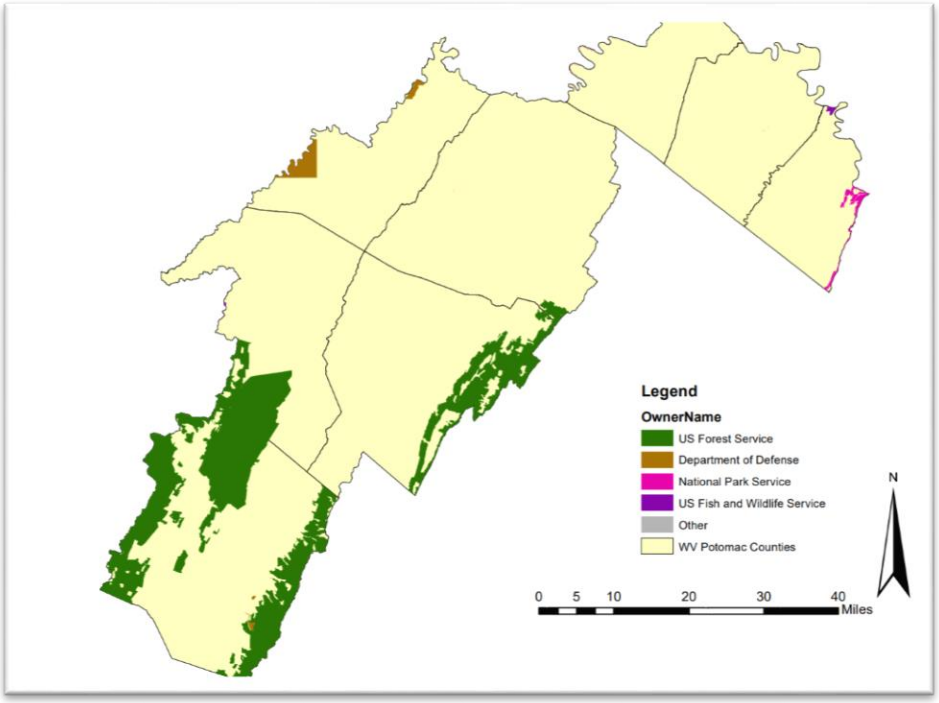
Forest Land Conservation

West Virginia has continued to informally commit to protecting an additional 1,200 acres of forestland per year in the Potomac Basin. This cannot be achieved without the help of federal, state and local governments and non-government organizations. These include Forest Legacy, Cacapon & Lost Rivers Land Trust, Land Trust of the Eastern Panhandle, Potomac Conservancy, The Nature Conservancy, and Farm Land Preservation (see the Agriculture Section D.5 for more information).

Federal Facilities

West Virginia did not set specific targets that federal facilities would have to reach with their own strategies of planned Best Management Practices and programmatic actions. Instead, we indicated to the Federal Facilities Workgroup (FFWG) that federal facilities practices and/or strategies, if communicated, would be reported and credited in the model.

The Phase 6 Chesapeake Bay watershed model includes land uses designated as federally owned and operated (note: several small parcels are not visible at this scale).



The following strategies represent our understanding of what could be expected at federal facilities.

- Stormwater Management requirements for new development under EISA Section 438
- Current and future WV regulations that federal lands would have to uphold, such as for stormwater management during and after construction, and timber harvesting.
- Identification of Wastewater Treatment Plants with permits that require upgrades.

Wastewater Sector

The Phase 3 WIP strategy for wastewater is to enforce Phase 2 WIP wasteload allocations from significant facilities using concentration limits for nitrogen and phosphorus. Any new loads of this type, of any size, will need to seek offsets or make adjustments through plant upgrades to ensure permit compliance. The single federal permitted facility in this category, the U.S. Department of Interior – Leetown Hatchery, is currently in compliance (documented in WV's milestone reports). A small number of non-significant permitted facilities listed in Appendix W3 are associated with federal lands.

Developed Lands Sector

The WV portion of the Chesapeake Bay watershed that is expected to experience the most growth is covered by both construction and post-construction stormwater management regulations. The WIP 3 strategy for the remaining developed lands in WV's Potomac Basin is to encourage voluntary efforts to reduce stormwater runoff and to minimize its adverse impact on water quality.

Construction Stormwater General Permits are applicable on federally-owned land. A small number of Industrial Stormwater permits, as shown in Appendix W4, are associated with federal lands. (http://www.epa.gov/oaintrnt/stormwater/requirements.htm) Section 438 of the Energy Independence and Security Act (EISA) of 2007 addresses stormwater runoff requirements for federal development projects. EISA Section 438 requires that the sponsor of any development or redevelopment project involving a federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.

Although the WV Phase 3 WIP does not specifically prescribe stormwater retrofits on federal facilities in WV, it should be emphasized that any reductions made by this sector on existing developed lands will help offset loads from future development.

Agriculture Sector

When feasible, grazing allotments on USDA Forest Service lands should be evaluated and prioritized for stream protection BMPs, such as livestock exclusion fencing and grass and forest buffer plantings. Management Directive RA12 of the Monongahela National Forest's Land and

Resource Management Plan states "[s]tream access points shall be selected for streambank and channel stability. Stabilization of the access points shall be accomplished if needed. When monitoring indicates that streambank stability is not being maintained, perennial or intermittent streams shall be fenced from livestock, and alternative crossings shall be designated." In addition, SW56 says "[d]esignated livestock stream crossings and watering points should be located, sized, and maintained to minimize impacts to aquatic and riparian resources," (USDA Forest Service, 2011). USDA Forest Service is the largest federal landholder in WV's Potomac Basin, with approximately 12% of the WV Potomac land area. Although grazing allotments make up only a small amount of the National Forests in this area (only 1,135.4 acres within the Monongahela National Forest in WV's Potomac Basin and zero within the George Washington and Jefferson National Forests in WV), the USDA Forest Service is a leader in demonstrating the benefits and feasibility of these agricultural practices. As a notable example, from 2007 through 2009, the USDA Forest Service partnered with Trout Unlimited, the USFWS and other entities to improve water quality in Big Run in Pendleton County. On the Big Run Allotment, which is approximately 248 acres, over 7,200 feet of stream channel were fenced from cattle access, and 37 acres of buffer area were protected and planted with native species. The project also included cattle watering sites, gravel hardening for water protection, cattle crossings, and other Best Management Practices.

Forestry Sector

This sector is considered to be non-actionable, that is, the current strategy is not relying on reductions from this sector. However, the 2012 Forest Management Plan for the George Washington National Forest will refer to the Chesapeake Bay TMDL and its pollutants of concern (USFS, Bailey, pers. comm.). Chapter 2 ("Forest-wide Management Direction") of the Monongahela National Forest's Land and Resource Management Plan refers to local TMDLs and BMPs that reduce nonpoint source pollution, and includes specific Management Directions that support WV's Phase 3 WIP. For example, SW20 says "[m]anage watersheds to sustain healthy aquatic systems, achieve desired conditions, and meet state designated water uses," (USDA Forest Service, 2011). Like the non-regulated developed lands sector, any reductions made by this sector will help WV to achieve its targets and improve local water quality. Any timber harvesting conducted on U.S. Forest Service property will be in compliance with WVDOF's Logging and Sediment Control Act. This Act requires Best Management Practices on all timber harvesting operations.

Climate Change

During the midpoint assessment, the Partnership performed an evaluation of the impacts of climate change between 1985 and 2025 and prescribed additional nutrient load reductions necessary to ensure water quality standard attainment in tidal waters. The additional load reductions were distributed to jurisdictions under the Planning Target methodology. The jurisdictional responsibilities for additional load reduction that resulted from the assessment are shown in the Table 6.

Table 6 – Midpoint Assessment of additional watershed load reductions to address climate change

Jurisdiction	Total Nitrogen (Million Pounds/yr)	Total Phosphorus (Million Pounds/yr)
NY	0.400	0.015
PA	4.135	0.143
MD	2.194	0.117
WV	0.236	0.017
DC	0.006	0.001
DE	0.397	0.006
VA	1.722	0.187
Basinwide	9.089	0.485

The preliminary estimates of climate change impacts and jurisdictional reduction responsibilities were presented at the March 2, 2018 meeting of the Principals' Staff Committee (PSC). The PSC decided that additional numeric climate change load reductions would not be immediately reflected in the WIP3 planning targets. Instead, the PSC directed the Partnership to perform a comprehensive assessment of new science, modify as necessary models, drivers, and BMP efficiencies and, by 2021, present a reassessment of additional load reductions necessary to offset climate change impacts. The PSC further directed that jurisdictional WIP3s include narrative strategies to address climate change impacts in the interim period and commitments to achieve any necessary additional load reductions determined necessary by the revised assessment in the milestone periods through 2025. The PSC also stated that individual jurisdictions could implement a numeric strategy in the interim period.

West Virginia has chosen to address potential climate change impacts directly and numerically. The management actions proposed in the WV WIP3 result in edge of tide loads substantively less than planning targets and provide freeboard that accommodates the additional climate change impact load reductions determined in the initial assessment (See Table 1). Pertinent numeric information is shown in Table 7.

Table 7: Loadings available to address climate change impacts

Nutrient	Planning Targets	WV WIP3	Freeboard	Climate Change
	MM#/YR EOT	MM#/YR EOT	MM#/YR EOT	MM#/YR EOT
Total Nitrogen	8.22	7.51	0.71	0.236
Total Phosphorus	0.432	0.383	0.049	0.017

Via this approach, West Virginia anticipates it will be in a good position to address climate change impacts in a timely manner. It is recognized that the new assessment directed by the PSC to be developed in 2021 may alter the overall load reductions that were determined necessary in the midpoint assessment and that West Virginia's responsibilities may change. West Virginia commits to evaluating the results of the reassessment and to determining if existing planned WIP3 activities remain adequate to achieve modified planning targets.

It is also important to note that many of the planned BMPs focused upon in the West Virginia WIP3 may provide climate resiliency co-benefits. West Virginia is also championing new voluntary green infrastructure retrofitting in nonregulated communities as a mechanism to co-benefit local flooding and CSO control issues that may be aggravated by climate change. CBIG funds have already been allocated to develop GI outreach materials and developing local conceptual plans for a few communities. Depending upon the amount of interest expressed and status of the funding source, it is hoped that this initiative will expand and be able to assist more communities with conceptual planning and also provide project design and implementation grant application assistance.

Streambank Restoration

In the Phase 2 WIP, streambank restoration via Natural Stream Design was characterized as an "evolving technology" that West Virginia supported and for which it would promote funding opportunities. It included a commitment to apply approximately 20,000 linear feet of this BMP in the West Virginia Potomac drainage by 2025. West Virginia is proud to report that a total of 47,731 linear feet of nonurban stream restoration have been installed through 2018 Progress, more than doubling its Phase 2 WIP commitment. Even though past performance has already exceeded WIP2 goals, West Virginia desires accelerated implementation of this BMP. Approximately 66,500 more linear feet are planned over the seven-year period of 2019-2025, for a total WIP3 commitment of 114,227 linear feet.

Past work has been accomplished through the combined and cooperative efforts of Trout Unlimited, the US Fish and Wildlife Service, Natural Resources Conservation Service (NRCS), Canaan Valley Institute and the Conservation Agency. Much of this work has been focused in the South Branch Potomac River headwaters and watersheds for which 319 plans for nonpoint source sediment reductions exist. Projects often couple streambank, instream and priority upland practices (livestock exclusion/riparian buffers) to maximize fishery and water quality benefits.

The Focused Conservation Approach (FCA) of NRCS, launched in FY2017 in West Virginia, is already proving to be an important driver of successful stream restoration. In this framework, Long Range Plans were developed cooperatively by Local Work Groups (LWG) through a locally-led process. The LWGs, comprised of local agriculture producers and interest groups, Conservation District supervisors, USDA and state agency representatives, were convened by the soil and water conservation districts and the NRCS District Conservationists. Then project plans evolving from each district's Long Range Plan were submitted to the state technical committee for approval. The Environmental Quality Incentives Program (EQIP) and leveraged resources from partners are used to implement each plan's conservation objectives. Some of the resulting project plans have successfully directed funding to stream restoration projects in the North Fork of the South Branch River, Edwards Run/Dillons Run (tributaries of Cacapon River), and New Creek/Patterson Creek, gaining momentum from lining up adjacent stream reaches for improvement projects. This makes communities excited about the work, and allows partners to document increases in brook trout numbers.

Streambank restoration is one of the aspects of the Phase 3 WIP aimed at improving West Virginia waters and addressing local water quality needs. Although the modeled nutrient

reduction credit for nonurban stream restoration (especially when reporting per the default protocol) may not appear as cost effective as other BMPs, West Virginia recognizes the strong co-benefits to the Vital Habitats, Brook Trout, and Healthy Watersheds Chesapeake Bay Agreement goals/outcomes and the positive impacts to local aquatic life, flood control/mitigation and recreational activities. Urban and Agricultural Stream Restoration received impact scores of 2.5 and 2, respectively, for Climate Adaptation in the 2017 Estimation of BMP Impact on the Chesapeake Bay Program Management Strategies report by Tetra Tech, Inc. which evaluates BMP effects on outcomes on a scale of +5 (very beneficial) to -5 (very harmful).

As a component of WIP development, a Streambank Restoration group was formed to guide the numerical goals for nonurban stream restoration in the WIP3 scenario. The group included key personnel from the previously mentioned groups and agencies that have been working cooperatively to further implementation of streambank restoration. The group identified the combined rate of implementation that may be expected from all partners and their evaluation strove to avoid both under-projecting and double-counting of planned practices. Their deliberations affirmed goals to couple the streambank restoration BMP with upland BMPs where feasible, and of the importance planning/reporting of actual sediment and nutrient reductions that allow more lucrative nutrient reduction crediting.

The projection of planned activities and the resultant WIP3 goals were based upon current funding and staff resources, but the group identified potential increases in capacity that would increase the rate of implementation of this practice. For example, hiring another stream designer would allow Trout Unlimited to coordinate up to an additional mile of streambank stabilization projects per year in conjunction with EQIP (FCAs). Other partners such as Downstream Strategies and Canaan Valley Institute also have capacity to design and implement projects, perhaps at sites that don't fit as well with T.U.'s goals or FCA areas, if funding and match can be identified.

To summarize, approximately 9500 additional linear feet/yr. of nonurban streambank restoration are planned from 2019 through 2025 across the West Virginia Potomac watershed. A portion of the new activity will addend work in prior focus areas, but projects may occur anywhere in the Potomac watershed where need and opportunity exist. This level of effort added to that from 2018 progress will result in a total 2025 goal of 114,227 linear feet

Cacapon River Watershed

The Cacapon River has emerged as an ideal place to focus nutrient reduction efforts because of the potential to improve local water quality along with delivered loads to the Chesapeake Bay. The Cacapon watershed can be divided into four distinct sections: the Lost River headwaters (the Lost River is the mainstem of the Cacapon that disappears into the ground under low flow conditions that is renamed the Cacapon River where it emerges); the Middle Cacapon from the Lost River to the confluence with the Cacapon's largest tributary, the North River; the North River and; the Lower Cacapon below the confluence with the North.

Chesapeake Bay Program staff presented scientific summaries of West Virginia's contributing area to the Bay in May 2018 ("Identifying Opportunities for BMP Implementation in West Virginia" by Matthew Johnston). The Lost River portion of the Cacapon watershed was one of the most prominent in the analysis (both in regard to nitrogen and phosphorus) of the difference between 2017 progress and E3 (the scenario where everyone everywhere does everything). In that analysis, both stormwater and agriculture BMPs were identified for which there is still great opportunity for implementation.

The Middle Cacapon watershed is heavily forested and sparsely developed, which has undoubtedly helped to keep the main Cacapon River off the West Virginia Clean Water Act Section 303(d) list until recently. Pursuant to the WVDEP methodology for measuring and listing streams, observed blooms of filamentous algae caused it to be listed for not meeting the water contact recreation designated use. Nutrient source tracking and assessment is currently underway to guide WVDEP's decision about a potential Total Maximum Daily Load for the nuisance algae condition in this watershed.

A Cacapon watershed planning group was formed to guide a strategy including numerical goals for BMP implementation in the WIP3 scenario. Similar to the success witnessed in the South Branch Potomac River, it is hoped that increased implementation of nutrient controls in the Cacapon watershed upstream of the algae impacts could both reduce loadings to the Chesapeake Bay and resolve the local impairment without new TMDL development. The group included key personnel from WVDEP, WVDA, NRCS, Cacapon Institute and TU. They reviewed results of WVDEP source tracking and research that the Interstate Commission on the Potomac River Basin (ICPRB) has conducted for several years to document the water quality conditions present at locations of algae blooms in the Cacapon River.

Initially, an evaluation of nutrient sources upstream of the manifestations of filamentous algae was conducted. The Cacapon stood out from other algae impacted streams in West Virginia in that there were no significant sewage discharges immediately upstream of most bloom areas.

The work of ICPRB has helped to establish that nutrient levels are fairly consistent throughout the Cacapon River during base flow conditions (which is the critical condition for the algae blooms to occur), and also helped to rule out certain potential sources such as the tributary Loman Branch and hypothetical sewage point sources. At this time, there is no strong evidence that causative sources exist in close upstream proximity to observed blooms, except below the Capon Bridge WWTP. Because the other blooms occur in reaches where stream chemistry, physical conditions and nutrient levels are similar to reaches that do not have algae blooms, one working theory currently being investigated is that the reaches in question may experience upwellings of groundwater bearing a small, yet to be detected, additional load of biologically-available phosphorus. This theory has been neither validated nor rejected. Other possibilities include cycling of nutrients through Submerged Aquatic Vegetation (SAV) to produce biologically available phosphorous, subtle shifts in stream chemistry that helps release available phosphorus, or presence of an undiscovered nutrient source. Ideally, precise cause and effect would be known and specific practices and locations could be planned. Unfortunately, this is not the case and continued investigation is needed.

In the interim, the group decided that focused implementation of nutrient-reducing practices in the Lost River and the Cacapon mainstem watershed down to the confluence with North River is advisable. The North River watershed and the Cacapon River downstream of the confluence with the North River are excluded from the focus area because investigators have not observed problematic algae blooms in those areas.

Given the elevated nutrient loadings and BMP opportunity in the watershed upstream of North River, increased implementation could have only a positive local effect. Lost River already has a fecal coliform bacteria TMDL developed and 319 Watershed Based Plan. This should facilitate the pursuit of practices that co-benefit bacteria and nutrient loadings. The following practices will be pursued in this watershed: Animal Waste Management, livestock exclusion, and forest and grass buffers. It is also known that agronomic nutrient excesses are present in Hardy County and that the county is a focus area for poultry manure transport. Export of excess manure will, in the long term, lower instream phosphorus that most often limits algae production in stream environments. Additional nutrient management planning in the Lost River watershed, both to identify the need for manure transport with respect to phosphorus and to efficiently replace manure nitrogen, will have a beneficial impact.

Local Area Planning Goals

West Virginia focused on local engagement in WIP3 development so that the proposed management actions are reasonable under available resources and aligned with local priorities. In general, West Virginia's delivered loads to the Chesapeake Bay are the same regardless of where practices are implemented. Because many of our practices are voluntary, we focus implementation where opportunities exist across the Potomac headwaters.

In the agriculture sector, certain priority practices are targeted by the local conservation districts for implementation. Using a Focused Conservation Approach with the input of Local Workgroups, West Virginia and federal assistance programs have identified priority geographic areas and practices.

Potomac Valley Conservation District:

- Poultry litter transfer out of the Chesapeake Bay watershed in Hardy and Pendleton counties where manure excesses exist and jeopardize local water quality.
- Stream restoration
- Animal waste structures

Eastern Panhandle Conservation District:

- Multi-species cover crops
- No-till

Through the West Virginia Conservation Agency's Agriculture Enhancement Programs, Conservation Districts identify priority practices on an annual basis. While the number of farms in West Virginia continues to decline, the region that is in the Chesapeake Bay watershed continues to lead the state in crop and poultry production. To address the resource concerns, Eastern Panhandle Conservation District (EPCD) and Potomac Valley Conservation District (PVCD) offer cost-share practices utilizing Agriculture Enhancement Program and Chesapeake Bay Implementation Grant funds. The practices that are available to producers are approved by each District annually. Although there are some distinct differences in production between the two districts, both have identified the same resource concerns to be addressed. Currently, EPCD and PVCD offer assistance with liming, hay and pasture reseeding, frost seeding, cover crop, heavy use area protection, exclusion fencing (with alternative watering systems), and pasture divisional fencing (with alternative watering systems). Because poultry production is limited the Potomac Valley, that district also offers cost-share for poultry litter that is transferred out of the Chesapeake Bay watershed.

Within the developed sector, local goals for post construction stormwater management on new development are prescribed in Berkeley and Jefferson counties. The vast majority of new development is expected to occur in those counties where the MS4 program is applicable (Berkeley) or local ordinances have been enacted that require commensurate controls (Jefferson). For those counties the rate of implementation of Stormwater Performance BMPs on new development experienced in the recent past have been used to project goals for the future.

Otherwise, goals are prescribed at the basin level so as to maximize opportunities wherever both resources and interest exist. Some of our important management actions (with respect to improving either tidal waters or West Virginia waters) are universally needed in many areas of the West Virginia Potomac Basin. For example, livestock exclusion from streams and forest buffers are broadly desired, not only to address Chesapeake Bay TMDL water quality goals, but other goals of the Chesapeake Bay Agreement and local water quality improvements related to West Virginia sediment and bacteria TMDLs.

Local Engagement

West Virginia's (WV) Chesapeake Bay Tributary Team conducted several types of outreach for the development of the Phase 3 Watershed Implementation Plan (WIP). We began the process in 2017 by presenting Chesapeake Bay progress and goals to each county commission in the Potomac Valley region (Grant, Hampshire, Hardy, Mineral and Pendleton counties). A Chesapeake Bay introduction and wastewater plant upgrade highlight was given by WV Department of Environmental Protection (DEP) staff at the WV Rural Water conference. A similar update was given at the October meeting of the WV State Conservation Committee. We also discussed the upcoming Phase 3 WIP development process when opportunities arose in other meetings and projects. We included a Phase 3 WIP Fact Sheet for local elected officials in a mailing to the eight county commissions and 12 incorporated towns or cities in West Virginia's Bay drainage area in the fall of 2017. Throughout that period, our Tributary Team participated on the Chesapeake Bay Program's Local Government Engagement Initiative workgroup. Periodic conference calls and meetings of West Virginia's WIP3 development team ensured continuous progress.

We had our first Chesapeake Assessment Scenario Tool (CAST) training for Tributary Team partners in January 2018, a group practice day in February, and another training with the CAST land use policy BMPs in April. WV Conservation Agency (WVCA), WV Rivers, and other partners of the Safe Water Harpers Ferry implementation team tabled at the Earth Day festival at Sam Michaels Park near Harpers Ferry. Part of the educational effort was about the Phase 2 WIP and upcoming Phase 3 WIP. There were approximately 100 visitors to the booth. In May, WV Department of Agriculture and WVCA held their first meeting about Phase 3 WIP planning with agricultural agency partners. In addition, Tributary Team partners presented an afternoon Chesapeake Bay session to the annual Eastern Panhandle Watershed Group gathering that included West Virginia's progress toward the nutrient reductions required by the Chesapeake Bay Total Maximum Daily Load (TMDL), the new watershed model results and targets, and the need to revise our strategies in the form of a Phase 3 WIP. We also highlighted the outcomes of the 2014 Chesapeake Bay Agreement that are applicable in WV, after which the participants provided input through post-it notes regarding their organizations' work that helps to accomplish certain outcomes. Also, in May, the Tributary Team hosted a Chesapeake Bay science meeting where representatives from WV Tributary Team agencies, non-profits and universities learned detailed information from US Geological Survey and Chesapeake Bay Program staff about our portion of the Chesapeake Bay watershed as portrayed in models and GIS analyses.

In June, WV Rivers staff presented to the Sierra Club West Virginia's Eastern Panhandle group (24 attendees) on activities in the Bay watershed, including the Phase 3 WIP planning process. Also, in June, the Chesapeake Bay Coordinator with the Eastern Panhandle Regional Planning & Development Council (Region 9) held a kick-off meeting about the Phase 3 WIP for developed lands stakeholders in the Eastern Panhandle (Morgan, Berkeley and Jefferson counties). In July, the Region 9 coordinator conducted more focused follow-up meetings in each of those counties (the only WV CBWS counties predicted to grow by 2025), attended by elected officials and their planning staff, emergency management representatives, and utility directors, and WVDEP representatives. Presented were specific strategies that would be helpful in the Phase 3 WIP and that already exist in planning documents such as Source Water Protection Plans and Hazard Mitigation Plans. This allowed attendees to participate actively by commenting on the feasibility and desirability of implementing these strategies, such as improving wastewater treatment in older developed areas or implementing green infrastructure practices to reduce flooding risk.

On July 19, WVDEP issued a press release regarding public meetings for the Phase 3 WIP development, and on July 26, 2018 the Region 9 Chesapeake Bay Coordinator announced during the "New Pollution" monthly segment on 1340 am WEPM radio that these were to be held on July 30 in Martinsburg and July 31 in Moorefield. Tributary Team partners also forwarded the meeting announcement to many recipients in e-mail "blasts" and electronic invitations. Attendance was modest, but good dialogue occurred that prompted the Tributary Team to offer more technical assistance opportunities. In the meantime, Tributary Team members were presenting information about the Phase 3 WIP at meetings they attended individually, such as Conservation Districts' monthly meetings, Comprehensive Economic Development Strategy (CEDS) sessions with the Regional Planning & Development Councils, regional school boards, Rural Development Authorities, a stormwater workshop, MS4 personnel, Local Workgroup meetings hosted by District Conservationists with the Natural Resources Conservation Service (NRCS), and a Rotary Club.

In August, Tributary Team partners presented Phase 3 WIP information to the Region 8 Planning & Development Council, which includes elected officials from the 5-county Potomac Valley region. Newly-approved additional incentives for the Conservation Reserve Enhancement Program (CREP) were a focus of that meeting. Similar information was presented specifically to Hardy County Commission in November as a follow-up to the Region 8 meeting. In August and October, phone meetings were conducted with partners to develop the stream restoration focus and Cacapon watershed sections of the Phase 3 WIP. The Cacapon effort also included a multi-partner field trip to discern the layout of algae blooms and potential nutrient sources. Agricultural partners also got together again in October to discuss BMP levels in the Phase 3 WIP CAST scenario ("strawman.") Staff from West Virginia Rivers and WV Department

of Environmental Protection conducted a “Flood-Fighters” workshop for Watershed groups’ board members in October, at which the Phase 3 WIP framed the discussion. Another stormwater workshop on October 25 in Martinsburg, this one focused on engineers and other practitioners, also included the Phase 3 WIP as a topic.

Also, in October, WV Rivers staff presented at the American Conservation Film Festival (approx. 120 attendees) on activities in the Bay watershed, including the WIP3 planning process. In December, WVCA staff presented the Phase 3 WIP topic at a dinner for local legislative representatives that was hosted by the Eastern Panhandle Conservation District. The Region 9 Chesapeake Bay Coordinator has been appearing before various City Councils and County Commissions throughout November 2018, December 2018, and January 2019 to update elected officials on the summer input session as mentioned above and to engage them once again on strategies that could also be included in the Phase 3 WIP.

West Virginia’s Chesapeake Bay Tributary Team posted meeting announcements throughout the WIP3 development process on our website and highlighted various stages of the process in our quarterly electronic newsletter, beginning with the Summer/Fall 2017 issue. WV’s Tributary Team maintains a Facebook page. Several posts were made leading up to the WIP3 Development meetings in July, including videos of the Martinsburg presentation on July 30th. In August, a link was reposted from the Chesapeake Bay Program on why the WIP matters to everyone. On September 20, a link was posted to the quarterly newsletter for articles on the WIP3 development process. Other posts that related to WIP development included posts advertising and promoting the Watershed Group Gathering, TMDL updates, and CAST trainings.

In January-March 2019, Tributary Team members began sharing drafts of various text sections or verbal summaries with stakeholder groups for feedback. A draft WIP3 was posted on the www.wvchesapeakebay.us website and press release issued April 12, 2019 announcing a 60-day public comment period.

Appendix W1. Significant Municipal Facilities

WV/NPDES Permit Number	Facility Name	Outlet Number(s)	Model Land/River Segment	Wasteload Allocation	
				Total Nitrogen (#/yr Edge-of-Stream)	Total Phosphorus (#/yr Edge-of-Stream)
WV0020699	ROMNEY	001	WV-N54027PU4_4310_4210(CBWS)	7610	761
WV0021792	PETERSBURG	001	WV-L54023PU4_5050_4310(CBWS)	20557	2056
WV0022349	CHARLES TOWN	001, 203	WV-N54037PS5_4380_4370(CBWS)	42855	5367
WV0023167	MARTINSBURG	001	WV-N54003PU2_3900_3750(CBWS)	45662	4566
WV0024392	KEYSER	001	WV-N54057PU4_3970_3890(CBWS)	36547	3655
WV0024775	SHEPHERDSTOWN	001	WV-N54037PU6_4080_4180(CBWS)	6091	609
WV0027707	WARM SPRINGS PSD	001	WV-N54065PU6_3530_3440(CBWS)	26484	2648
WV0082759	BERKELEY COUNTY PSSD - Opequon Hedgesville	001 or 005	WV-N54003PU2_3900_3750(CBWS)	19787	1979
WV0082759	BERKELEY COUNTY PSSD - Inwood	002 or 006	WV-N54003PU2_4220_3900(CBWS)	22831	2283
WV0082759	BERKELEY COUNTY PSSD - Baker heights	003 or 007	WV-N54003PU2_4220_3900(CBWS)	22831	2283
WV0082759	BERKELEY COUNTY PSSD - North End	004 or 008	WV-N54003PU2_3900_3750(CBWS)	24353	2435
WV0106038	MOOREFIELD REGIONAL WWTP	001	WV-L54031PU4_4310_4210(CBWS)	51431	5221
WV0105988	FRANKFORT PSD	001	WV-N54057PU2_4160_3930(CBWS)	24656	3593

Appendix W2. Significant Industrial Facilities

WV/NPDES Permit Number	Facility Name	Outlet Number(s)	Model Land/River Segment	Wasteload Allocation	
				Total Nitrogen (#/yr Edge-of-Stream)	Total Phosphorus (#/yr Edge-of-Stream)
WV0005649	LEETOWN SCIENCE CENTER	001-003	WV-N54037PU2_4220_3900(CBWS)	18273	1827
WV0111821	WVDNR-REEDS CREEK HATCHERY	001	WV-N54071PU1_5820_5380(CBWS)	26298	2630
WV0112500	WVDNR-SPRING RUN HATCHERY	008, 011	WV-L54023PU4_5050_4310(CBWS)	65480	6548
WV0116149	THE CONSERVATION FUND FRESHWATER INST	002, 004	WV-N54037PU6_3750_3752(CBWS)	15372	1538

Appendix W3. Nonsignificant Municipal Facilities

WV/NPDES Permit Number	Facility Name	Outlet No.	Model Land/River Segment	Agency	Wasteload Allocation Component	
					Total Nitrogen (#/yr) EOS	Total Phosphorus (#/yr) EOS
WV0105872	BC PARTNERS	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	2650	265
WV0105953	BERKELEY SPRINGS DEVELOPMENT, LLC	001	WV-N54065PU6_3610_3530(CBWS)	Non-Federal	3046	305
WV0024970	FRANKLIN	001	WV-L54071PU0_5620_5380(CBWS)	Non-Federal	10965	1828
WV0027405	PAW PAW	001	WV-N54065PU6_4020_3870(CBWS)	Non-Federal	10965	1828
WV0027707	WARM SPRINGS PSD - GC	002	WV-N54065PU3_3860_3610(CBWS)	Non-Federal	3290	548
WV0039136	HARPERS FERRY-BOLIVAR PSD	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	16448	2741
WV0045501	WARDENSVILLE TOWN OF	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	6579	1097
WV0081850	CENTRAL HAMPSHIRE PSD	001	WV-N54027PU6_4020_3870(CBWS)	Non-Federal	10965	1828
WV0101524	MOUNTAIN TOP PSD-Bayard (001)	001	WV-H54023PU2_4720_4750(CBWS)	Non-Federal	2741	457
WV0101524	MOUNTAIN TOP PSD-Gormania (002)	002	WV-H54023PU2_4720_4750(CBWS)	Non-Federal	548	91
WV0101524	MOUNTAIN TOP PSD-Elk Garden (003)	003	WV-N54057PU3_4451_4450(CBWS)	Non-Federal	2741	457
WV0103161	BERKELEY COUNTY PSSD - Woods II	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	4580	817
WV0105708	BERKELEY COUNTY PSSD - Brookefield	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	2741	457
WV0105724	Old Standard, LLC	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	1904	190
WV0105791	BERKELEY COUNTY PSSD - Marlowe	001	WV-N54003PU6_3602_3730(CBWS)	Non-Federal	2741	457
WV0105830	BERKELEY COUNTY PSSD -Forest Heights I	001	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	1371	228
WVG410499	Gloria Ryals	001	WV-N54037PU6_4180_4150(CBWS)	Non-Federal	28	5
WVG410613	William W. Hartman	001	WV-N54071PU0_6080_5620(CBWS)	Non-Federal	33	5
WVG412046	C&R Development	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	33	6
WVG412299	Leonard & Peg Mc Masters	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	27	5
WVG412450	Ruby M. Kisamore	001	WV-N54071PU1_5520_5210(CBWS)	Non-Federal	33	5
WVG412886	John e Russel	001	WV-N54027PU2_4340_3860(CBWS)	Non-Federal	27	5
WVG413117	Thomas Stollings	001	WV-N54003PU2_3770_3600(CBWS)	Non-Federal	27	5
WVG413235	Tilhance Farm Subdivision	001	WV-N54003PU2_3770_3600(CBWS)	Non-Federal	27	5
WVG413357	Julie Sheets & Issac Crouse	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	27	5
WVG413769	Kim-Sue Corporation	001	WV-N54027PU2_4340_3860(CBWS)	Non-Federal	27	5
WVG413868	MICHAEL HOCKMAN	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	28	5
WVG414126	JOHN G. DOBBIE	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	27	5
WVG414260	JEFFREY AND AMY SMITH	001	WV-N54057PU4_3970_3890(CBWS)	Non-Federal	28	5
WVG550023	BURLINGTON UM FAM. SERV.	001	WV-N54057PU2_4360_4160(CBWS)	Non-Federal	274	46
WVG550120	E A Hawse Nursing & Rehab Center	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	1124	187
WVG550132	FALLING WATERS ESTATES	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	987	164
WVG550137	Oakhill MHC	001	WV-N54037PS5_4380_4370(CBWS)	Non-Federal	822	137
WVG550140	C&J Utilities, LLC	001	WV-L54023PU4_5050_4310(CBWS)	Non-Federal	614	102
WVG550189	CAMP TIMBERRIDGE	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	1151	192
WVG550214	TROUT POND RECREATION AREA	001	WV-N54031PU3_4280_3860(CBWS)	Federal	724	121
WVG550292	SENECA ROCKS MINI MALL	001	WV-N54071PU3_5210_5050(CBWS)	Non-Federal	99	16
WVG550345	PRIESTFIELD PASTORAL CTR	001	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	932	155

WV/NPDES Permit Number	Facility Name	Outlet No.	Model Land/River Segment	Agency	Wasteload Allocation Component	
					Total Nitrogen (#/yr) EOS	Total Phosphorus (#/yr) EOS
WVG550357	CHERRY RUN MHP	001	WV-N54003PU6_3640_3600(CBWS)	Non-Federal	713	119
WVG550373	Berkeley Springs Rehab & Nursing	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	1919	320
WVG550375	WALNUT LANE ESTATES	001	WV-N54027PU4_4310_4210(CBWS)	Non-Federal	411	69
WVG550387	TRI-LAKE PARK	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	2741	457
WVG550411	HARPERS FERRY KOA	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	1919	320
WVG550433	USDA- Forest Service	001	WV-L54023PU4_5050_4310(CBWS)	Federal	82	14
WVG550455	MOUNT STORM VILLAGE	001	WV-N54023PU1_4760_4451(CBWS)	Non-Federal	367	61
WVG550499	Crystal Valley Ranch	001	WV-N54027PU4_4310_4210(CBWS)	Non-Federal	164	27
WVG550524	Fountainhead Sewerage System	001	WV-N54057PU2_4360_4160(CBWS)	Non-Federal	713	119
WVG550529	SMOKE HOLE CAVERNS	001	WV-N54023PU3_5210_5050(CBWS)	Non-Federal	274	46
WVG550533	Shenandoah Junction WWTP	001	WV-N54037PU6_4180_4150(CBWS)	Non-Federal	987	164
WVG550629	WOODSEDGE MHP	001	WV-N54071PU2_5700_5210(CBWS)	Non-Federal	439	73
WVG550636	Cave Quarter WWTP	001	WV-N54037PS5_4380_4370(CBWS)	Non-Federal	877	146
WVG550656	Powell's Patch	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	1371	228
WVG550673	Waugh's Community Home Park	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	806	134
WVG550690	UNION EDUCATIONAL	001	WV-H54023PU1_4760_4451(CBWS)	Non-Federal	439	73
WVG550694	522 INDUSTRIAL PARK	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	1371	228
WVG550699	UPPER TRACT PENDELTON CNTY IND. PK	001	WV-L54071PU1_5820_5380(CBWS)	Non-Federal	822	137
WVG550733	EVERGREEN CENTER	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	548	91
WVG550766	ALLEN'S MOBILE VILLAGE	001	WV-L54023PU1_5380_5050(CBWS)	Non-Federal	548	91
WVG550778	BROAD LANE MHP	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	1480	247
WVG550786	CAPON SPRINGS AND FARM	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	2193	366
WVG550792	S.O.M.E. INC.	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	329	55
WVG550793	GRANT COUNTY DEVELOPMENT AUTHORITY	001	WV-H54023PU1_4840_4760(CBWS)	Non-Federal	274	46
WVG550812	Pendleton Business Ctr	001	WV-N54071PU0_6080_5620(CBWS)	Non-Federal	1097	183
WVG550815	JUDY LYNN MOBILE HOME PARK	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	274	46
WVG550823	Burgundy Center for Wildlife Studies	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	192	32
WVG550827	BUFFALO RUN TRAILER COURT	001	WV-N54027PU4_4310_4210(CBWS)	Non-Federal	329	55
WVG550828	Cliffside Inn, LLC	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	932	155
WVG550854	PEPPER TREE MHP	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	66	11
WVG550856	MIDWAY MOBILE HOME PARK	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	1261	210
WVG550858	Berkeley Co PSSD Ghant MHP	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	411	69
WVG550862	VALLEY DALE MAINT. ASSOC.	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	548	91
WVG550884	COOLFONT MOUNTAINSIDE ASSOCIATION	001	WV-N54065PU6_3610_3530(CBWS)	Non-Federal	1069	178
WVG550911	POTOMAC PARK CAMP INC	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	1371	228
WVG550914	MARLOWE GARDEN APTS-PHASE I	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	822	137
WVG550937	LOST RIVER STATE PARK	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	493	82
WVG550938	AVALON VILLAGE CONDO.	001	WV-N54027PU3_3860_3610(CBWS)	Non-Federal	345	58
WVG550964	HIGHPOINTE SUBDIVISION	001	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	614	102

WV/NPDES Permit Number	Facility Name	Outlet No.	Model Land/River Segment	Agency	Wasteload Allocation Component	
					Total Nitrogen (#/yr) EOS	Total Phosphorus (#/yr) EOS
WVG550966	The Corners at Arden WWTP	001	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	722	120
WVG551048	Springer Run Park	001	WV-N54003PU2_3770_3600(CBWS)	Non-Federal	1645	274
WVG551055	Union Gap Subdivision	001	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	507	84
WVG551078	Berkeley County PSSD (Tomahawk Elementary)	001	WV-N54003PU2_3770_3600(CBWS)	Non-Federal	329	55
WVG551105	Concord Retreat LLC	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	334	56
WVG551122	Cacapon East, Inc	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	548	91
WVG551158	Blue Ridge Elementary	001	WV-N54037PS5_4380_4370(CBWS)	Non-Federal	658	110
WVG551159	Page Jackson Elementary School	001	WV-N54037PS5_4380_4370(CBWS)	Non-Federal	658	110
WVG551160	Whitebush Landing Subdivision	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	614	102
WVG551163	Ridge View Subdivision	001	WV-N54065PU6_3530_3440(CBWS)	Non-Federal	1480	247
WVG551181	WVDNR - Cacapon State Park	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	2741	457
WVG551199	Berkeley County PSSD (Northbrook WWTP)	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	1151	192
WVG551203	Sugar Grove LLC	001	WV-N54071PU2_6050_5190(CBWS)	Non-Federal	2741	457
WVG551208	Potomac Plaza	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	55	9
WVG551222	Cacapon South Utility	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	2083	347
WVG551230	Colonial Motel	001	WV-N54027PU4_4310_4210(CBWS)	Non-Federal	123	21
WVG551257	Antietam, LLC	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	493	82
WVG551263	Morgan Village MHP	001	WV-N54003PU6_3640_3600(CBWS)	Non-Federal	1919	320
WVG551283	Capon Bridge Technology Park	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	1371	228
WVG551285	Peterkin Camp & Conference Ctr	001	WV-N54027PU4_4310_4210(CBWS)	Non-Federal	1097	183
WVG551294	BERKELEY COUNTY PSSD - Honeywood	001	WV-N54003PU6_3600_3602(CBWS)	Non-Federal	2741	457
WVG551311	Hickory Run Subdivision	001	WV-N54003PU2_3770_3600(CBWS)	Non-Federal	614	102
WVG551338	CACAPON INVESTMENTS, LLC	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	110	18
WVG551343	T&S Market	001	WV-N54027PU4_4310_4210(CBWS)	Non-Federal	274	46
WVG551349	Hardy County High School	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	274	46
WVG551350	CAPON BRIDGE	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	2741	457
WVG551367	N & S Family Resturant	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	110	18
WVG551369	Gerrardstown (Mtn Ridge) Intermediate School	001	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	439	73
WVG551371	Seneca Shadows Campground	001	WV-N54071PU2_5700_5210(CBWS)	Federal	724	121
WVG551390	Central Hampshire PSD No. 2	001	WV-N54027PU6_4020_3870(CBWS)	Non-Federal	2193	366
WVG551394	South Fork Crossing Subdivision	001	WV-N54071PU2_6050_5190(CBWS)	Non-Federal	184	31
WVG551400	Skyline Village Treatment Plant	001	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	603	101
WVG551421	FOUNTAINHEAD SUBDIVISION	001	WV-N54003PU2_3900_3750(CBWS)	Non-Federal	1371	228
WVG551422	HARDY COUNTY PSD	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	2193	366
WVG551424	SLEEPY KNOLLS SUBDIVISION	001	WV-N54027PU6_4020_3870(CBWS)	Non-Federal	1151	192
WVG551448	US CUSTOMS AND BORDER PROTECTION	001	WV-N54037PS5_4370_4150(CBWS)	Federal	2193	366
WV0105830	BERKELEY COUNTY PSSD -Forest Heights II	002	WV-N54003PU2_4220_3900(CBWS)	Non-Federal	2851	475
WVG414907	ROBERTSON, CHARLES N	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	33	5
WVG414926	ESTATE OF WAYNE E EATON	001	WV-H54057PU3_4451_4450(CBWS)	Non-Federal	27	5

WV/NPDES Permit Number	Facility Name	Outlet No.	Model Land/River Segment	Agency	Wasteload Allocation Component	
					Total Nitrogen (#/yr) EOS	Total Phosphorus (#/yr) EOS
WVG414957	HALE, JASON R	001	WV-N54057PU4_3970_3890(CBWS)	Non-Federal	27	5
WVG415112	KUHLMANN, WILLIAM	001	WV-N54057PU4_3970_3890(CBWS)	Non-Federal	27	5
WVG415146	MINERAL COUNTY HISTORICAL FOUNDATION	001	WV-N54057PU2_4360_4160(CBWS)	Non-Federal	27	5
WVG415392	DCM PROPERTIES, LLC	001	WV-N54057PU2_4360_4160(CBWS)	Non-Federal	27	5
WVG415507	SALAS, FRANK	001	WV-N54027PU3_4280_3860(CBWS)	Non-Federal	27	5
WVG415512	BREWSTER, PETER W	001	WV-N54003PU2_3770_3600(CBWS)	Non-Federal	27	5
WVG415568	TEPHABOCK, WILLIAM MAYNARD FORREST	001	WV-H54057PU3_4451_4450(CBWS)	Non-Federal	33	5
WVG415805	DROPPLEMAN, JOHN & CHRISTINE	001	WV-N54057PU4_3970_3890(CBWS)	Non-Federal	27	5
WV1018027	Mettiki Coal	402	WV-H54023PU2_4720_4750(CBWS)	Non-Federal	17	0
WV0105384	RIVERBEND MEMBERSHIP CORP	001	WV-N24043PU6_3600_3602(CBWS)	Non-Federal	5483	914
WVG551450	POTOMAC ROCK ESTATES, LLC	001	WV-N24043PU6_3750_3752(CBWS)	Non-Federal	493	82

Appendix W4. Nonsignificant Industrial Facilities

WV/NPDES Permit Number	Facility Name	Outlet No.	Model Land/River Segment	Agency	Wasteload Allocation Component	
					Total Nitrogen (#/yr) EOS	Total Phosphorus (#/yr) EOS
WV0005517	OX PAPERBOARD, LLC	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	2437	609
WV0005525	VIRGINIA ELECTRIC & POWER	001	WV-H54023PU1_4840_4760(CBWS)	Non-Federal	121837	6092
WV0020371	NAVAL SEA SYSTEMS COMMAND	204	WV-N54057PU4_3970_3890(CBWS)	Federal	3378	338
WV0020371	ALLIANT TECHSYSTEMS, INC.	107	WV-N54057PU4_3970_3890(CBWS)	Non-Federal	122	12
WV0105112	US FISH & WILDLIFE SERVICE	001	WV-N54037PU6_3750_3752(CBWS)	Non-Federal	4496	749
WV0105856	PNGI CHARLES TOWN GAMING LLC	001	WV-N54037PU2_4220_3900(CBWS)	Non-Federal	5300	530
WV0115321	VEPCO-NORTH BRANCH POWER STATION	001	WV-H54023PU2_4750_4451(CBWS)	Non-Federal	82	14
WVG980070	WV DEPARTMENT OF TRANSPORTATION	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	NA	25
WVG980093	WV DEPARTMENT OF TRANSPORTATION	001	WV-N54071PU2_6050_5190(CBWS)	Non-Federal	NA	25
WVG980098	WV DEPARTMENT OF TRANSPORTATION	001	WV-L54023PU4_5050_4310(CBWS)	Non-Federal	NA	25
WVG980099	WV DEPARTMENT OF TRANSPORTATION	001	WV-N54023PU1_4760_4451(CBWS)	Non-Federal	NA	25
WVG980141	WV DEPARTMENT OF TRANSPORTATION	001	WV-N54003PU6_3730_3750(CBWS)	Non-Federal	1097	183
WVG980150	WV DEPARTMENT OF TRANSPORTATION	001	WV-N54057PU2_4360_4160(CBWS)	Non-Federal	170	50
WVG990023	BURLINGTON VOLUNTEER FIRE DEPT	001	WV-N54057PU2_4360_4160(CBWS)	Non-Federal	NA	56
WVG990038	CLASSIC CAR WASH	001	WV-N54057PU2_4160_3930(CBWS)	Non-Federal	NA	77
WVG990075	ROTH, JEFFREY R	001	WV-L54023PU4_5050_4310(CBWS)	Non-Federal	NA	77
WVG990109	PERDUE FARMS INC	001	WV-N54031PU3_4280_3860(CBWS)	Non-Federal	NA	50
WVG990120	NATIONAL PARK SERVICE	001	WV-N54037PS5_4370_4150(CBWS)	Non-Federal	NA	195
WVG990129	POLINO CONTRACTING, INC.	001	WV-H54023PU1_4840_4760(CBWS)	Non-Federal	NA	90
WV0116980	WVDNR - Petersburg Hatchery	001	WV-L54023PU4_5050_4310(CBWS)	Non-Federal	7456	913
WV0117293	WVDNR - Ridge Hatchery	001-007	WV-N54065PU2_3630_3590(CBWS)	Non-Federal	4067	470

Appendix W5. Combined Sewer Overflows

WV/NPDES Permit Number	Facility Name	Model Land/River Segment	Model Baseline (No Action) Loads		Wasteload Allocation (85% Reduction)	
			Total Nitrogen (#/yr Edge-of-Stream)	Total Phosphorus (#/yr Edge-of-Stream)	Total Nitrogen (#/yr Edge-of-Stream)	Total Phosphorus (#/yr Edge-of-Stream)
WV0106038	MOOREFIELD REGIONAL WWTP	WV-L54031PU4_4310_4210 (CBWS)	692	86	104	13
WV0106038	MOOREFIELD REGIONAL WWTP	WV-L54031PU2_5190_4310 (CBWS)	1805	226	271	34
WV0023167	MARTINSBURG	WV-N54003PU2_3900_3750(CBWS)	40606	5076	6091	761
WV0023167	MARTINSBURG	WV-N54003PU2_4220_3900(CBWS)	392	49	59	7
WV0024392	KEYSER	WV-N54057PU4_3970_3890(CBWS)	7949	994	1192	149
WV0105279	PIEDMONT	MD-N24001PU4_3970_3890 (CBWS)*	144	18	22	3
WV0105279	PIEDMONT	WV-N54057PU4_3970_3890 (CBWS)	3296	412	494	62
WV0105279	PIEDMONT	MD-N24001PU4_4440_3970 (CBWS)*	4642	580	696	87

*Modeled loads from West Virginia sources in this North Branch Potomac mainstem model segment attributed inappropriately to Maryland

Appendix W.6: Example Self-Monitoring and Reporting Requirements

(Example only - not to be construed as comprehensive or final permit requirements)

1) The Chesapeake Bay TMDL and the West VirginiaWatershed Implementation plan provide individual total nitrogen and total phosphorous wasteload allocations of xxxxx lbs/yr and yyyyy lbs/yr, respectively.

2) Permit limitations for total nitrogen and total phosphorous are being implemented on an annual total load basis. The annual total load limitations shall be attained in accordance with the following:

   a) The Division recognizes there is not an EPA approved method to directly test for total nitrogen. The total nitrogen value to be reported on the permittee's Discharge Monitoring Reports (DMRs) shall be the sum of the following parameters: Total Kjeldahl Nitrogen, Nitrate and Nitrite.

      i) If all three constituents of total nitrogen are not detected at their method detection limit (MDL), the permittee shall sum the actual MDLs for each constituent and report the result as less than the calculation.
      ii) If analytical results for one or more constituents are greater than or equal to the MDL, the total nitrogen calculation shall include those actual results with zero values for any constituent(s) with results less than the MDL.

   b) Effluent monitoring for the following pollutants shall be conducted using the most sensitive methods and detection levels commercially available and economically feasible. The following methods and detection levels are recommended to be used unless the permittee desires to use an EPA-approved method with a lower detection level:

Parameter	**EPA Method No.**	**Method Detection Limit (mg/l)**
Total Kjeldahl Nitrogen	351.4	0.03
Nitrate Nitrogen	300.0	0.002
Nitrite Nitrogen	300.0	0.004
Total Phosphorous	365.4	0.01

   Any "not detected" (ND) results must be reported as less than the MDL. (See also Section 2.a for Total Nitrogen) The permittee may not report zero or ND, or report the result as less than a minimum level (ML), reporting limit (RL) or practical quantification limit (PQL).

   c) The permittee shall collect (8-hour or 24-hour) hour composite samples for total phosphorous and for each constituent of total nitrogen. All sampling shall be collected concurrently and shall be representative of normal operations.

   d) The actual total (not the average) monthly flow shall be used in conjunction with the total nitrogen and total phosphorous concentration results to determine the total monthly mass results for DMR reporting purposes.

   [Total Flow Discharged in Month (Million Gallons per Month)]*[Nutrient Concentration (mg/l)]*8.34] = Monthly Load (lbs/month)

   e) The sum of total monthly mass results for total nitrogen and total phosphorous shall not exceed the following annual mass limitations for any calendar year:

Parameter	**Annual Total Load Limit**
Total Nitrogen	xxxxx lbs/yr
Total Phosphorous	xxxxx lbs/yr

   (Effluent limitations and self-monitoring requirements will also be contained in Section A of the permit)