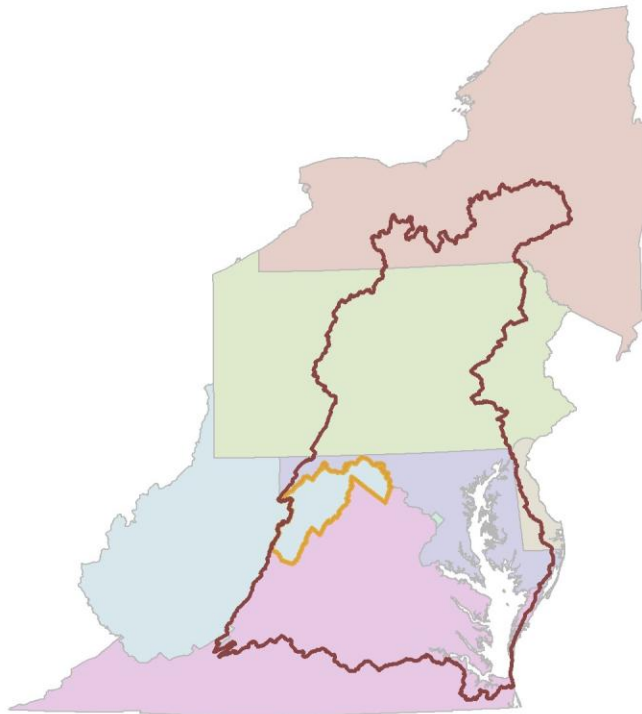


West Virginia's Chesapeake Bay TMDL Watershed Implementation Plan

A product of the
West Virginia WIP Development Team



In cooperation with the
WV Department of Environmental Protection
WV Conservation Agency
WV Department of Agriculture

Submitted to the Chesapeake Bay Program

November 29, 2010

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SECTION 2. EXECUTIVE SUMMARY

The Chesapeake Bay is a national and local treasure, and an important source of livelihood, recreation and cultural heritage for the region. However, after receiving pollution from the surrounding landscape for many years, the Bay is in trouble. The states in the Chesapeake Bay watershed – Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia – along with the District of Columbia and the U.S. Environmental Protection Agency are working together to find solutions to the Bay’s problems. They determined that the key to restoring the Bay’s health entails reducing the flow of nutrients (nitrogen and phosphorus) and sediment flowing from the Bay states into the Bay, and have set maximum amounts for nitrogen, phosphorus and sediment, known as Cap Load Allocations (hereafter referred to as CLAs or Cap Loads), for each of the jurisdictions.

In 2004, Bay Program Partners developed and began to implement cooperative and voluntary Tributary Strategies to reduce current pollutant loads to the CLA levels by the year 2010. The Chesapeake Bay Program determined that load reductions of 33% for nitrogen, 35% for phosphorus, and 6% for sediment were required of West Virginia. It was understood that, if this effort was not successful, the U.S. Environmental Protection Agency would begin developing a Total Maximum Daily Load (TMDL) for the Chesapeake Bay, a process that would place significant additional restrictions on pollution sources in all the Bay States. A TMDL sets forth a pollution budget for a watershed that allocates the amount each pollutant source is allowed to release while still attaining water quality standards.

In 2008, in recognition that pollution reduction goals were not being met, the federal and state governments determined that shorter-term milestones would improve accountability, accelerate pollution reductions, and increase the likelihood of meeting pollution reduction targets. The first milestones were announced in May 2009. Plans to meet these commitments were laid out over the three years between January 1, 2009 and December 31, 2011.

In May 2009, President Obama issued an Executive Order that substantially expanded the federal commitment to the Chesapeake Bay region. Many of the federal actions will directly support restoration efforts by local governments, nonprofit groups and citizens. The Order also requires that federal lands and facilities lead by example in environmental stewardship. Integral to the Order was the decision for the EPA to proceed with the Chesapeake Bay TMDL, which would expand regulation of urban and suburban stormwater and concentrated animal feeding operations and increase enforcement activities and funding for state regulatory programs. Finally, the Order gives the EPA enforcement authority if states miss established goals.

The Order required the six watershed states and the District of Columbia to develop and submit **Watershed Implementation Plans** (WIP) as a key element of this approach.

This document is the **Phase I Watershed Implementation Plan (WIP)**, which was required to be developed and submitted to EPA November 29, 2010 for inclusion in the final Chesapeake Bay TMDL. It begins the process of defining how West Virginia, in partnership with federal and local governments, will achieve the pollution load reductions required of the state of West Virginia to support the TMDL.

WIP strategies are directed to have controls in place by 2025 that would achieve target loads, and by 2017 that would result in 60% of necessary nutrient and sediment reductions compared to current loads. The WIP strategies address existing as well as new or expanded sources of nutrients and sediment.

West Virginia developed an incomplete draft Phase I WIP on September 1, 2010 that was advertised by EPA concurrently with the draft TMDL. In contrast to the draft, this revised Phase I WIP is based upon allocation scenarios that the Chesapeake Bay Watershed Model (CBWM) predicts will achieve 2017 and 2025 goals for West Virginia. The CBWM uses mathematical models to simulate changes in the Bay ecosystem due to changes in population, land use, or pollution management. These simulations are not the same as actual conditions, but represent the best scientific estimate of what average loadings are likely to be. The revised WIP also includes more detailed descriptions of planned actions and contingencies necessary to demonstrate reasonable assurance that proposed pollutant reductions will be achieved.

A Phase II WIP, due to be completed by November 2011, will follow CBWM revisions to correct known deficiencies and include more detailed, local information. Future CBWM refinement and reassessment are again planned in 2017. At that time, the jurisdictions will develop Phase III WIPs to ensure attainment of Cap Loads by 2025.

This document provides a preliminary review of the strategies to be undertaken in West Virginia's major load sectors: Wastewater, Developed Lands and Industrial, Agriculture, Forest, and Other (see Appendix C). Some of these sectors are regulated and some are not.

Wastewater

- Significant Municipal Facilities
- Nonsignificant Municipal Facilities
- Combined Sewer Overflows
- Significant Industrial Facilities
- Nonsignificant Industrial Facilities
- Negligible Industrial Wastewater Discharges

Developed Lands & Industrial

- Regulated Sectors – Stormwater - Associated with Industrial Activity
- Regulated Sectors – Stormwater - Mining Discharges
- Regulated Sectors – Stormwater - Construction Stormwater General Permit
- Regulated Sectors – Stormwater - Municipal Separate Storm Sewer Systems (MS4s)
- Non-regulated Sectors – Developed Lands

Agriculture

- Agriculture -- General
- Regulated Sectors: CAFO/AFO

Forestry

Each sector includes the following subjects: Current Programs and Capacities, Accounting for Growth, Gap Analysis, Strategy to Fill the Gaps, Contingencies, and Tracking and Reporting Protocols.

SECTION 3. INTRODUCTION

The Chesapeake Bay is a national and local treasure, and an important source of livelihood, recreation and cultural heritage for the region. However, after receiving pollution from the surrounding landscape for many years, the Bay is in trouble. The states in the Chesapeake Bay watershed – Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia – along with the District of Columbia and the U.S. Environmental Protection Agency have come together to find solutions to the Bay’s problems. They have determined that the key to restoring the Bay’s health entails reducing the flow of nutrients (nitrogen and phosphorus) and sediment flowing from the Bay states into the Bay, and have set maximum amounts for nitrogen, phosphorus and sediment, known as Cap Load Allocations (hereafter referred to as CLAs or Cap Loads), for each of the jurisdictions.

West Virginia’s role in this process began when Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding on June 18, 2002, making West Virginia, along with New York and Delaware, a Headwaters Partner in the Chesapeake Bay Program. With the agreement, West Virginia gained a seat at the Chesapeake Executive Council, a voice in deciding how best to achieve the Program’s goals, and demonstrated its intent to significantly improve water quality by establishing and implementing strategies to meet voluntary goals and objectives to reduce nutrient and sediment loads.

Bay Program partners agreed at that time to develop and carry out cooperative and voluntary Tributary Strategies to reduce existing pollutant loads to the CLA levels by the year 2010. The Chesapeake Bay Program determined that load reductions of 33% for nitrogen, 35% for phosphorus, and 6% for sediment would be required of West Virginia.

It was understood that failure to achieve the necessary reductions by 2010 would lead the U.S. Environmental Protection Agency to begin developing a Total Maximum Daily Load (TMDL) for the Chesapeake Bay, a process that would place significant additional restrictions on pollution sources in all the Bay States, including headwaters states like West Virginia. A TMDL sets forth a pollution budget for a watershed that allocates the amount each pollutant source is allowed to release while still attaining water quality standards.

The West Virginia Potomac Tributary Strategy was developed in 2003-2004 using a Potomac Basin stakeholder process. Anyone with a “stake” in the outcome was invited to take part, and individuals representing counties, municipalities, industry, agriculture, developers, environmental organizations, and state and regional governments all participated. This Tributary Strategy provided the framework for a comprehensive planning process to equitably reduce the flow of nutrients and sediment loads to the Potomac River, and ultimately to the Chesapeake Bay. The WV Potomac Tributary Strategy document also provided substantial background information that is not repeated in this document; it is available for download at: <http://www.wvca.us/bay/documents.cfm>. The implementation deck associated with the strategy included pollution reduction practices implemented from 1985 through those

expected to be implemented by 2010.

Following development of West Virginia's Strategy document and proposed implementation deck, the WV Potomac Tributary Strategy Team moved into an implementation phase designed to refine the original proposal, begin actively implementing the Tributary Strategy, and enhance support for and input on the process through a series of public meetings. One result of that public process was the WV Potomac Tributary Strategy Implementation Plan, first submitted to the USEPA in December 2005, and last revised in June 2007. The Implementation Plan summarized actions to be taken from 2004 through 2010 to meet West Virginia's Cap Load, plus a "Cap maintenance strategy" that explains how Cap loads will continue to be honored in the face of population growth and other expected changes in the region.

In 2008, in recognition that pollution reduction goals were not being met, the federal and state governments determined that shorter-term milestones would improve accountability, accelerate pollution reductions, and increase the likelihood of meeting pollution reduction targets. The first milestones were announced in May 2009. Plans to meet these commitments were laid out over the three years between January 1, 2009 and December 31, 2011.

In May 2009, President Obama issued an Executive Order that ushered in a new era of shared federal leadership, action and accountability. The Order expanded the federal commitment to the Chesapeake region in a move that led agencies to dedicate unprecedented resources to the effort, targeting actions where they can have the most impact. Many of the federal actions will directly support restoration efforts by local governments, nonprofit groups and citizens. The Order also requires that federal lands and facilities lead by example in environmental stewardship. Integral to the Order was the decision for the EPA to proceed with the Chesapeake Total Maximum Daily Load, which would expand regulation of urban and suburban stormwater and concentrated animal feeding operations and increase enforcement activities and funding for state regulatory programs. Finally, the Order gives the EPA enforcement authority if states miss established goals.

The Order highlighted the need for acceleration of progress, sharpened emphasis on explicit actions, and required greater transparency and accountability in these efforts. The six watershed states and the District of Columbia were required to develop and submit **Watershed Implementation Plans** (WIP) as a key element of this approach and in support of the development of the draft and final Chesapeake Bay Total Maximum Daily Load (Bay TMDL). The WIPs will show how the states and the District, in partnership with federal and local governments, will achieve and maintain the Bay TMDL nitrogen, phosphorus, and sediment allocations necessary to meet Bay water quality standards.

The six Chesapeake Bay watershed states and the District of Columbia developed draft Phase I WIPs that were submitted to the USEPA by September 1, 2010. In combination with the two-year milestones and follow-up progress reports to the public, these plans respond to the heightened expectation within Executive Order 13508: Chesapeake Bay Protection and

Restoration to create a new accountability framework that guides local, state and federal water quality restoration efforts.

WIP strategies are directed to have controls in place by 2025 that will achieve target loads, and by 2017 that will result in 60% of necessary nutrient and sediment reductions compared to current loads. The WIP strategies address existing as well as new or expanded sources of nutrients and sediment.

West Virginia submitted an incomplete draft Phase I WIP on September 1, 2010 that was advertised by EPA concurrently with the Draft TMDL. In contrast to the draft, this revised Phase I WIP is based upon allocation scenarios that the Chesapeake Bay Watershed Model (CBWM) predicts will achieve 2017 and 2025 goals for West Virginia. The CBWM uses mathematical models to simulate changes in the Bay ecosystem due to changes in population, land use, or pollution management. These simulations are not the same as actual conditions, but represent the best scientific estimate of what average loadings are likely to be. The revised WIP also includes more detailed descriptions of planned actions and contingencies necessary to demonstrate reasonable assurance that proposed pollutant reductions will be achieved.

A Phase II WIP, due to be completed by November 2011, will follow CBWM revisions to correct known deficiencies and will represent a refinement of Phase I that will include more detailed, local information. Future CBWM refinement and reassessment are again planned in 2017. At that time, the jurisdictions will develop Phase III WIPs to ensure attainment of Caps loads by 2025.

SECTION 4. DEVELOPMENT OF PHASE I WATERSHED IMPLEMENTATION PLANS

The WV WIP Development Team (WV-WIPDT) is comprised primarily of representatives from WV Department of Environmental Protection (WVDEP), WV Department of Agriculture (WVDA), WV Conservation Agency, WV Division of Forestry, Cacapon Institute, and The Conservation Fund's Freshwater Institute. This core group has been directing the development and implementation of strategies since the first Potomac Tributary Strategy was completed in 2005. While the entire WV-WIPD Team was responsible for developing the Watershed Implementation Plan in cooperation with other organizations in the state, the creation of the "input deck" that outlines WV's responsibilities for reducing and maintaining their Cap Load was the responsibility of WVDEP along with WVDA and related agricultural organizations. WVDEP's Potomac Basin Coordinator led this effort and was responsible for coordinating outreach to all the sectors impacted by the WIP.

Along with all of the other jurisdictions with waters flowing into the Chesapeake Bay, WV has been assigned a Cap load (see Figures 1, 2 & 3). The combined Cap Load for all the jurisdictions represents an overall pollution "diet" that the Chesapeake Bay requires to become healthy again. WV's Cap Load is a budget for nitrogen, phosphorus, and sediment limits for WV's portion of the Potomac Basin. For each of these pollutants WV has to develop a strategy to reduce the current pollutant load down to the level of the Cap Load as well as derive a strategy on how that Cap Load will be maintained. To do this, we must first know what the current load is (2009 Progress), what the future loads will be, and which pollutant sources are responsible for generating those loads.

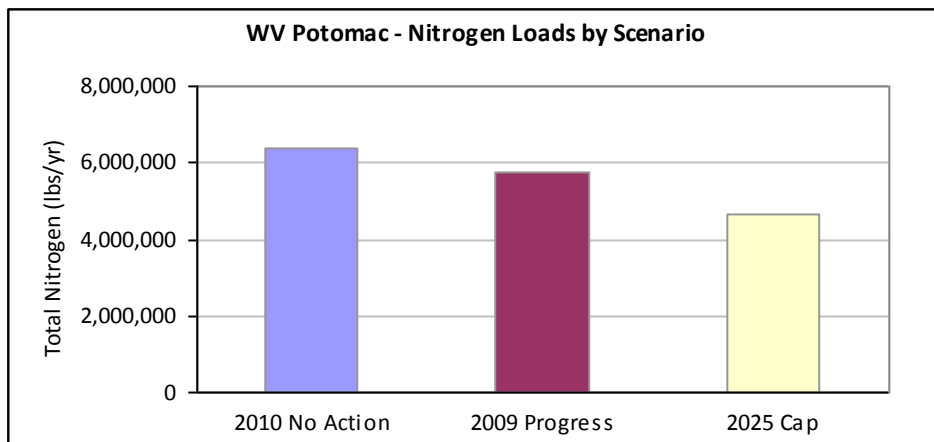


Figure 1. Nitrogen loads delivered to the Chesapeake Bay from West Virginia. 2010 No Action is the nitrogen load that would have been delivered to the Bay by West Virginia without past and current programs. 2009 Progress is the progress made by West Virginia in reducing nitrogen loads through 2009. 2025 Cap is the target delivered load.

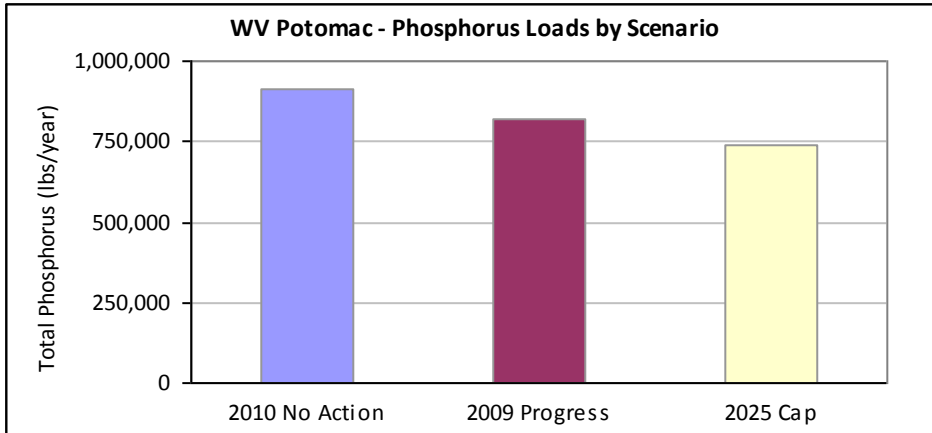


Figure 2. Phosphorus loads delivered to the Chesapeake Bay from West Virginia. 2010 No Action is the phosphorus load that would have been delivered to the Bay by West Virginia without past and current programs. 2009 Progress is the progress made by West Virginia in reducing phosphorus loads through 2009. 2025 Cap is the target delivered load.

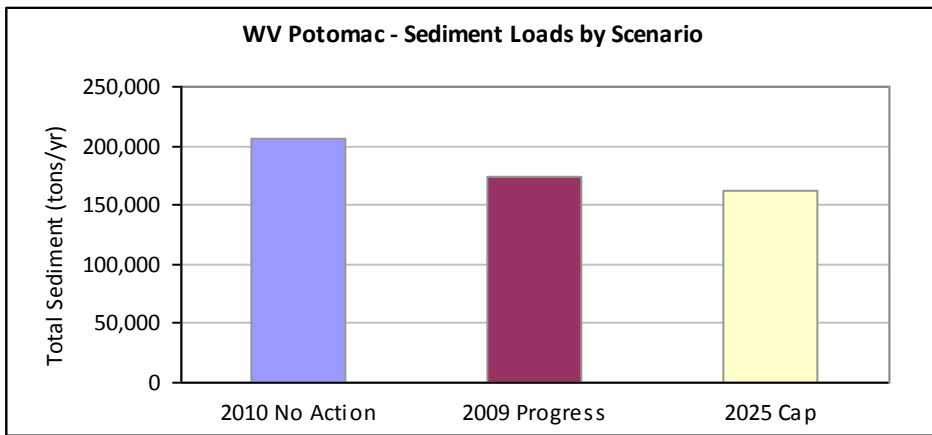


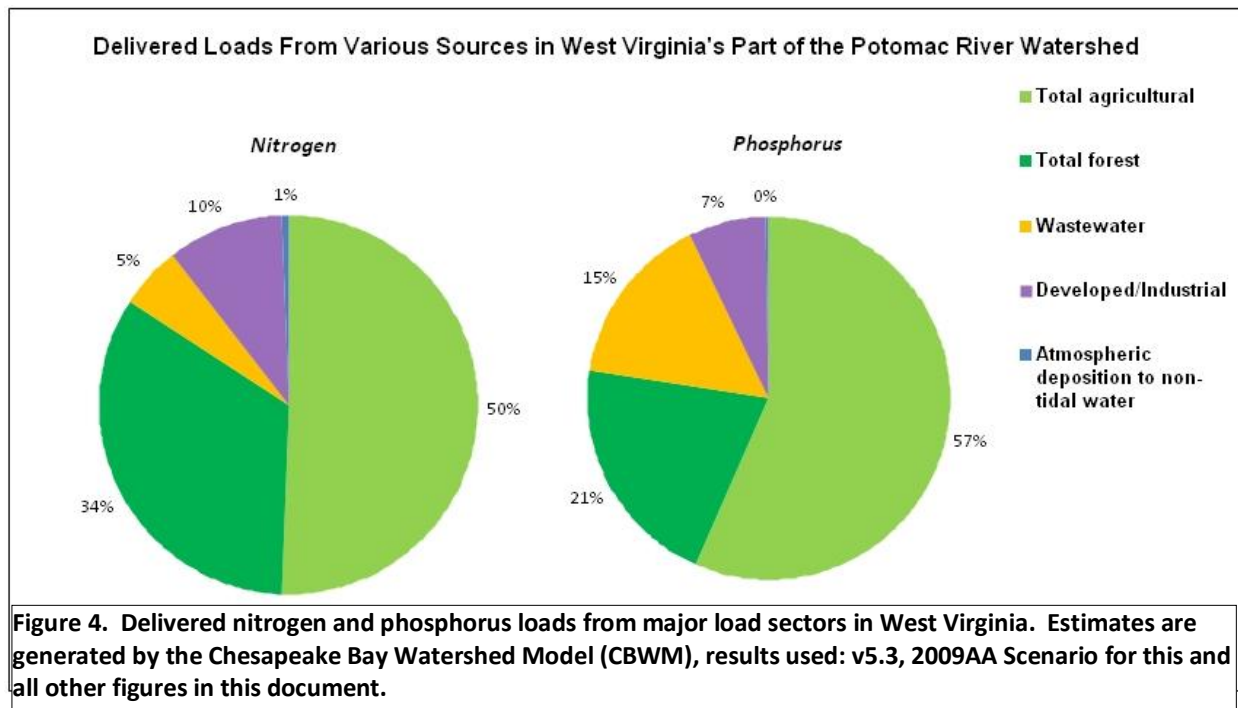
Figure 3. Sediment loads delivered to the Chesapeake Bay from West Virginia. 2010 No Action is the sediment load that would have been delivered to the Bay by West Virginia without past and current programs. 2009 Progress is the progress made by West Virginia in reducing sediment loads through 2009. 2025 Cap is the target delivered load.

Current and future pollutant load estimates are generated by the Chesapeake Bay Watershed Model (CBWM) and broken down into land uses (sources) and locations. Examples of land use are pasture and developed land. Each of these land uses has a pollution load associated with it. The location part of the equation can best be thought of as a watershed. The CBWM breaks the Potomac Basin down into numerous watersheds each having their own unique characteristics that reflect how they impact the Bay.

The pollutant sources which are responsible for generating loads are grouped into “sectors.” For the purposes of this document, the major load sectors in West Virginia are Wastewater, Developed Lands and Industrial, Agriculture, Forest, and Other (see introductions to Sections 6-9, and Appendix C). Some of these sectors are regulated and some are not. Furthermore, some

sources within a sector may be regulated while the rest of sources within that sector are not. An example would be stormwater runoff from construction sites. This source is regulated by permits while other sources such as runoff from lawns are not. All point sources are regulated. Point sources are divided into industrial and municipal categories. Taken together the entire load from developed lands includes that from urban and residential runoff, septic systems and municipal wastewater treatment plants. Sources are also categorized into point and nonpoint pollution. Point sources are facilities, typically wastewater treatment plants, that discharge directly from a pipe (point), whereas nonpoint sources are sources that comprise runoff generated by rainfall.

The Chesapeake Bay Watershed Model categorizes loads into “edge-of-stream” and “delivered”. An edge-of-stream load, as the term suggests, is the amount of pollutant that enters the stream in the locality of the pollutant source. A delivered load is the proportion of the edge-of-stream load that ultimately reaches the Chesapeake Bay. For nitrogen, the delivered load decreases as you get farther away from the Bay. Thus, one pound of edge-of-stream load from Jefferson County has a much greater impact than a pound of edge-of-stream load from Hardy County (see delivery factor maps in Appendix D). The difference between edge-of-stream and delivered loads affects the overall cost and efficiency of implementing



pollution reductions. Because of its proximity to the Chesapeake Bay, it is much more cost effective to reduce nitrogen from Jefferson County than it is from counties farther away from the Bay. Looked at another way, Berkeley and Jefferson counties have a much greater impact on the Bay than other counties in the Potomac Basin because of their proximity to the Bay.

Figure 4 provides the delivered loads of nitrogen and phosphorus from the major load sectors in West Virginia, based on load estimates are generated by the Chesapeake Bay Watershed Model (CBWM). That portion of the total load delivered from forested lands is, for the most part, unaddressable, which means that the necessary reductions in pollutant loads must come from the other load sectors.

Once the Cap Load and current loads are known an “input deck,” or scenario, is developed. The input deck takes current loads provided by the CBWM and then assigns controls or practices to these loads that will result in pollution reduction. Each of the controls entered in the input deck reduces the pollutant load by an amount specific to that particular control. The challenge in developing an input deck is to come up with a suite of practices that can realistically be implemented by 2025 and that will not cost too much.

Once the input deck is completed, it is input into the CBWM, which then outputs the pollution reductions resulting from the controls outlined in the input deck. If the input deck is successful it will contain the outline for implementation, if not, another one has to be submitted until the Cap Load is attained.

At the time of the draft Phase I WIP West Virginia had proposed management actions to be implemented through 2017. The model predicted that the nitrogen and phosphorus pollutant reductions associated with those actions were sufficient to achieve 2017 goals. However, the actions proposed in the draft Phase I WIP did not achieve the 2025 Cap Loads.

Subsequently, West Virginia refined the model input deck and, after several iterations, arrived at two scenarios for which the model predicted attainment of 2017 and 2025 goals. The first scenario, (WVWIP4N090910 aka “WV 2017 Scenario”) is based upon planned point source controls and implementation of Best Management Practices (BMPs) through 2017 and greatly exceeds the pollutant reductions needed to achieve 2017 goals (Table 1). The second scenario (2010WVWIP6N110410 aka “WV 2025 Scenario”) adds additional BMP implementation planned between 2017 and 2025 and reduces pollutant loads below 2025 Cap Loads (Table 2). Both successful scenarios are contingent upon plans to reduce phosphorus loads more than necessary to attain phosphorus goals and the exchange of a portion of the phosphorus Cap Load to the nitrogen Cap Load at a ratio of 5 #/yr N to 1#/yr P. Tables 1 and 2 display the outputs of each scenario with respect to applicable goals.

The large surpluses associated with the WV 2017 Scenario provide assurance that planned pollutant reductions over the next seven years will achieve the 2017 goals and may provide a sufficient buffer to counter uncertainty associated with model refinements for the Phase II WIP. The strategies outlined in the following sections provide an overview of how loads will be reduced and maintained over the next fifteen years to meet Cap Loads. Contingencies are also provided should future two-year milestone assessments demonstrate inadequate progress.

Table 1: WV 2017 Scenario

Pollutant	Cap Load	2009 Progress	2017 Goal	Scenario Result	Deficit / Surplus	P Exchange	Surplus*
	#/yr	#/yr	#/yr	#/yr	#/yr	# /yr	#/yr
Nitrogen	4,684,284	5,773,932	5,120,143	5,321,430	-201,287	NA	0
Phosphorus	746,790	833,053	781,295	654,985	126,310	40,257**	86,053
Sediment (tons/yr)	170,176	187,562	177,130	160,112	17,018	NA	17,018

* Display represents P exchange to the extent necessary to meet 2017 N goal; the exchange amount can be varied to ensure Cap Load attainment for both parameters.

** Phosphorus exchange at 5N:1P offsets 201,287 #N/Yr

Table 2: WV 2025 Scenario

Pollutant	Cap Load	Scenario Result	Deficit / Surplus	P Exchange	Surplus*
	#/yr	#/yr	#/yr	#/yr	#/yr
Nitrogen	4,684,284	5,452,219	-767,935	NA	0
Phosphorus	746,790	590,378	156,412	153,587**	2825
Sediment (tons/yr)	170,176	150,060	20,116	NA	20,116

* Display represents P exchange to the extent necessary to meet 2017 N goal; the exchange amount can be varied to ensure Cap Load attainment for both parameters.

** Phosphorus exchange at 5N:1P offsets 767,935 #N/Yr

As far back as Tributary Strategy development in 2004, West Virginia has never targeted pollutant reductions in the small, remote, rural area associated with the West Virginia portion of the James River watershed. In that watershed, 88% of the approximate 49,000 acres are forested, with the remaining area primarily comprised of hay and pasture land uses. The pollutant loadings from the West Virginia James watershed (<1% and <2% of WV’s delivered N and P loads, respectively) are a very small component of West Virginia Cap Loads and have negligible impacts to water quality of the tidal James River and the Chesapeake Bay mainstem. For those reasons, the WV Phase I WIP did not prescribe pollutant reductions in the James watershed. Instead, WVDEP more practically focused efforts in the Potomac watershed that, when accomplished, achieve statewide Cap Loads.

During their review of the draft Phase I WIP, EPA representatives told West Virginia that the WIP must attain Potomac River watershed-specific and James River watershed-specific Cap Loads in addition to the state-wide Cap Loads. By design, Potomac watershed-specific Cap Loads are attained and, as demonstrated in Tables 1 and 2, the proposed reductions in the Potomac accomplish statewide goals. Also, the proposed actions accomplish 2017 goals which are only intended at the statewide scale. Because West Virginia did not propose pollutant reductions from any sources in its James River watershed, small deficits for all parameters of concern remain.

Although the Phase I WIP does not specifically prescribe pollutant reductions in the James River watershed, pollutant reductions are nonetheless expected through implementation of local TMDLs. EPA has approved bacteria TMDLs for a subset of streams in the watershed and a

Watershed Based Plan for their implementation is in the preliminary stages. The local TMDLs prescribe fecal coliform bacteria reductions for agricultural nonpoint sources and any implemented BMPs will also provide nutrient and sediment reductions. As discussed at the end of Section 8A, West Virginia agricultural agencies will direct resources to the implementation of the local TMDLs and will track and report applicable BMP implementation.

The small deficits in the James watershed may also be overcome if West Virginia transfers a portion of the extra phosphorus and sediment granted by EPA to West Virginia in the Cap Load process from the Potomac watershed to the James watershed. As existing, all of those loads have been applied in the Potomac watershed, and at the statewide scale, the West Virginia 2025 Scenario affords phosphorus and sediment reductions in excess of those necessary to attain Cap Loads. Redistribution would result in watershed-specific Cap Load attainment for both watersheds as demonstrated in Tables 3 and 4.

Table 3: Potomac Watershed Cap Load Assessment

Pollutant	Cap Load	2025 Scenario Result	Deficit / Surplus	P Exchange	Deficit / Surplus	Available for James
	#/yr	#/yr	#/yr	#/yr	#/yr	#/yr
N	4,666,583	5,425,631	-759,048		0	0
P	737,038	578,885	158,153	151,810	6,343	6,343
Sed (tons/yr)	161,853	135,564	26,289		26,289	26,289

Table 4: James Watershed Cap Load Assessment

Pollutant	Cap Load	2025 Scenario Result	Deficit / Surplus	Apply from Potomac Surplus	Deficit / Surplus	Apply / Exchange from Potomac Surplus	Deficit / Surplus
	#/yr	#/yr	#/yr	#/yr	#/yr	#/yr	#/yr
N	17,701	26,588	-8,887	0	-8,887	NA	0
P	9,752	11,493	-1,741	1,741	0	1,778	2,825
Sed (tons/yr)	8,323	14,496	-6,173	6,173	0	NA	20,116

EPA and West Virginia agree that it is more prudent to concentrate near-term implementation activity in the Potomac watershed where impacts are more significant. Because 2017 goals are being achieved pursuant to state-wide Cap Loads, James watershed implementation could be targeted for the 2017 to 2025 time period. That notwithstanding, West Virginia will reevaluate the distribution of loads between the two watersheds and quantify expected pollutant reductions associated with local TMDL implementation in the James watershed in the Phase II WIP development process.

The WIP strategies outlined below provide an overview of how loads will be reduced to meet West Virginia’s statewide Cap Load by 2025 and then maintain our pollutant loads at that Cap Load going into the future. Maintaining Cap Loads will be particularly challenging for the Developed Lands sector, as it will continue growing into the future. As new lands are developed this increases the amount of pollution reaching the Bay. Therefore, if we are to maintain our Cap Load, we must offset these new loads by reducing loads somewhere else on

the landscape. Once our Cap Load is met, we will not be able to add any more pollution to the Bay.

SECTION 5. Point and Nonpoint Sources

Pollution is usually described as coming from either a point source or a nonpoint source. Point source pollution comes from an easily identifiable place - like a factory or a sewage treatment plant, and enters the environment at a clearly identifiable location – like a pipe or a smokestack. The flow of pollutants from point sources is regulated by the state and federal governments by means of National Pollutant Discharge Elimination System (NPDES) permits, is fairly constant and predictable, and control measures can be applied at the source.

Nonpoint sources of pollution are more difficult to control and assess than point sources because they are everywhere - they include streets, parking lots, lawns, farm fields, barnyards, and construction sites. The flow of pollutants from nonpoint sources is less predictable than point sources, and mostly occurs when rain and snowmelt wash the surface of the land and carry pollutants via surface runoff and groundwater paths to streams, rivers, lakes, and oceans.

Within this TMDL, wasteload allocations must be granted for the pollutant loads associated with the WV/NPDES permitted point source discharges from a myriad of activities, including:

- Individual WV/NPDES permits for the effluents of sewage treatment facilities and authorized collection system overflows
- Individual WV/NPDES permits for discharges from industrial facilities with potential to discharge nitrogen and phosphorus
- Individual and general WV/NPDES permits (and associated SMCRA based permits) for discharges from mining activity
- Registrations under General WV/NPDES permits for small sewage treatment facilities
- Registrations under the Multi-Sector Stormwater General Permit (stormwater associated with industrial activity)
- Registrations under the Construction Stormwater General Permit (stormwater associated with construction activity)
- Registrations under the MS4 General Permit (stormwater associated with Municipal Separate Storm Sewer Systems)
- Individual permits for discharges from the production areas of Concentrated Animal Feeding Operations (CAFO)

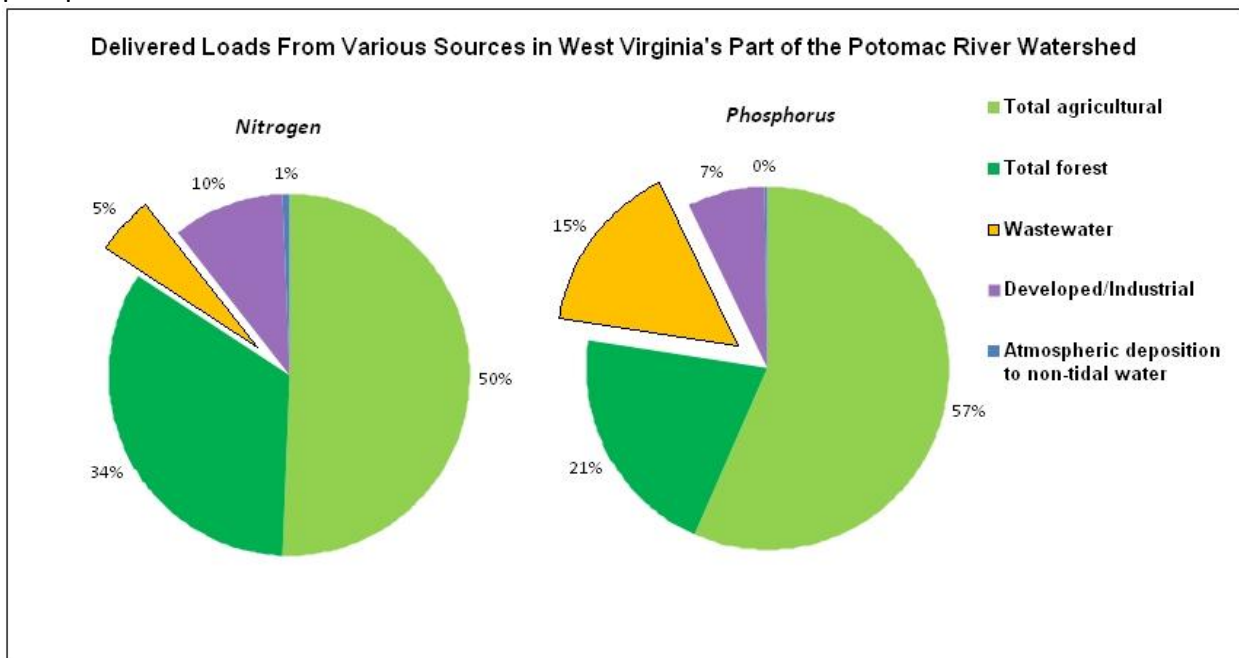
The following sections provide a description of the various permit types, TMDL allocations and implementation approaches to reduce both point and nonpoint nutrient and sediment sources from West Virginia that impact the Chesapeake Bay.

SECTION 6. Wastewater

Wastewater Section at a Glance

For the purposes of this document, “wastewater” refers to the wastewater from municipal and industrial point sources that is controlled via National Pollutant Discharge Elimination System (NPDES) permits. It includes: Significant Municipal Facilities; Nonsignificant Municipal Facilities, Combined Sewer Overflows (CSO), Significant Industrial Facilities, Nonsignificant Industrial Facilities, and Negligible Industrial Wastewater Discharges.

According to the Chesapeake Bay Watershed Model, the “wastewater” sector is responsible for five percent of the total delivered nitrogen load and fifteen percent of the total delivered phosphorus load.



Summary Actions:

Wastewater- Allocation

- Significant facilities reduce to loads based upon existing design flow and 5 mg/l N and 0.5 mg/l P (Apps. A.1 and B.1)
- Significant facility implementation via individual wasteload allocation
- Nonsignificant facilities held to existing loads (Apps. A.4 and B.2); implementation via grouped wasteload allocation
- Eliminate anhydrous ammonia use as a treatment chemical by mining sources (App. B.4)
- 85% Combined Sewer Overflows reduction (App. A.5)

Wastewater - Accounting for growth

- 100% offset for all new loads for permitted facilities of any size
- Can offset by:
 - Better treatment of existing source
 - Assimilation of other sources
 - Other mechanisms under future trading/offset program

Tracking and Reporting

- Significant facilities compliance status via Discharge Monitoring Reports through Permit Compliance System (PCS)
- Existing nonsignificant compliance status assumed = baseline condition, simply verify a component wasteload allocation at reissuance and report baseline condition
- All new/increased facilities' compliance status individually tracked
- CSO via number of overflows in annual reports
 - 0 = 100% reduction from 2010NA
 - < 6 = 85% reduction from 2010NA
 - 6 = 0% reduction

SECTION 6A. Significant Municipal Facilities

Significant municipal facilities are those sewage treatment systems with existing permitted flows greater than or equal to 0.4 million gallons per day (MGD). Appendix A.1 provides a list of facilities and includes all pertinent location, loading and Bay delivery information. Individual, edge-of-stream, average annual, wasteload allocations are prescribed based upon each facility's current permitted discharge flow and total nitrogen and total phosphorus effluent concentrations of 5 mg/l and 0.5 mg/l, respectively.

6A.a. Current Programs and Capacity

In 2005, WVDEP began imposing permit conditions in WV/NPDES permits as dictated by the provisions of West Virginia's Potomac Tributary Strategy. For significant municipal facilities, the TMDL wasteload allocations are equal to the Tributary Strategy expectations. As such, facilities in this category are currently subject to permit requirements that are generally consistent with the prescribed wasteload allocations. WVDEP will continue implementation of established NPDES permitting, compliance assessment and enforcement protocols to compel compliance with the wasteload allocations. Compliance will be required in the shortest time possible but not later than 2017.

Appendix A.2 provides an assessment of the compliance status of significant individual facilities in 2009. Because wasteload allocations are average annual loads, some facilities are currently attaining compliance without application of targeted nitrogen and phosphorus treatment technologies. Even though effluent nitrogen and phosphorus concentrations exceed those used to calculate wasteload allocations, compliance is being achieved because wastewater flows are less than current permitted flow. This is acceptable, but positive future growth will increase wastewater flows and jeopardize compliance if additional treatment is not provided. Under

existing permit terms and conditions, permittees are responsible for planning and executing treatment upgrades as necessary to maintain compliance.

All existing permits contain flow, total nitrogen and total phosphorus effluent self-monitoring and reporting requirements that will provide the primary basis for compliance assessment. Appendix A.3 displays example permit conditions intended for self-monitoring and reporting pursuant to the nitrogen and phosphorus effluent limitations resulting from the Chesapeake Bay TMDL. WVDEP will conduct regular Compliance Evaluation Inspections and Compliance Sampling Inspections to ensure permittees are properly self-monitoring and reporting. WVDEP will address noncompliance with enforcement actions escalated as necessary to compel compliance in the shortest time period possible.

WV/NPDES permit reissuance protocols provide an additional mechanism for WVDEP to review individual facility performance, reevaluate/revise permit conditions and initiate enforcement actions. WVDEP's NPDES permitting program for existing sources is organized under the West Virginia Watershed Management Framework. All of the 8-digit HUC watersheds in West Virginia are classified into five hydrologic groups. Within each hydrologic group all existing permits expire during the same West Virginia fiscal year (July 1- June 30). Appendix A.2 also displays the permitting schedule for significant municipal facilities pursuant to the Watershed Management Framework cycle.

During the 2009 Legislative Session, the West Virginia Legislature passed Senate Bill 715 which amended Chapter 22 of the West Virginia Code by adding a new section designated §22-11-30, the Chesapeake Bay Restoration Initiative. Senate Bill 715 charged the WVDEP to consider and recommend to the Legislature a program establishing a new and independent source of funding for capital improvements for public facilities made necessary by the imposition of nutrient removal requirements. In collaboration with local stakeholders, WVDEP considered multiple funding mechanisms and made recommendations to the Legislature in June, 2010. The 2011 Legislature will consider those mechanisms to enhance financial assistance for publicly owned treatment works so as to facilitate prompt compliance with NPDES permit requirements resulting from the Chesapeake Bay TMDL.

6A.b. Accounting for Growth

No wasteload allocations are provided for new or expanded discharges from sewage treatment facilities of any size. All such discharges must offset 100% of new loadings and WV/NPDES permits must include enforceable provisions to implement offsets. All offsets should be based upon delivered loads rather than edge of stream loads to ensure accurate accounting. Significant municipal facilities may add treatment processes to mitigate new or expanded discharges within the terms of the TMDL allocation and their NPDES permit. They may also secure offsets by assimilation of existing onsite systems and other existing wastewater treatment systems for which wasteload allocations have been provided.

Additional offset mechanisms may be available upon the development and approval of a trading and offset program. In that regard, Senate Bill 715 also requires the WVDEP to establish a program of nutrient trading and offsets by June 2011. A draft, statewide nutrient trading program has been developed and is described at <http://www.wri.nrcce.wvu.edu/programs/pwqb/index.cfm>. Policy application in the Bay watershed will require consideration of the final TMDL and definition of baseline requirements for credit generation from the agricultural and urban stormwater sectors. In the document prepared pursuant to Senate Bill 715, the WVDEP will explore and define additional offset mechanisms that are consistent with the definitions and common elements described in Appendix S of the TMDL, and will coordinate with EPA to ensure program acceptability. The WVDEP's future trading and offset implementation plans will be described in detail in the Phase II WIP.

6A.f. Tracking and Reporting Protocols

WVDEP has historically used the Permit Compliance System (PCS) to assess the performance of NPDES permittees with respect to effluent limitations. PCS will facilitate efficient and transparent tracking and reporting of significant municipal facility performance pursuant to this effort. Although the intended federal mechanisms for reporting Chesapeake Bay TMDL implementation progress are incomplete at this time, it is assumed that significant municipal facility tracking will incorporate entry of Discharge Monitoring Report data by WVDEP into PCS and the uploading of PCS data into the system ultimately established. Compliance will be assessed simply and regularly by comparing individual facility performance to effluent limitations that are consistent with the prescribed individual wasteload allocations.

Where WVDEP must pursue administrative enforcement actions to compel compliance, that information will also be entered into PCS. This will allow transparent tracking of compliance schedule interim milestones and the attainment of compliance.

6A.g. Compliance

Appendix A.2 provides anticipated compliance dates for all significant facilities. Certain facilities will be compliant upon TMDL issuance and others have projects underway such that compliance is expected in the near future. Upon issuance of the final TMDL, the WVDEP intends to universally evaluate the compliance status of all significant facilities and to initiate administrative enforcement actions to compel noncompliant facilities to pursue corrective actions. Under such actions, compliance with TMDL wasteload allocations will be expected in the shortest time possible but not later than December 31, 2015. Appendix A.2 also displays aggregated loading reductions expected from significant municipal and industrial facilities expected to be accomplished by December 31st of each odd numbered year through 2017.

SECTION 6B. Nonsignificant Municipal Facilities

Nonsignificant municipal facilities are those sewage treatment systems with existing permitted flows less than 0.4 MGD. Appendix A.4 displays the nonsignificant municipal facilities in the Chesapeake Bay watershed and provides pertinent location, loading and delivery information. Grouped, edge-of-stream, annual average wasteload allocations are prescribed at the county scale for non-significant municipal facilities. The grouped wasteload allocations are based upon the summation of individual facility loads at current permitted flow. For the majority of facilities, the total nitrogen and total phosphorus default concentrations of the “2010 No Action” (2010NA) model scenario (18 mg N/l and 3 mg P/l) were used in the individual facility load calculations. Total nitrogen and total phosphorus concentrations of 5 mg/l and 0.5 mg/l, respectively, were used in the individual facility load calculations for nine facilities. Those facilities were initially permitted after WVDEP began Tributary Strategy implementation and their initial WV/NPDES permits included mass limitations based upon those concentrations and required installation and operation of treatment facilities necessary to achieve them. Pollutant reductions are not prescribed by the wasteload allocations for any existing facilities in this subcategory.

6B.a. Current Programs and Capacity

A small number of facilities in this subcategory operate pursuant to individual WV/NPDES permits. The remaining facilities, representing the vast majority of sources, 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.

WVDEP performed a detailed evaluation of the existing permitted facilities meeting the nonsignificant municipal definition and provided wasteload allocations that are intended to allow continued permitting of those existing sources without pollutant reductions. TMDL implementation will simply be accomplished through the verification of an Appendix A.4 component loading for existing discharges at the time of permit reissuance. During the public comment period for the draft TMDL, WVDEP determined two facilities were mistakenly omitted in the draft Phase I WIP and has subsequently updated Appendix A.4 to include wasteload allocations for them. The combined, additional delivered loads associated with the wasteload allocations for the omitted permits (1230 #N/yr and 160 #P/yr) do not jeopardize attainment of 2017 or 2025 goals. Those wasteload allocations will be formally included in the model input deck associated with the Phase II WIP.

The level of performance associated with the wasteload allocations for nonsignificant municipal facilities is different than Tributary Strategy expectations for existing facilities sized between 0.05 MGD and 0.4 MGD. Nitrogen and phosphorus effluent limitations have been imposed in existing permits for a subset of those facilities based upon Tributary Strategy implementation.

Permit requirements may be modified (relaxed) so as to be consistent with each facility's component load identified in Appendix A.4.

6B.b. Accounting for Growth

No wasteload allocations are provided for new or expanded discharges from sewage treatment facilities of any size. All such discharges must offset 100% of new loadings and WV/NPDES permits must include enforceable provisions to implement offsets. Nonsignificant municipal facilities may secure offsets by improved treatment of existing discharges and/or by assimilation of existing onsite systems and other existing wastewater treatment systems for which wasteload allocations have been provided. Additional offset mechanisms may be available upon the development and approval of a trading and offset program. New or expanded municipal discharges of any size will require regulation under an individual WV/NPDES permit to implement offset provisions and allow tracking and reporting. All offsets should be based upon delivered loads rather than edge of stream loads to ensure accurate accounting.

6B.f. Tracking and Reporting Protocols

Because existing facilities are provided wasteload allocations based upon the default concentrations of the 2010 No Action (2010NA) scenario and pollutant reductions are not required, individual facility performance tracking and load reporting is not generally intended. Without expansion, all facilities will be assumed to be contributing loadings authorized by the wasteload allocations and reported as such. If new or expanded sources with discharges less than 0.4 MGD are permitted in the future, they will be classified as significant facilities and subjected to individual tracking and reporting consistent with the provisions for existing significant facilities. Upon the request of permittees or future trading partners, existing individual nonsignificant municipal facilities may be classified and tracked as significant municipal facilities, provided that acceptable flow measurement and nutrient self-monitoring capability is demonstrated. If existing sources are reclassified or eliminated through assimilation by another facility, then their component loads will no longer be included in reported nonsignificant municipal loadings.

SECTION 6C. Combined Sewer Overflows

Appendix A.5 displays Combined Sewer Overflow (CSO) facilities in the Chesapeake Bay watershed and provides location, loading and delivery information. Individual, edge-of stream, average annual, wasteload allocations are prescribed based upon an 85% reduction of the loads represented in the 2010NA scenario.

6C.a. Current Programs and Capacity

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 facilities are required to implement six “minimum controls” and to develop Long Term Control Plans that lead to compliance. 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 subject facilities have implemented significant CSO controls and all are recently reporting activity at less than six overflows per year. Only maintenance of existing conditions is necessary pursuant to Chesapeake Bay TMDL implementation.

6C.b. Accounting for Growth

Not applicable as CSO loading will only decrease in the future. WVDEP will not authorize construction of combined collection systems nor permit overflows from newly constructed systems.

6C.f. Tracking and Reporting Protocols

WV/NPDES permits require the 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 loadings is not practical. Reporting will be based upon an assumption that control that achieves less than six overflows per year is commensurate with an 85% reduction of CSO load. Facilities that report less than six overflows per year will be reported at 15% of 2010NA edge of stream loads. Zero loads will be reported if a facility reports zero overflows. 2010NA loads will be reported if more than six overflows are reported.

SECTION 6D. Significant Industrial Facilities

Significant industrial facilities are those estimated in the 2010NA scenario to discharge more than 27,000 lb/yr nitrogen or more than 3,800 lb/yr phosphorus. Appendix B.1 provides a list of facilities and includes all pertinent location, loading and Bay delivery information. Individual, edge-of-stream, average annual wasteload allocations are prescribed based upon 2010NA flows and total nitrogen and total phosphorus effluent concentrations of 5 mg/l and 0.5 mg/l, respectively.

6D.a. Current Programs and Capacity

In 2005, WVDEP began imposing permit conditions in WV/NPDES permits as dictated by the provisions of West Virginia's Potomac Tributary Strategy. For significant industrial facilities, the TMDL wasteload allocations are equal to the Tributary Strategy expectations. As such, facilities in this category are currently subject to permit requirements that are generally consistent with the prescribed wasteload allocations. WVDEP will continue implementation of established NPDES permitting, compliance assessment and enforcement protocols to compel compliance with the wasteload allocations. Compliance will be required in the shortest time possible but not later than 2017. Appendix A.2 provides an assessment of the compliance status of significant industrial facilities in 2009.

All existing permits contain flow, total nitrogen and total phosphorus effluent self-monitoring and reporting requirements that will provide the primary basis for compliance assessment. Appendix A.3 displays example permit conditions intended for self-monitoring and reporting pursuant to the nitrogen and phosphorus effluent limitations resulting from the Chesapeake Bay TMDL. WVDEP will conduct regular Compliance Evaluation Inspections and Compliance Sampling Inspections to ensure permittees are properly self-monitoring and reporting. WVDEP will address noncompliance with enforcement actions escalated as necessary to compel compliance in the shortest time period possible.

WV/NPDES Permit reissuance protocols provide an additional mechanism for WVDEP to review individual facility performance, reevaluate/revise permit conditions and initiate enforcement actions. WVDEP's NPDES permitting program for existing sources is organized under the West Virginia Watershed Management Framework. All of the 8-digit HUC watersheds in West Virginia are classified into five hydrologic groups. Within each hydrologic group all existing permits expire during the same West Virginia fiscal year (July 1- June 30). Appendix A.2 displays the permitting schedule for significant facilities pursuant to the Watershed Management Framework cycle.

6D.b. Accounting for Growth

No wasteload allocations are provided for new or expanded discharges from industrial facilities of any size. All such discharges must offset 100% of new loadings and WV/NPDES permits must include enforceable provisions to implement offsets. All offsets should be based upon delivered loads rather than edge of stream loads to ensure accurate accounting. Significant industrial facilities may add treatment processes to mitigate new or expanded discharges within the terms of the TMDL allocation and their NPDES permit. Offsets may be secured by other mechanisms that may be available upon the development and approval of a trading and offset program.

In that regard, Senate Bill 715 also requires the WVDEP to establish a program of nutrient trading and offsets by June 2011. A draft, statewide nutrient trading program has been

developed and is described at <http://wwwri.nrcce.wvu.edu/programs/pwqb/index.cfm>. Policy application in the Bay watershed will require consideration of the final TMDL and definition of baseline requirements for credit generation from the agricultural and urban stormwater sectors. In the document prepared pursuant to Senate Bill 715, the WVDEP will explore and define additional offset mechanisms that are consistent with the definitions and common elements described in Appendix S of the TMDL, and will coordinate with EPA to ensure program acceptability. The WVDEP's future trading and offset implementation plans will be described in detail in the Phase II WIP.

6D.f. Tracking and Reporting Protocols

WVDEP has historically used the Permit Compliance System to assess the performance of NPDES permittees with respect to effluent limitations. PCS will facilitate efficient and transparent tracking and reporting of significant industrial facility performance pursuant to this effort. Although the intended federal mechanisms for reporting Chesapeake Bay TMDL implementation progress are incomplete at this time, it is assumed that significant industrial facility tracking will incorporate entry of Discharge Monitoring Report data by WVDEP into PCS and the uploading of PCS data into the system ultimately established. Compliance will be assessed simply and regularly by comparing individual facility performance to effluent limitations that are consistent with the prescribed individual wasteload allocations.

Where WVDEP must pursue administrative enforcement actions to compel compliance, that information will also be entered into PCS. This will allow transparent tracking of compliance schedule interim milestones and the attainment of compliance.

6D.g. Compliance

Appendix A.2 provides anticipated compliance dates for all significant facilities. Certain facilities will be compliant upon TMDL issuance and others have projects underway such that compliance is expected in the near future. Upon issuance of the final TMDL, the WVDEP intends to universally evaluate the compliance status of all significant facilities and to initiate administrative enforcement actions to compel noncompliant facilities to pursue corrective actions. Under such actions, compliance will be expected in the shortest time possible but not later than December 31, 2015. Appendix A.2 also displays aggregated loading reductions expected from significant municipal and industrial facilities expected to be accomplished by December 31st of each odd numbered year through 2017.

SECTION 6E. Nonsignificant Industrial Facilities

Nonsignificant industrial facilities are those estimated to discharge non-negligible loads of nitrogen and phosphorus less than the thresholds defining significant industrial facilities. Appendix B.2 provides a list of facilities and includes all pertinent location, loading and Bay delivery information. Grouped, edge-of-stream, annual average wasteload allocations are

prescribed at the county scale for non-significant industrial facilities. The grouped wasteload allocations are based upon the summation of individual facility loads. Individual facility loads are equal to 2010NA representation except where, based upon the judgment of permitting staff, the existing condition is substantively different from 2010NA representation. Pollutant reductions are not prescribed by the wasteload allocations for any existing facilities in this subcategory.

6E.a. Current Programs and Capacity

Some facilities in this subcategory operate pursuant to individual WV/NPDES permits and others are registered under general WV/NPDES permits. WVDEP performed a detailed evaluation of the existing permitted facilities and provided wasteload allocations that are intended to allow continued permitting of those existing sources without pollutant reductions. TMDL implementation will simply be accomplished through the verification of an Appendix B.2 component loading for existing discharges at the time of permit reissuance.

6E.b. Accounting for Growth

No wasteload allocations are provided for new or expanded discharges from industrial facilities of any size. Except as provided in the Negligible Industrial Sources section, all new sources must offset 100% of new loadings and WV/NPDES permits must include enforceable provisions to implement offsets. Offsets may be secured by improved treatment of existing discharges and/or by other mechanisms that may be available upon the development and approval of a trading and offset program. All offsets should be based upon delivered loads rather than edge of stream loads to ensure accurate accounting.

6E.f. Tracking and Reporting Protocols

Because existing facilities are provided wasteload allocations that do not require pollutant reductions, individual facility performance tracking and load reporting is not generally intended. Without expansion, all facilities will be assumed to be contributing loadings authorized by the wasteload allocations and reported as such. If new or expanded non-negligible sources are permitted in the future, they will be classified as significant facilities and subjected to individual tracking and reporting consistent with the provisions for existing significant facilities. Upon the request of permittees or future trading partners, existing individual nonsignificant industrial facilities may be classified and tracked as significant industrial facilities, provided that acceptable flow measurement and nutrient self-monitoring capability is demonstrated. If existing sources are reclassified or eliminated through assimilation by another facility, then their component loads will no longer be included in reported nonsignificant industrial facility loadings.

SECTION 6F. Negligible Industrial Wastewater Discharges

WVDEP has determined that nitrogen and phosphorus are not pollutants of concern for certain industrial WV/NPDES permit types and/or discharge types because they contain negligible nitrogen and phosphorus loadings. Continued discharge is authorized without specific wasteload allocations. Future new discharges of similar types/characteristics are also allowable without specific wasteload allocations. This provision is necessary to avoid use of limited resources in permitting and/or tracking of sources for which no substantive water quality improvement opportunities exist and to avoid unpredictable complications relative to trading and offsets.

Discharges regulated by registrations under the Hydrostatic Testing, Groundwater Remediation and Water Treatment Plant general permits are assumed to contribute negligible total nitrogen and total phosphorus loads, as are boiler blow down, water softener and filter backwash, once through cooling water, and cooling tower blow down waste streams.

In addition to the permit and discharge types identified above, any discharge for which the maximum expected total nitrogen and total phosphorus effluent concentrations are less than 1.3 mg/l and 0.04 mg/l, respectively, may be considered as a negligible source. The thresholds are based upon the average total nitrogen and total phosphorus concentration for West Virginia waters and a general assumption that discharge at or below those levels would reflect no net increase above the pollutant loads expected in intake water.

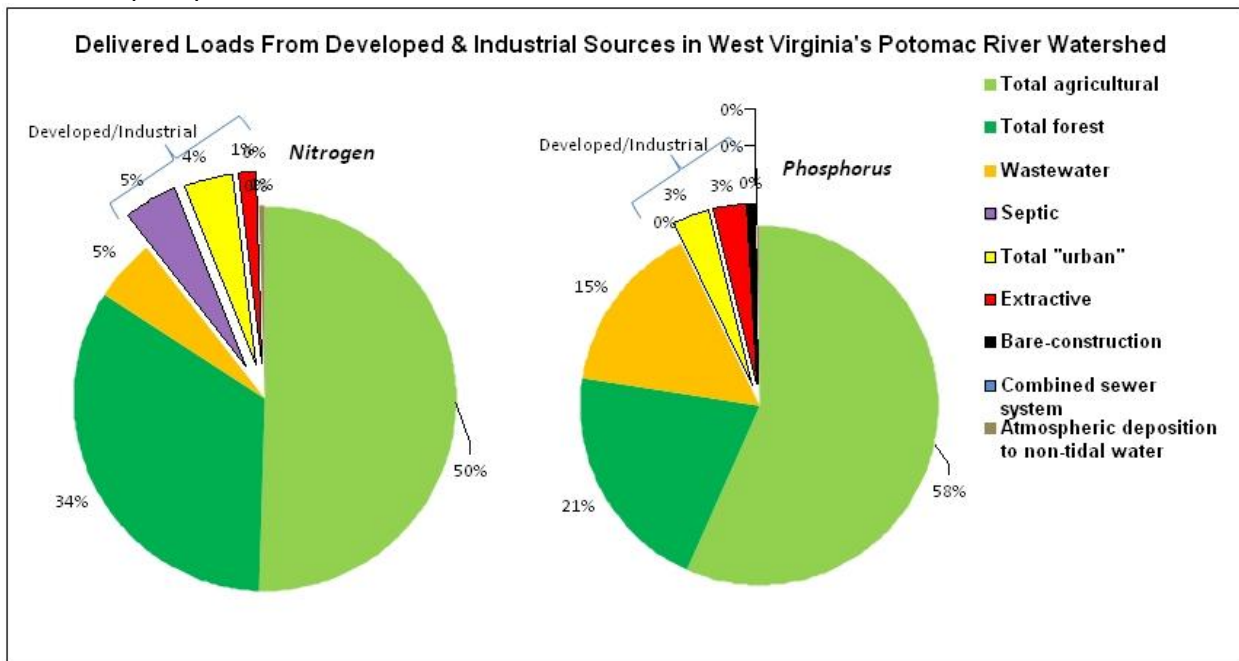
Concerns have been expressed over this categorization of industrial wastewater sources, with suggestion to provide a grouped allocation against which existing loadings can be credited. Such a protocol suggests individual facility flow and pollutant concentration monitoring and agency tracking and reporting. The WVDEP is extremely concerned about the counterproductive use of limited resources in efforts that will not result in substantive pollutant reductions. WVDEP will, however, reconsider this source categorization, the validity of the negligible nature of the referenced permit and wastestream types, the proposed concentration-based thresholds and the grouped allocation concept in its preparation of the Phase II WIP.

SECTION 7. Developed Lands & Industrial

Developed Lands & Industrial Section at a Glance

For the purposes of this document, Developed Lands & Industrial constitutes that portion of the load from developed lands that does not include the “wastewater” load described in Section 6. It includes stormwater from regulated sources subject to NPDES permits, including: industrial, mining, construction stormwater General Permit, Municipal Separate Storm Sewer Systems (MS4s). It also includes non-regulated loads delivered from developed lands, including residential lawns and septic tanks.

According to the Chesapeake Bay Watershed Model, the “developed lands & industrial” sector is responsible for eleven percent of the total delivered nitrogen load and six percent of the total delivered phosphorus load.



Summary Actions:

Regulated Stormwater

- Stormwater Associated with Industrial Activity (App. B.3)
 - N/P loads similar to urban/residential landuse (because of SWPP, GPP, SPCC permit requirements)
 - Obtained location, area, % pervious/impervious info from permitting staff
 - Cropped appropriate areas from urban pervious and urban impervious modeled land uses
 - Allocations = 2010 NA - No reduction required
- Mining NPDES permits (App. B.5)

- Reconfigured model landuse to accurately portray existing permitted area (surface coal mines and quarries)
- Loading reductions from “No Action” commensurate w/ existing permit requirements
- Eliminate anhydrous ammonia use as a treatment chemical by mining sources (App. B.4)
- Construction Stormwater (App. B.6)
 - Reconfigured model landuse to accurately portray existing permitted area
 - Loading reductions from “No Action” commensurate w/BMPs associated with existing permit requirements
 - Decreased acreage overtime (2 yr milestones)
- Municipal Separate Storm Sewer Systems (MS4)
 - Existing = Martinsburg, Berkeley County, WVDOH
 - Allocations for existing MS4s = 2010 NA loads - No reduction required
 - Rainfall capture requirements for new and redevelopment expected to offset new urban stormwater loads from development w/in MS4 and elsewhere in Potomac watershed
 - Future (depending upon 2010 census) – maybe Ranson, Charles Town, Shepherdstown, Jefferson County will be MS4s

Non-regulated Developed Lands

- Allocations = 2010 NA - No reduction required
- Future growth anticipated to be offset by required MS4 controls and voluntary BMPs in non-regulated areas – No net increase from 2010NA from urban lands in Potomac watershed
- LID encouraged in Construction Stormwater General Permit review
- Track area, location, pre-development landuse and BMPs associated w/ new/redevelopment by MS4 annual reports and by CSGP program
- Contingencies (if “no net increase” not achieved; 2015 assessment)
 - Use Residual Designation Authority for MS4 in Jefferson County if 2010 census doesn’t require
 - Pursue statewide Stormwater Management Program with post construction requirements if EPA Nationwide regulations not finalized
 - Required retrofits for MS4
 - Modify CSGP to require post-construction controls in Bay watershed
- WV WIP provides “menu” of strategies to be prioritized on the community level, including for:
 - Local governments
 - Homeowners
 - Septic systems
 - Institutions
 - West Virginia seeks input from the community on these strategies for Phase II WIP development

SECTION 7A. Regulated Sectors – Stormwater - Associated with Industrial Activity

Point source discharges of stormwater associated with industrial activity are regulated by the Multi-Sector Stormwater General Permit (WV011457) 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 Countermeasures Plans. Proper implementation renders stormwater discharges of quality similar to urban stormwater.

The 2010NA model scenario inappropriately categorized loadings from an incomplete list of industrial stormwater sources in the input deck for the wastewater sector. WVDEP permitting staff provided detailed information for all Chesapeake Bay drainage facilities registered under the Multi-Sector Stormwater General Permit and for the stormwater components of individually permitted industrial facilities. Appendix B.3 displays the industrial facilities in the Chesapeake Bay watershed with stormwater regulated by an NPDES permit and provides location and drainage area information and land cover characteristics. At the county scale, WVDEP has assigned appropriate areas of urban pervious and urban impervious land uses to industrial stormwater sources. Grouped, edge-of-stream, annual average wasteload allocations are provided for the stormwater discharges of all facilities identified in Appendix B.3. Pollutant reductions are not prescribed by the wasteload allocations for any existing facilities in this subcategory.

7A.b. Accounting for Growth

Significant growth in this category is not expected. During construction, new stormwater loads would be controlled via the Construction Stormwater General Permit area allowances. No wasteload allocations are provided for new post-construction loads. Depending upon the pre-development land use, offsets may be required. Alternatively, permits may require new sources to maintain pre-development volume/velocity characteristics. All new discharges in MS4 jurisdictions will be subject to the one inch capture and onsite management requirements (see Section 7D).

7A.f. Tracking and Reporting Protocols

DEP will annually report areas of industrial stormwater sources in the format of Appendix B.3.

SECTION 7B. Regulated Sectors – Stormwater - Mining Discharges

The existing stormwater contributions of nitrogen and phosphorus from this subcategory of point sources are generally not appreciable in regard to Chesapeake Bay impacts. However, certain coal mining facilities use anhydrous ammonia as a treatment chemical for pH adjustment which results in nitrogen discharges greater than those of other facilities. Appendix B.4 identifies mining related WV/NPDES permits and outlets for which anhydrous ammonia is currently in use. Zero wasteload allocations are provided for the nitrogen additions associated with the use of anhydrous ammonia. The zero wasteload allocations will be achieved by 2017 by documenting cessation of anhydrous ammonia use. These facilities, and all other mining facilities, are indirectly granted additional, non-zero wasteload allocations for nitrogen and phosphorus under the stormwater-based protocols described in the following sections.

7B.a. Current Programs and Capacity

Mining activities are regulated by two separate permitting programs in West Virginia. Permits issued pursuant to West Virginia Code §22-3 and §22-4 (commonly referred to as Article 3 and Article 4 permits) implement the requirements of the federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) in relation to coal and non-coal (quarries) mining, respectively. WV/NPDES permits are also issued to coal and non-coal mining activities pursuant to West Virginia Code §22-11.

The CBWM provides an “extractive” land use to facilitate representation of mining activity. DEP queried available permit information to quantify the permitted acreage associated with active mining operations. This was accomplished using the PERBD shapefile maintained by the Division of Mining and Reclamation, which spatially locates and provides area information for Article 3 and 4 permits. Appendix B.5 identifies the permitted facilities included in the assessment and provides location and permit bonded area information.

The area of extractive land use provided in the 2010NA scenario is generally consistent with the PERBD derived “permit bonded areas” at the county scale. However, the land cover and pollutant loadings associated with the extractive land use are not representative of expected permitted conditions. Because of contemporaneous reclamation permit requirements, it is not realistic to portray all permitted area as disturbed when, in fact, at any point in time the permitted area includes undisturbed, disturbed and reclaimed components. In West Virginia TMDLs developed by EPA and WVDEP, this is rectified by characterizing permit bonded area as 33% barren, 33% forest and 33% grassland. For the Bay TMDL, the characteristics of permit bonded area are best approximated as 33% extractive and 67% forest, as the forest land use is comprised of both wooded and open land covers. Furthermore, the high nitrogen and phosphorus loading characteristics of the extractive land use are not consistent with the nutrient deficient quality of disturbed lands associated with mining or the fact that stormwater runoff from disturbed mining lands is treated by sedimentation basins subject to technology-based TSS limitations under the NPDES program.

To characterize existing conditions at existing sources, 2010NA forest loading for 67% of permit bonded area was combined with 2010NA extractive land use loading for 33% of the permit bonded area and the extractive component was then reduced by application of the Abandoned Minelands Reclamation BMP (the only BMP available for this landuse). This operation eliminates extractive land use in the model and results in pollutant loadings equal to forest loading associated with permit bonded area.

The above methodology is the best available to represent the erosion and sedimentation controls that are needed to comply with current permit requirements and to characterize existing loading from this subcategory of sources. Other than the aforementioned cessation of anhydrous ammonia use, pollutant reductions are not prescribed by the wasteload allocations for any existing facilities in this subcategory.

Grouped, edge-of-stream, annual average wasteload allocations were intended to be prescribed at the county scale for all facilities in this category. However, WVDEP was advised by EPA that it may not reclassify the loadings from the forest land use within the wasteload allocation in the Phase I WIP. Given this constraint, it should be recognized that each facility identified in Appendix B.5 has been granted a wasteload allocation for its permit bonded area, and attainment of wasteload allocations is assumed for facilities that are otherwise compliant with existing permits. Upon the planned refinement of the model representation of this source subcategory, designation of numerical wasteload allocations will be pursued in the Phase II WIP.

7B.b. Accounting for Growth

In general, the rate of reclamation and permit release is expected to outpace any new coal mining activity. With the majority of existing permit activity associated operations in western Grant and Mineral counties (land segments A54057 and A54023) where delivery factors for both nitrogen and phosphorus are extremely low, delivered new load impacts will be negligible. New and expanded quarry operations are a possibility and may need to offset new loads.

7B.f. Tracking and Reporting Protocols

DEP will provide annual reports of permit activity for mining sources. Reports will document cessation of anhydrous ammonia use at targeted NPDES outlets as it occurs. Total permit bonded area associated with Article 3 and Article 4 permits will be reported at the county scale. The reporting process will subtract areas associated with completely released permits and add areas associated with new permits to the baseline condition shown in Appendix B.5.

SECTION 7C. Regulated Sectors – Stormwater - Construction Stormwater General Permit

The wasteload allocations for this subcategory of sources are based upon the total disturbed area concurrently registered under the Construction Stormwater General Permit (CSGP) and are prescribed at the county scale. Implementation is intended to be accomplished by maintaining total registered disturbed areas equal to or less than the area provided for each county (Appendix B.6). This mechanism is consistent with the approach used in local TMDLs, where construction activities in parts of the Bay watershed have restrictions applicable to the amount of concurrently registered area.

7C.a. Current Programs and Capacity

The Construction Stormwater General Permit (WV0115924) is used to regulate point source discharges of stormwater associated with construction activity. 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

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.

The CBWM provides a “bare construction” land use to facilitate representation of construction activity. Permitting staff provided the current level of activity under the general permit at the county scale in terms of total registered disturbed area. Although current registrations under the permit encompassed more than 14,000 disturbed acres in the Potomac watershed, the 2010 model land use provided less than 500 acres of bare construction. The model mechanism for estimation of the bare construction land is based upon the observed rate of change in impervious land and has obviously failed in the West Virginia portion of the Bay watershed. The bare construction land deficit in the baseline condition of the model necessitated land use reclassification to accommodate the intended wasteload allocation implementation protocol. To rectify this, WVDEP reclassified excess extractive land and existing urban pervious land uses as bare construction land in accordance with the following protocol:

- All assessments were performed at the county scale
- The necessary amounts of extractive and bare construction land uses were determined
- If excess extractive exceeded bare construction need, surplus was converted to forest
- If excess extractive did not attain bare construction need, need was fulfilled by reclassification of pervious urban land use areas

Permitting staff projected future intended decreases in concurrent permitted disturbed area, with implementation goals provided for 2011, 2013, 2015, 2017 and 2025. Those goals served as the basis for the wasteload allocations. Appendix B.6 displays summarized current disturbed area, pre-construction land use types, and future goals for active registrations under the permit.

The longer term reduction goals are substantive and recognize that various existing large scale construction projects (highways, pipe lines) will be completed. Also, current oversight resource constraints allow some sites to continue registration under the permit even though their registered area is not actually disturbed. The operators of some sites accomplish stabilization of disturbed areas that would allow termination of permit coverage but nonetheless do not submit NOTs. Permit coverage for some sites is speculatively attained but construction is not pursued. Future implementation will address those issues and will pursue all available mechanisms to maintain the area caps, including the possibility of delaying registrations of new activity until area becomes available via termination of existing registrations.

Certain mine land reclamation projects conducted by Abandoned Mine Lands and Special Reclamation sections of DEP obtain CSGP registration. As the base activity is included in the extractive land use, the associated areas need not be considered in the CSGP area cap assessment.

7C.b. Accounting for Growth

Growth is not expected within this subcategory, as the implementation plan envisions reduction of the total areas existing in 2010.

7C.f. Tracking and Reporting Protocols

DEP will annually submit information on the level of activity under the Construction Stormwater General Permit. Annual reporting will provide the maximum disturbed concurrently registered area by county that occurred during each calendar year.

SECTION 7D. Regulated Sectors – Stormwater - 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 reissued on June 22, 2009, and effective July 22, 2009. 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 MS4s in the Chesapeake Bay watershed: the City of Martinsburg, Berkeley County and the West Virginia Division of Highways. Data from the 2010 U.S. Census will likely trigger the designation of several additional MS4 operators in the Chesapeake Bay Watershed moving heretofore non-regulated urban stormwater sectors into the regulated arena. These possible areas include the City of Ranson, the City of Charles Town, the Town of Shepherdstown, and Jefferson County. However, quantifiable details on new designations will not be available until after the census data is released. Upon designation, any future MS4 entities will be granted an offset equal to 2010 No Action (NA) loadings for all areas that will be subject to MS4 regulation.

WVDEP is not prescribing pollutant reductions from existing urban stormwater sources, but intends to control new development and redevelopment in MS4 areas to counter increased urban stormwater loads from growth throughout the watershed.

7D.a. Current Programs and Capacity

Statewide Program

West Virginia's MS4 General Permit requires that MS4s develop and submit stormwater management programs (SWMPs) to WVDEP for approval no later than January 22, 2011. The SWMP must include 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 runoff from new development and redevelopment, and pollution prevention and good housekeeping for municipal operations. MS4s must be fully implementing their SWMPs by 2015.

EPA has recognized that West Virginia's MS4 General Permit is particularly progressive with regard to its post construction requirements. The post construction minimum control of the General Permit directs MS4s to develop ordinances requiring all new development and redevelopment of one acre or greater to capture and manage the first one inch of rainfall by utilizing runoff reduction stormwater practices. Runoff reduction practices include: canopy interception, soil amendments, evaporation, rainfall harvesting, engineered infiltration,

extended filtration and/or evapotranspiration and any combination of these practices. The MS4 General Permit also contains a section with strong watershed protection elements that includes non-structural practices to protect water quality. For the remaining, most difficult sites, the permit allows for the MS4 to develop a payment-in-lieu program or offset mitigation to address the runoff reductions.

Redevelopment sites including brownfields, high density, vertical density and mixed use and transit oriented development are provided the incentive (reduction in amount of capture) to capture the first 0.80 inches of rainfall on site with no discharge to surface waters. Each incentive will allow the developer to reduce the amount of stormwater that is required to be managed on site. A maximum reduction of 0.75 inches is allowed (Permit section Part II.C.b.5.ii.A.3.).

West Virginia's current MS4 program consists of the MS4 General Permit and one full time staff person who oversees statewide implementation of that permit, along with all of the programmatic elements of the MS4 program. There is one additional person that will review (as needed) SWMPs submitted to WVDEP for approval under the reissued permit. WVDEP anticipates that the bulk of the SWMPs will be reviewed in 2011.

An engineer will be hired to provide additional technical support to the WVDEP MS4 program. A portion of their time will be work in the MS4 program. The engineer will review the post construction designs for new development and re-development at State and Federal MS4s that are currently "self regulated". State and Federal MS4s include the WV Division of Highways, universities and federal correctional institutions. It is anticipated that this position will be filled no later than the end of 2011.

The first MS4 audit by WVDEP Environmental Enforcement in the Chesapeake Bay watershed took place in August 2010. Audits will be performed once every 5 years thereafter for all MS4s in the state. Permit noncompliance identified in audits will be addressed through appropriate enforcement actions.

Local MS4 Programs

Regulated municipal MS4s in West Virginia have been granted authority by state law to form stormwater utilities in order to finance the implementation of their stormwater programs and the MS4 program. The City of Martinsburg is the only municipally operated MS4 located in the Chesapeake Bay watershed and, to date, has not formed a utility. Berkeley County is currently investigating the establishment of a utility and stormwater fee. A stormwater utility could be a means of achieving TMDL targets.

Lack of adequate resources and support for MS4 staff is a statewide issue. In many MS4 entities, the public works director or the chief operator of the WWTP is tasked with managing stormwater in addition to their existing duties. The City of Martinsburg does not have a full

time stormwater manager dedicated to implementing their stormwater program. In addition, the reissued MS4 General Permit requires a certain level of understanding of runoff reduction practices to manage stormwater. Stormwater management is new to most West Virginia communities, and runoff reduction practices are even newer. MS4 operators have little training in the science of stormwater management, much less implementation of effective stormwater practices. WVDEP does provide some training, but there is much more available from other institutions and organizations. In response to this, WVDEP initiated the following:

- Training workshops sponsored by WVDEP that are open to all parties interested in managing stormwater or implementing the MS4 General Permit
- Contracted with the Center for Watershed Protection to develop a compliance spreadsheet tool for stormwater designers/engineers and MS4s that will ascertain compliance with the one inch capture performance standard. Two workshops scheduled in 2010 provided instruction on using the spreadsheet tool
- Development of a statewide stormwater management guidance manual that will provide design specifications of runoff reduction practices. Runoff reduction practices are the primary method to meet the one inch capture performance standard. The completed scope of work for the manual specifies that each stormwater practice design include a discussion of removal of nutrients, and how the practice can best remove nutrients from stormwater consistent with Chesapeake Bay approved runoff reduction practices. Expressions of Interest were received in July 2010, and the contractor for the manual has been selected. The contract is currently being negotiated. The manual is anticipated to be complete by summer of 2012. During the interim before WV's manual becomes available, WVDEP is recommending that the *Northern Kentucky Stormwater Management Handbook* and *The Prince George's County Bioretention Manual* be consulted
- Plans to fill a position to provide compliance assistance to MS4 communities in the Chesapeake Bay drainage. This employee will promote utilization of stormwater practices that encompass green infrastructure including infiltration, extended filtration, canopy interception, soil amendments, evaporation, evapotranspiration, reuse and any other practices that reduce stormwater volume. The employee will assist the three existing MS4s, counties and consulting engineers in meeting MS4 permit criteria for stormwater management

7D.b. Accounting for Growth

Berkeley County and the City of Martinsburg have enjoyed robust growth over the last few decades. Jefferson County has similarly grown and it is anticipated that the 2010 U.S. Census will trigger the designation of several new MS4 entities in this county. Recent development in

these counties accounts for the majority of urban growth in the West Virginia portion of the Chesapeake Bay watershed and that trend is expected to continue in the foreseeable future. Jefferson and Berkeley counties are closest to the Bay impaired segments and have the highest associated West Virginia nitrogen delivery factors.

Data from WVDEPs construction stormwater permitting program indicates that virtually no development in Berkeley or Jefferson County is occurring on forested lands. In Berkeley County, 75% of new construction is occurring on pasture, 15% on crop land and 10% on low intensity urban land. In Jefferson County, 70% of new construction is occurring on pasture, 20% on low intensity urban land, and 10% on crop land.

Because the pre-development landuses already contribute non-negligible loads, it is reasonable to assume that the implementation of the one inch capture performance standard will, over time, reduce baseline conditions in MS4 areas of responsibility. Furthermore, the relatively higher delivery factors and development rates in those areas will counter growth in the non-regulated areas of the West Virginia portion of the Chesapeake Bay watershed. WVDEP believes that the MS4 requirements coupled with other BMPs implemented in non-regulated areas will be sufficient to attain no net increase in 2010 NA delivered nitrogen and phosphorous loads from urban stormwater sources. The assessment process is described in the Tracking and Reporting Protocols section, below.

7D.c. Gap Analysis and Strategy to Fill Gaps

There will be a period of time between MS4s submitting their SWMPs to WVDEP for review and approval before the runoff reduction practices are put into full implementation. The reissued MS4 General Permit requires that SWMPs be submitted to WVDEP for approval no later than January 22, 2011. Statewide, MS4s are required to implement the runoff reduction one inch capture performance standard within four years of SWMP approval. However, the MS4 General Permit also includes a requirement for MS4s to consider TMDLs and ensure their stormwater management program includes measures specifically targeted to achieving any applicable wasteload allocations. The Chesapeake Bay TMDL wasteload allocations (no increase to 2010 NA loads) will require existing MS4 entities to accelerate implementation of their SWMPs.

Berkeley County has already enacted an ordinance that requires one inch capture, so development occurring in their jurisdiction should already be implementing this standard. The City of Martinsburg has not yet modified their ordinances to reflect the new performance standard, but is required by the new MS4 permit to propose a draft ordinance as a component of their modified stormwater management program.

Newly designated MS4s will be subject to the same runoff reduction requirements of the current permit. Jefferson County and several of the incorporated cities in Jefferson County have ordinances in place to address post construction stormwater discharges. Jefferson County

is revising their ordinance at this time and is working with WVDEP on this revision. For the time period where stormwater discharges from Jefferson County entities are non-regulated, WVDEP will track qualified BMPs that are installed through local authority.

WVDEP will prioritize review of stormwater management programs for MS4s in the Bay watershed and require them to provide a modified program within 6 months to address the WLA in the TMDL. The modification will be reviewed and approved by the WVDEP. WVDEP will also require inclusion in the stormwater management program a plan to accelerate implementation of capture requirements and to track land use conversion that results from development on or after January 1, 2011.

WVDEP's General Permit for Construction Stormwater has a statement which says *"when a permittee is developing structural practices for stormwater control, the permittee shall consider the use of but not limited to: infiltration of runoff onsite; flow attenuation by use of open vegetated swales and natural depressions; stormwater retention structures and stormwater detention structures. The permittee should consider low impact development (LID) in the design of the site and the best management practices. This will allow the site to retain its natural hydrology and infiltrate stormwater within the boundary of the site"*. As part of the review process of the Stormwater Pollution Prevention Plan in areas not subject to MS4 regulation, the WVDEP will encourage practices that reduce post-construction stormwater impacts and will track installation of implemented qualified BMPs. In fact, many of the post-construction controls previously reported and encompassed in the 2009 progress scenario resulted from voluntary implementation encouraged and tracked under the Construction Stormwater permitting program.

WVDEP will develop a statewide stormwater management guidance manual that will provide design specifications of runoff reduction practices by the summer of 2012. Runoff reduction practices are the primary method to meet the one inch capture performance standard. The completed scope of work for the manual specifies that each stormwater practice design include a discussion of removal of nutrients and how the practice can best remove nutrients from stormwater consistent with Chesapeake Bay approved runoff reduction practices.

WVDEP recognizes there is a staffing issue in regards to the Stormwater Program and specifically to the MS4 Section. The Program Manager has sent a proposal to senior management for several new positions to be created to implement the Chesapeake Bay TMDL. These positions are dependent on the necessary funding being available. One source of funding WVDEP will pursue is the Chesapeake Regulatory and Accountability Program grant.

The first position is an engineer to be hired to provide additional technical support to the WVDEP MS4 program. A portion of their time will be work in the MS4 program. The engineer will review the post construction designs for new development and re-development at State and Federal MS4s that are currently "self regulated". State and federal MS4s include the WV Division of Highways, universities and federal correctional institutions. This position would

become a full time member of the Stormwater Program once statewide post construction regulations are implemented in West Virginia.

The second position is an additional permit reviewer whose primary duties would be to assist existing and anticipated new Chesapeake Bay MS4s accelerate the implementation of the runoff reduction requirements of the General Permit for MS4s. This position would also be responsible for the review, comment and approval of the SWMPs for Chesapeake Bay MS4s. This would greatly shorten the time the SWMPs for these MS4s are under review and quicken the implementation of the runoff reduction requirements. The position would also develop training specifically targeted to the Chesapeake Bay MS4s and the Chesapeake Bay TMDL.

The last position proposed is an Environmental Resources Analyst. This position will have duties throughout the Stormwater Program which will include working with the Program Manager to develop a post construction stormwater program and working closely with agency staff responsible for WIP development and implementation tracking. This position will also be the point of contact for the Stormwater Program for all the required reporting for the Chesapeake Bay TMDL.

7D.e. Contingencies

If the incorporated areas of Jefferson County do not qualify as MS4s after the most current census data is released, WVDEP will pursue residual designation authority for those areas within six months.

As detailed in the following section, WVDEP will evaluate the effectiveness of MS4 controls by December 31, 2015. If the no net increase in delivered nitrogen and phosphorus to the Chesapeake Bay from urban areas is not being met, WVDEP will implement these contingencies by December 31, 2017:

- WVDEP will encourage the WV Legislature to enact statewide stormwater management regulations that address post construction impacts outside of MS4 areas. This would ensure a level playing field for all new development across the watershed and help to prevent sprawl in areas where there are no stormwater management regulations. If EPA's nationwide stormwater management regulations are not finalized, the WVDEP will pursue a statewide program. WVDEP will evaluate provisions needed to attain "no net increase" goals and propose an appropriate program to the 2017 West Virginia Legislature.
- WVDEP will require the necessary level of retrofits in Chesapeake Bay watershed MS4s it determines are necessary to attain wasteload allocations. These retrofits will meet the capture requirement of .80 inches of rainfall on site with no discharge to surface waters. Pursuant to Part III.D.1 and D.2 of the existing permit, permittees are required to achieve wasteload allocations of any applicable TMDLs. Upon demonstration of

noncompliance, WVDEP will require SWMP modification to include retrofits. No modification to the MS4 general permit is necessary to implement this contingency.

- As a final contingency, and if statewide post construction stormwater management requirements are not realized, the WVDEP will pursue expansion of the General Permit for Construction Stormwater to require post-construction controls for projects in the Chesapeake Bay watershed. One inch capture requirements similar to the MS4 permit are envisioned. Pursuant to Section G.5 of the Construction Stormwater General Permit, this contingency may be implemented without permit modification. Alternatively, new construction activities may be regulated under an individual permit. Finally, the Construction Stormwater General Permit is scheduled for reissuance in 2017 and the WVDEP will be able to include more specific requirements that it determines are necessary.

7D.f. Tracking and Reporting Protocols

Currently regulated MS4s are required to submit annual reports detailing their progress and implementation of their stormwater management program. The MS4 permit requires permittees to inventory and track stormwater management practices deployed at new development and redevelopment projects. Furthermore, Part III.D.b. of the permit requires MS4s discharging into a water body with an approved TMDL to include monitoring to assess the effectiveness of the BMPs in achieving the wasteload allocations.

WVDEP is currently developing a standardized form for Chesapeake Bay MS4s. This form includes additional information regarding monitoring and tracking of implementation of their runoff reduction practices. Chesapeake Bay MS4s will report the number of acres newly developed/redeveloped, the landuse on which the new development/redevelopment occurred, and the list of runoff reduction practices installed to meet the 1 inch capture requirement. Retrofits would also be included in this reporting.

In processing of registrations under the Construction Stormwater General Permit, the compliance assistance person will track location, developed area and pre- and post construction landuse in non-regulated areas of the Chesapeake Bay watershed. Any qualified BMPs for post construction control that are identified in the CSGP process will also be tracked. The compliance assistance person, in conjunction with the WVDEP's Potomac Basin Coordinator, will communicate with local government entities that are not currently regulated MS4s but nonetheless implement post construction regulations to capture BMP information.

WVDEP will compile and report the additional Chesapeake Bay specific data to EPA. In addition, WVDEP's compliance assistance person will be tasked with developing an inspection protocol to certify that new and existing regulated and non-regulated urban and construction stormwater BMPs are in place and functioning as designed. This compliance assistance person will conduct

annual inspections following the protocol and report to the Chesapeake Bay Program through National Environmental Information Exchange Network (NEIEN).

SECTION 7E. Non-regulated Sectors – Developed Lands

The land uses and sources (considered by the Chesapeake Bay Watershed Model (CBWM)) considered in this section include high- and low-intensity pervious urban, high- and low-intensity impervious urban, and septic systems. Successful reduction of priority pollutants from the non-regulated sector of developed lands depends on voluntary adoption of new land use practices, adoption of new laws and ordinances by state and local governments and an increase in both personnel and financial resources to enable implementation and enforcement. As this non-regulated sector has limited capacity to either deliver programs or enforce actions, we are not calling for a reduction from it at the current time. This section of the WIP will stress holding the line, i.e. no net increase in nutrients generated by new development. However, the need to reduce loads from this sector to meet our Cap Load obligations may necessitate a move from voluntary to mandatory practices in the future, effectively moving some non-regulated lands into the regulated arena. Actions that will be taken in the event that the non-regulated developed lands sector fails to meet the “no net increase” goal are discussed below in the Contingencies section. Any reductions made by this sector on existing developed lands will help offset loads from future development, ultimately aiding in meeting the “no net increase” goal.

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 relative small size of the WV Potomac Basin facilitates outreach as well. Outreach efforts made, for example, at one high school, will, in many cases, reach that age group and many of their families for an entire county.

7E.a. Current Programs and Capacity

Laws and Regulations

West Virginia’s Land Use Planning regulations provide for regional planning entities that cross jurisdictional boundaries. Regular updates of Comprehensive Plans are required as well by these regulations. The counties in the Eastern Panhandle have a limited number of regulations designed to protect water quality. Only Morgan, Berkeley, and Hampshire Counties have stormwater ordinances.

Staffing & Technical Capacity

The WIP is being developed and will be implemented by professional staff from a wide range of state and local governments and NGOs. These will include: WVDEP, West Virginia Conservation Agency (WVCA), West Virginia Department of Agriculture (WVDA), Cacapon Institute, Freshwater Institute, as well as county/municipality planning & engineering staff. Within state agencies, staff dedicated to the WIP effort include:

- The Potomac Basin Coordinator, funded by WV's State Implementation Grant, facilitates the partnership of agencies, non-profits, and other entities that implement these strategies and report to the Chesapeake Bay Program Office. That position has also been able to focus mainly on the Eastern Panhandle counties, where developed lands are expected to increase, and to focus on the developed lands sector and septic systems.
- The Environmental Specialists at WVCA are vital positions to these efforts as well, serving many functions, including 319 Implementation and coordinating with Conservation Districts and individual property owners for on-the-ground implementation.

Programs

West Virginia's current programs include voluntary outreach and education. There is limited financial and limited technical support to get developed lands Best Management Practices (BMPs) on the ground. Specific examples are outlined below. The BMPs installed with these programs and the associated load reductions will help to achieve a no net increase in nitrogen and phosphorus from non-regulated developing lands.

- West Virginia's Section 319 program supports a volunteer monitoring coordinator who conducts several workshops and special monitoring projects in the Potomac Basin annually. His outreach to school groups, watershed associations, and other communities results in better understanding about best practices for landscapes and stream corridors. The 319 program also makes funding available for nonpoint source pollution reduction in streams, through Incremental grants and other opportunities described below. The Potomac Basin Coordinator is the local representative for this program in the Potomac Basin.
- In several priority watersheds, fecal coliform bacteria TMDLs have enabled agencies and partners to apply 319 Incremental funding to incentives for homeowners to pump, repair and replace septic systems. These watersheds include Sleepy Creek, Mill Creek of the South Branch Potomac, Mill Creek of Opequon, Tuscarora Creek of Opequon, Elks Run, and Lost River. 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, Eastern Panhandle Conservation District and WVDEP.
- The current 319 Incremental Project in Mill Creek of Opequon watershed includes a number of residential/commercial BMP demonstrations. Rain barrel workshops and a pet waste reduction campaign are also included in the project. All of the above activities are included in the 319 proposal because of their ability to reduce sediment and bacteria from developed lands. They will have the added effect of reducing

nutrients in runoff, and educating the public about best practices for residential and commercial areas.

- 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. They have been used recently to install a wetland demonstration, rain garden demonstrations, and will be used to revegetate streambanks. Warm Springs Watershed Association is participating.
- WV's Stream Partners Program makes grants up to \$5000 available to broad-based community groups who do watershed improvement projects, and who provide 20 percent local match. Annually, about three groups from the Potomac Basin receive these grants that support the Chesapeake Bay restoration effort by encouraging citizens to partner and implement projects that reduce nonpoint source pollution and educate the public. This program is a partnership of WVDEP, WVCA, West Virginia Division of Forestry (WVDOF), and West Virginia Division of Natural Resources (WVDNR).
- One of the most challenging outreach problems facing the Bay restoration effort is enlistment of the widely dispersed, individual home-owning and renting community in adopting Bay-friendly practices around their homes. Cacapon Institute (CI) will work with teachers and students in WV Potomac Highland schools to enhance homeowner awareness of the need to apply only enough fertilizer to maintain their lawns. Students will conduct nutrient soil surveys of lawns in their communities and, working with West Virginia WIP partners, develop an informational packet with fertilizer recommendations to hand out with their test results. The project will include before and after community polling to assess changes in attitudes and actions that might occur as a result of this program.
- Public schools provide an opportunity for urban runoff mitigation that has practical stormwater management implications *and* public education potential. The WV WIP partners will inventory all public school facilities in the WV Potomac Basin and conduct a "schoolyard-watershed" survey. The inventory will reflect a uniform listing of rain water management facilities (such as storm drains and culverts, etc.). The resulting inventory, and dissemination of information on stormwater management BMPs, will provide a foundation for comprehensive planning and implementation of future BMPs for stormwater runoff and nonpoint source pollution mitigation at each school.
- In 2009, WV WIP partners began an Urban Tree Canopy (UTC) project in Berkeley and Jefferson counties to foster wider acceptance of voluntary BMPs for urban tree conservation and plantings to reduce storm water runoff and address the Chesapeake Bay Program goals. A high resolution UTC assessment was completed for Jefferson County. County planners, in coordination with planners in Charles Town, Harpers Ferry, Ranson, and Shepherdstown are currently developing UTC goals. Cacapon Institute is

leading a similar effort in Berkeley County. In addition, Jefferson County and a number of county municipalities working with CI have submitted a proposal to obtain funds for the purpose of beginning an aggressive urban tree planting program in the county.

- In recent years, an effort by WV WIP partners to promote better stormwater management began under the name of “West Virginia Stormwater Network” but quickly grew to include nearby Virginia and other states. It is now called the Great Valley Stormwater Alliance (GVSA). The GVSA is an informal group open to all stormwater practitioners seeking to promote runoff reduction* practices and foster practical management of stormwater in karst terrain. One of its first activities was to develop “West Virginia’s Stormwater Strategy for the Potomac Basin” (2009).
*runoff reduction is defined in section 7.D.a “Current Programs and Capacity”.
- The Conservation Fund’s Freshwater Institute works closely with local governments in the Eastern Panhandle to increase understanding of the environmental impacts of growth as well as the benefits of green infrastructure. Their Rockymarsh Run Watershed Initiative serves to promote an awareness of the local benefits of Chesapeake Bay restoration.
- DEP is currently developing a statewide stormwater management guidance manual that will provide design specifications of runoff reduction practices. The scope of work for the manual has been completed, and it specifies that each stormwater practice design include a discussion of removal of nutrients, and how the practice can best remove nutrients from stormwater consistent with Bay-approved runoff reduction practices. Expressions of Interest were received in July 2010, and the contractor for the manual has been selected. The contract is currently being negotiated. The manual is anticipated to be complete by summer of 2012.

Financial

The sustainability of most of the current programs and capacity relies primarily on short-term grants. Dedicated funding streams such as fees would ensure their long-term viability.

Funding from the Chesapeake Bay Program is vital to maintain the capacity we have built, and to adaptively manage to increase capacity as needed. Grant funds seem to be sufficient for demonstration projects, and we have noticed NFWF Chesapeake Stewardship Funds being awarded for the top retrofit projects in communities where prioritized lists exist. However, none of our communities have developed such a list, nor have they successfully accessed those grant funds for that purpose. A NFWF planning grant is currently being used in Jefferson County to understand the stormwater and wastewater issues in the Blue Ridge Communities. That effort shows promise for future implementation, targeted according to the recommendations of this current project.

Limited funding (such as WV Stream Partners, Clean Water Act Section 106 and 319 grants, DEP Stormwater Program) for this sector is available for demonstration projects. Each of these projects includes significant in-kind match from partners involved, including homeowners who buy, install and maintain the practices.

7E.b. Accounting for Growth

West Virginia's strategy for non-regulated developed lands is based on enhancing voluntary actions for already developed lands, and working with state, county and municipal governments to implement policies that result in no net increase in nutrients generated by new development. Several options for new local laws and regulations that require both nutrient control practices in new developments and additional mitigating offsets that result in zero net increase in nutrients are outlined below. WVDEP will work with the local governments in the development of Phase II of the WIP to identify a path forward. Details regarding strategies to account for growth can be found in Section 7E.d. – Strategy to Fill Gaps.

7E.c. Gap Analysis

West Virginia has many gaps between the existing capacity to reduce loads from developed lands and the ability to do so. There is no requirement at the state or county level to regulate post construction stormwater on new or redeveloped sites outside of MS4 areas or to retrofit existing developed areas to better treat stormwater runoff. In addition, there is no regulation of residential lawn fertilizer and no limits of oversized lawns. Excess runoff coupled with over-fertilization can lead to nutrients entering our local waterways. While some counties have subdivision and stormwater ordinances, we need to investigate in Phase II how these complement our WIP strategy. Implementing stormwater controls when constructing a new facility is less costly than attempting to retrofit a site that isn't otherwise undergoing construction.

Regulatory

West Virginia is in the process of developing nutrient criteria for select streams. When completed, this will make it easier to directly connect the nutrient problem to local conditions and document that a local problem exists, as opposed to the more distant issue of nutrient loads delivered to the Bay.

There are currently no stormwater utilities in the Potomac basin. Enabling of stormwater utilities will facilitate the establishment of a dedicated funding stream to address stormwater priorities such as maintenance and installation of stormwater management retrofits.

Very little of West Virginia's Potomac Basin (WVPB) is currently covered by MS4's. Increasing coverage of MS4's would increase regulatory oversight on stormwater management.

There is a legacy of conventionally platted subdivisions that do not have to be developed according to current local regulations. These subdivisions were grandfathered under the regulations which were in place at the time they were platted.

There are no requirements for stormwater retrofits or enhanced stormwater management at re-development sites.

Programmatic, Staffing & Technical Capacity

A general lack of awareness and engagement exists at the local government level. While West Virginia's Chesapeake Bay Implementation Team works vigorously to engage elected and professional decision makers, local governments currently have only a limited sense of the scope of their responsibility for managing loads and little idea concerning what they can do to achieve no net increase in nutrients. While Comprehensive Plans are required to be updated at regular intervals, there are no requirements for inclusion of elements concerning natural resources or the environment. In addition, provisions for the requirements and processes of Chesapeake Bay TMDL implementation are also not a required component of Comprehensive Plans.

Local jurisdictions generally lack the capacity (staffing and funding) to manage nutrients in stormwater. In the following areas, lack of information prevents jurisdictions from understanding capacity and/or accounting for practices that result in load reductions:

- Voluntary, individual actions are often not associated with government programs where they will be tallied. For example, rain barrel workshops' attendance may be counted, implementation remains unknown.
- As local governments are generally unaware of what is required of them, they are unable to assess capacity or account for practices because they are not aware of what they can get "credit" for.

Chesapeake Bay implementation has yet to become institutionalized on a local level. We know of no local governments in the Potomac Basin of WV that have used tools to plan ordinance revisions, outreach campaigns, or retrofit activities to optimize nutrient or sediment load reductions from such actions. We are aware of tools that might be applicable for these governments with some customization required, but local governments have not asked for assistance with obtaining or using them.

There is a lack of management of septic systems. While county health departments have the authority to check the function of septic systems, this activity is generally limited to following up on complaints for anything but new installations. There are few siting requirements and no requirements for denitrifying systems on new installations or retrofitting existing septic systems with denitrifying technology.

Voluntary participation at the local level is insufficient to result in substantial BMP installation on the ground. Successful reduction of priority pollutants from the non-regulated sector of developed lands depends on voluntary adoption of new land use practices.

There is no framework in place to manage fertilization of residential lands.

Stormwater BMPs with the highest nutrient reductions are not promoted or required.

Inconsistency in awareness and technical capacity regarding runoff reduction within architecture and engineer/developer/builder community leads to the failure to design developments with effective stormwater management.

There are many gaps and opportunities for BMPs to be installed on developing lands in West Virginia to prevent an increase in nutrient loads from this sector. These include tree buffers, grass buffers, urban tree planting, infiltration or filtering practices, urban stream restoration, and denitrifying septic systems.

Financial

Currently, none of the towns or counties in the Potomac Basin of West Virginia has a stormwater fee that could be used for local government staff dedicated to reducing stormwater impacts, to retrofit, install and maintain practices described in this section, or to pay for broad-based homeowner BMP incentive programs. Significant progress in the non-regulated developed lands sector will be dependent upon actions and programs established using fee-based funding at the county and municipal level.

Institutional

Most public and institutional facilities including schools and other federal, state and local government buildings in West Virginia lack sufficient stormwater management to adequately reduce runoff. Public facilities that implement good stormwater management serve as good examples and result in nutrient load reductions and should be rewarded for their efforts.

7E.d. Strategy to Fill Gaps

While the section below outlines the variety of strategies that could potentially be used to fill gaps, West Virginia is engaging local governments in our WIP efforts on an ongoing basis. Based on the input of local governments, more refined and detailed strategies will be discussed in the Phase II WIP.

Local Governments/Land Use Planning

- Create a new, possibly jointly funded, Chesapeake Bay Liaison position in the Eastern Panhandle to actively work with the three counties and several incorporated municipalities to reduce loads from developed lands. If needed, this position could be expanded into a program modeled after Virginia's Chesapeake Bay Local Assistance Program and include assistance to residential landowners
- Encourage stormwater BMPs with highest nutrient reductions
- Enable state or local authority/capacity to regulate post-construction stormwater
- Provide counties and local governments with nutrient load goals and the type and amount of BMPs that could be implemented to achieve these goals, with timely updates on local progress
- Provide counties and local governments with WVDEP incentive funds to develop or enhance regulatory and accountability programs
- Assist local governments in developing comprehensive planning goals that will minimize loads from new development
- At the county level, incentivize runoff reduction practices for new and existing developments, using methods such as:
 - Assessing lower impact fees for subdivisions designed to minimize runoff
 - Assessing an impervious cover fee that gives credit for runoff reduction
- Implement a strategy to require structures that are closer to streams to have more rigorous pollution prevention controls
- Disable grandfathering of legacy platted subdivisions by requiring them to meet current and new local regulations
- The three counties of the Eastern Panhandle and municipalities are currently working to draft a model stormwater ordinance that will help to achieve WIP goals. It is expected to be complete in spring 2011, at which time follow-up efforts will begin to help these counties adapt and adopt the model ordinance, and to reconcile existing codes and ordinances to remove barriers and make regulations complementary
- Hampshire, Morgan, and Berkeley counties already have stormwater ordinances in place, but analysis needs to be performed to determine how to better control pollution loads from new and existing development through these ordinances. Municipalities must also be included in this process
- The state agencies and Chesapeake NEMO (Network for Education of Municipal Officials) should provide as many tools and resources as possible to increase understanding by municipal and county governments and boards of health that the ordinances, codes and rules that can limit nutrients and sediment from newly developed areas can be enacted and enforced at the local level
- Require Comprehensive Plans to include environmental and natural resource elements and Chesapeake Bay TMDL implementation language for jurisdictions within the Potomac basin. This would require an amendment to the state land use planning code
- Enable counties and municipalities to form stormwater utilities to maintain stormwater practices and to fund stormwater retrofits

- Institute fertilizer restrictions on developed lands
- Disincentivize large lawns through turf tax or incentivize tree planting to replace large lawns
- Regulation to protect and/or increase tree cover along streams
- Regulations to cease mowing along streams
- Regulations to protect and/or increase tree cover generally

Implementation of Specific BMPs

- Assign a staff person or group to track and ensure increased acreage of tree buffer and tree planting occurs in each county
 - Use EPCD and PVCD tree sales (very important to maintaining current rate of implementation) along with 319, Bay Implementation, and Stream Partners grants to fund individual projects at minimal or partial cost to landowner
 - Urban Tree Canopy programs in each county with overall goals would also have the effect of achieving more acreage of these BMPs
- Assign staff person or group(s) to track and ensure increased acreage treated by infiltration and filtering practices occurs in each county. Use 319, Bay Implementation, and Stream Partners grants to fund individual projects at minimal or partial cost to landowner
 - The projects aimed at runoff reduction at public facilities should have the effect of achieving some of these acreages
 - Some communities would benefit from formal prioritized inventories of retrofit opportunities, to enable them to qualify for NFWF grants, etc.

Homeowner Engagement

- Actively recruit residential landowners of several acres in visible places to reduce mowed area
- Install homeowner rain gardens in several of these sites along well-traveled routes
- Build local capacity (social infrastructure) for voluntary implementation in the form of watershed associations and Community Environmental Management (CEM). Choose several communities to pilot the CEM concept, and support them with a facilitator for meetings once or twice monthly for two years, plus start-up funding for projects. Other communities could mimic this model with volunteer or agency staff facilitators, and seek their own funding for projects. Foster the ability of local communities to identify and report violations and resolve stormwater-related problems. Build capacity for citizen monitoring of implementation efforts
- Institute homeowner runoff reduction campaign to recruit homeowners to disconnect downspouts, help them install rain barrels, create swales, rain gardens and other small-scale runoff reduction practices. Voluntary pledges of maintenance would be encouraged

- Package runoff reduction educational materials as train-the-trainer modules, and leaders in organizations like Rotary, Ruritans, Scouts, and 4-H could be tasked with carrying out the program in a small area. This would reduce the need for paid staff, although paid staff would still need to coordinate the program for the Potomac Basin overall
- Expand technical assistance for homeowners either through the auspices of a Chesapeake Bay Local Assistance Program or through expansion of services provided by local university extension offices
- Promote grass buffers through lawn care outreach programs that include education about not mowing, or only cutting once per year, along streams

Education, Outreach & Technical Assistance

- Train builders and developers, etc. on runoff reduction principles
- Establish certification and continuing education program for those responsible for reviewing, designing, and installing stormwater management practices
- Promote “Runoff Reduction Toolkit” website as a clearinghouse for guidance and publications related to runoff reduction methods
- Develop campaign to encourage installation of more stormwater retrofits
- Develop campaign to encourage installation of enhanced stormwater management practices at re-development sites
- Conduct education and outreach at all levels of society – press, ads, workshops, white papers, pamphlets, booklets, articles, web, meetings with community groups, etc.
- Provide assistance to local governments in developing stormwater management guidelines and plans, training, and information on the latest stormwater management techniques
- Conduct a survey of urban land uses, including residential, business/industry, government, airports, and golf courses, that result in excessive nutrient runoff. Develop an appropriate nutrient management plan education and assistance program based on the results of the survey
- Urban stream restoration - work with communities to discover problem areas that they see other benefits in fixing. Help them to apply for funding and develop strategies to fill budgetary shortfalls

Institutional

- Recommend stormwater performance standards for new public facilities in terms of “runoff volumes and pollutant loads.” Focus on schools because of the future societal impact, and use the resulting practices in environmental education curriculum
- Use incentives to decrease runoff from existing public facilities, e.g. reduce turf cover, increase trees
- Encourage school boards to attend training on managing wet weather with green infrastructure and charge them with promoting resulting successes

Onsite Wastewater Treatment

- Build capacity, preferably through Responsible Management Entities, to fully manage onsite and decentralized wastewater treatment (e.g. regular pumping of septic tanks, use of filters on tank outlets)
- Reduce number of failing septic systems through the following initiatives, targeting areas that have concentrations of failing septic systems:
 - Fats/oil/grease education program and grease collection centers;
 - Disseminate homeowner education packets that cover operation and maintenance of septic systems;
 - Pursue incentives to fix failing septic systems
- Request credit in the Chesapeake Bay Watershed Model for repaired/replaced septic systems
- Improve site requirements and application criteria for land application of septage and include nutrient management plans at minimum
- Increase capacity at wastewater treatment plants for septage reception and treatment that minimizes nutrient release
- Encourage/incentivize existing septic system owners to have advanced nitrogen removal technology installed. Write more of these into future 319 project proposals, publicize demonstration sites so that septic system owners with the means may begin to voluntarily opt for this type of system
- Mandate conversion to denitrifying septic systems within floodplains and priority watersheds
- Promote adoption by health departments of Morgan County's policy to disallow new septic systems in the 100-year floodplain
- Promote adoption by health departments of a strategy to require structures that are closer to streams to have more rigorous pollution prevention controls on septic systems
- Promote the requirement that new septic systems have advanced nitrogen removal technology

Other regulatory actions

- Continued work by WVDEP in developing and implementing nutrient criteria where needed
- More stringent enforcement of ordinances and regulations that protect water quality (This would likely require increased staffing)

Financial

New programs and initiatives are not possible without an attendant funding stream for costs such as increased staff, technical assistance, and enforcement. It would be beneficial for all

eight Potomac counties to have the authority to create stormwater utilities so that a funding base would be in place to address state and community stormwater priorities.

7E.e. Contingencies

WVDEP will evaluate the commitment to no net increase in urban stormwater by December 31, 2015. If the no net increase goal in delivered nitrogen and phosphorus to the Chesapeake Bay from urban areas is not being met, WVDEP will implement these contingencies by December 31, 2017:

- WVDEP will encourage the WV Legislature to enact statewide stormwater management regulations that address post construction impacts outside of MS4 areas. This would ensure a level playing field for all new development across the watershed and help to prevent sprawl in areas where there are no stormwater management regulations. If EPA's nationwide stormwater management regulations are not finalized, the WVDEP will pursue a statewide program.
- WVDEP will require a certain percentage of retrofits in MS4s that are located in the Chesapeake Bay watershed. These retrofits will meet the capture requirement of .80 inches of rainfall on site with no discharge to surface waters. This is an enforceable mechanism through the TMDL and the existing MS4 General Permit.
- As a final contingency, and if statewide post construction stormwater management requirements are not realized, WVDEP will pursue expansion of the General Permit for Construction Stormwater to require post construction controls for projects in the Chesapeake Bay watershed.

7E.f. Tracking and Reporting Protocols

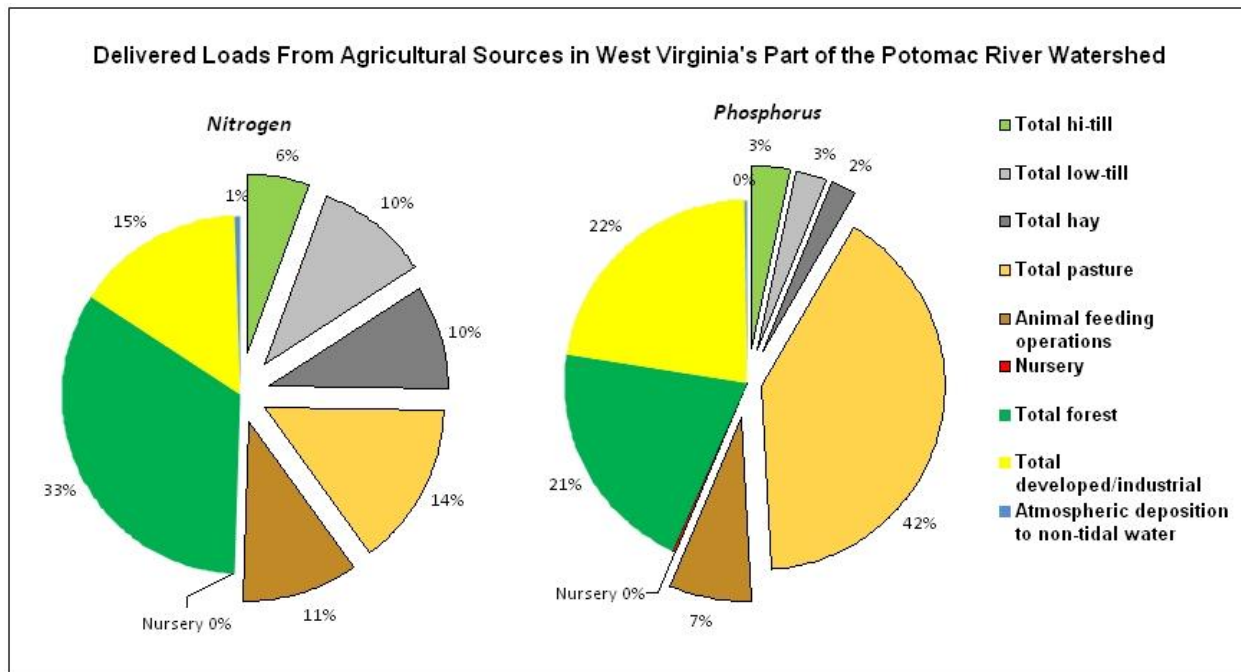
- One staff person in West Virginia DEP will be responsible for developing a protocol for and conducting annual inspections to certify new and existing regulated and non-regulated urban and construction stormwater BMPs are in place and functioning as intended and report to CBP through NEIEN.
- BMPs for this category will be tracked and reported consistent with the Quality Assurance Project Plan on file with EPA.

SECTION 8. Agriculture

Agriculture Section at a Glance

For the purposes of this document, Agriculture constitutes the load from all agricultural activities in the Potomac Basin of West Virginia. It includes regulated sources (CAFOs/AFOs) and non-regulated sources of nonpoint nutrients and sediment.

According to the Chesapeake Bay Watershed Model, the “agriculture” sector is responsible for fifty percent of the total delivered nitrogen load and fifty-seven percent of the total delivered phosphorus load.



Summary Actions:

- Focus on tracking and reporting previously unreported or “non cost-share” BMPs
- Goal is for agriculture to have a voluntary plan
- Poultry Litter Transfer
 - By 2025, West Virginia plans to transfer 1/3 of produced poultry litter out of the Chesapeake Bay Watershed.
 - A Poultry Litter Transfer Program is available with incentives that pay \$10 per ton to the generator of poultry litter to move it out of the Chesapeake Bay watershed. This is an extremely effective nutrient reducing BMP for the watershed and allows farmers in the central part of West Virginia to improve their soil.
- Nutrient Management
 - The State of West Virginia is committed to increase the number of acres covered under Nutrient Management Plans. This effort includes targeting of the two counties that have the highest nitrogen delivery factor to the Chesapeake Bay. Those counties,

Berkeley and Jefferson, will have 95% of agricultural acres under Nutrient Management Plans by 2025.

- Although there will be a significant focus on these two counties, the remaining counties in the Chesapeake Bay watershed will also increase number of planned acres to help reduce nitrogen and phosphorous inputs.
- Stream Fencing: West Virginia is committed to increasing the number of acres of pastures fenced. The goal is to have 40% of pastures fenced by 2025.
- AFO/CAFO Regulations: The State of West Virginia plans to work with animal feeding operations that fall under the definition of a large or medium CAFO or that are designated as a CAFO to help comply with NPDES/CAFO rules.
- Natural Stream Restoration: Natural Stream Restoration (NSR) will be used in WV to restore conditions that will allow natural fluvial processes to create streams that are both stable and complex. It allows a stream system to naturally “heal” itself by allowing more efficient water and sediment transport within the channel to reduce bank erosion problems. NSR technology will have significant impact upon reducing sediment loading to the Chesapeake Bay.
- Agricultural Education: By working together, farmers and support agencies enable agriculture to remain competitive and profitable, thus ensuring the sustainability of the family farms in West Virginia. Through continued support by USDA-NRCS, USDA-FSA, Conservation Districts, WVDA, WVCA, FSA, WVDEP, WVU Extension and agricultural organizations, West Virginia has and will continue to have a strong educational initiative for agricultural producers throughout West Virginia’s Potomac Basin.
- Efforts will also be increased on Buffers, Cover Crops and Conservation Tillage

Introduction

The West Virginia agriculture community is committed to the implementation of voluntary Best Management Practices (BMPs) that will reduce nutrients and sediment, to fulfill its obligations under the Chesapeake Bay Total Maximum Daily Load (TMDL) and to protect the waters of West Virginia.

An impressive voluntary, incentive based, agriculture nutrient management program has been underway in West Virginia for many years and much progress has been made. Much of this progress has been documented and credited toward Chesapeake Bay nutrient and sediment reduction goals, but much of it has not. The State of West Virginia is fully committed to documenting as many of the non cost share BMPs that have been implemented by agricultural producers as possible over the next 15 years. The State is also committed to working with universities, other researchers and agricultural experts to strengthen the science of BMP implementation and effectiveness as it relates specifically to West Virginia.

West Virginia farmers have collectively voiced their opinions and concerns about the Chesapeake Bay TMDL process and what it means to their livelihood. West Virginia farmers have been the leading profession in ensuring that they keep valuable nutrients from running into their local streams and rivers. This allows farmers the ability to have high yields and keep costs to a minimum. West Virginia’s farmers have a proven history of being good stewards of

the land and have stated publicly during recent EPA TMDL meetings that they are willing to make changes to their farming operations if they are presented with reliable, credible data on which to base decisions. This effort requires much more than model based assumptions, estimates and extrapolations. It requires straightforward, transparent, easily understandable water quality data that shows impairments and progress made as BMPs are installed.

To develop and accomplish the goals of the agricultural portion of West Virginia's WIP, a team of agricultural experts and decision makers was formed. This group includes representatives from:

- USDA Natural Resources Conservation Service
- USDA Farm Service Agency
- West Virginia Department of Agriculture
- West Virginia Conservation Agency
- West Virginia Department of Environmental Protection
- West Virginia University Extension Service
- Tetra Tech

With top decision makers as members of this group, quick decisions and plans are able to be made to carry out WIP goals. One example of the effectiveness of this group is a Poultry Litter Transfer Program that designed and implemented during the time that this document was being written. West Virginia **now** has an incentive program that pays \$10 per ton to the generator of poultry litter to move it out of the watershed. This group will continue to coordinate, implement, track and adapt the agricultural portion of West Virginia's WIP through 2025.

Because of the agricultural community's past successes and its current level of cooperation and commitment, the State of West Virginia has a high level of confidence that it can accomplish the goals that are laid out in this document and in the "input deck," or scenario, that details the programs that will be used to accomplish West Virginia's goals.

West Virginia has an implementation scenario that meets our 2025 Cap Load and achieves 60% of the Cap Load by 2017. These scenarios include a variety of agriculture BMPs including nutrient management, animal waste storage, barnyard runoff and mortality composting for AFOs and CAFOs, litter transfer, cover crops, conservation tillage, pasture management and limiting livestock access to streams. Given continued targeted funding to federal and state partners for the Chesapeake Bay Program, it is our estimate at the current time that the technical and financial resources will be available to install and/or document the needed practices through 2017.

West Virginia submitted the draft WIP on September 1, 2010 with a scenario that included the practices that we have determined are feasible between now and 2017. While this scenario did meet our goal of 60% by 2017, we did not meet our 2025 Cap Load. As we had not included

practices through 2025, following the receipt of comments by EPA, West Virginia reconvened the agriculture experts and decision makers and identified those additional practices that would be implemented between 2017 and 2025. This was West Virginia's scenario 6 and the results indicate we are meeting, and in some cases exceeding, our Cap Load requirements.

SECTION 8A. Agriculture -- General

8A.a.1. Current Programs and Capacity

United States Department of Agriculture – Natural Resources Conservation Service (NRCS)

The 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 dollars in financial assistance funds have been committed through Farm Bill Programs such as the EQIP, WHIP, AMA and CBWI. 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 support and assist the State of West Virginia in meeting their stated 2 year milestone goals.

The Natural Resources Conservation Service provides financial and technical assistance to farmers and non-industrial forest land owners through a variety of Farm Bill programs. These programs are voluntary and applications are taken on a continuous basis. However, applications nearly always exceed available funding; therefore, applications are prioritized and funds are awarded based on the effectiveness of the application in addressing natural resource concerns. All of these programs require a contract with NRCS to ensure that the practices are completed prior to the landowner receiving payment.

A recent draft 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 implementing 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 on cropland in the Chesapeake Bay basin. When this report is final, the information will assist 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. It is further anticipated that comprehensive nutrient management and enhanced nutrient management will be key practices promoted for cropland in the state. West Virginia's approximately 200,000 acres of cultivated cropland on farms will be a target of increased program and technical assistance.

The Environmental Quality Incentives Program (EQIP) provides payments to producers who sign a contract with NRCS. NRCS conservation planners work with landowners to identify and plan conservation practices that will best address the resource needs on their land. This program provides an incentive to promote agricultural production, forest management, and environmental quality as compatible goals. This program helps farmers meet federal, state, and local environmental regulations while maintaining healthy and productive agricultural lands. In 2010, there were approximately \$25 million dollars in EQIP applications competing for approximately \$5.3 million in available funds (statewide).

The Wildlife Habitat Incentives Program (WHIP) also provides payments to private agricultural land owners and non-industrial private forestland holders. The goal of WHIP is to encourage private landowners to develop and improve high quality habitat that supports wildlife of national, state, or local significance. Like EQIP, participants in WHIP sign a contract with NRCS to install and maintain conservation practices that support the landowner and the agency's mutual conservation goals. In 2010, West Virginia received \$147,000 in funding for WHIP contracts.

The Agricultural Management Assistance (AMA) program is available in 16 states, including West Virginia, where participation in the Federal Crop Insurance Program is historically low. This program seeks to reduce the risks associated with farming by encouraging, and paying for, conservation practices that will enhance the farm's natural resources. Applications for this program currently exceed the available funding of \$206,000 that West Virginia received in 2010.

The NRCS offers a variety of easement programs that protect agricultural land use, and preserve the related conservation values inherent in agricultural lands. The Farm and Ranch Land Protection Program (FRPP), the Wetland Reserve Program (WRP), and the Grassland Reserve Program (GRP) are all examples of land "set-aside" programs available through NRCS. These programs are voluntary and competitive, again with applications often exceeding funding.

There has been a coordinated effort between NRCS and other agricultural partners to target Chesapeake Bay funding to the priority watersheds. NRCS will direct funds to the most crucial areas as identified by the WVDA priority watersheds.

NRCS's programs help people reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters. The Farm and Ranch Land Protection Program provides matching funds to help purchase development rights, and to keep productive farmland in agricultural uses. The Grassland Reserve Program helps landowners and operators restore and protect grassland, including rangeland, pastureland, and certain other lands, while maintaining these areas as grazing lands. The Wetlands Reserve Program provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private land in an environmentally beneficial and cost-effective manner.

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

NRCS practices must be installed according to strict engineering and agronomic standards. Once installed, practices are monitored for the life of the contract, plus one additional year. However, many practices have a physical lifespan that lasts much longer than the financial contract period: a period of up to 15 to 20 years on some structural measures. These practices continue to function as long as their physical lifespan allows.

The chart below details the current and future staffing capacities of USDA-NRCS:

	Berkeley/ Morgan	Jefferson	Grant	Hampshire	Hardy	Mineral	Pendleton	Total (2010)	Total (2011)
Soil Conservationist	1	1	1	1	1	1	1	7	
Soil Conservation/ Eng. Technician	1		1		1	1	1	5	
District Conservationist	0.5	0.5	0.33	1	0.33	0.33	1	4	
Soil Scientist serving 8 counties	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1	
Part Time FRPP serving 8 counties	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.5	
Additional Soil Conservation Technician/ Biologist (2011)			1						1
Resource Con./Soil Con.	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1	

servicing 8 counties (2011)									
Additional Soil Con./ servicing 8 counties (2011)			0.2	0.2	0.2	0.2	0.2		1
Forester servicing 8 counties (2011)	0.14	0.14	0.14	0.14	0.14	0.14	0.14		1
TOTAL								18.5	21.5

Potomac Headwaters Resource Conservation & Development (PHRC&D)

Potomac Headwaters Resource Conservation & Development (PHRC&D) was incorporated in 1969 as a 501(c)(3) non-profit organization. The council was created through the sponsorship of the eight County Commissions of the Eastern Panhandle, the Potomac Valley and Eastern Panhandle Conservation Districts, and the US Department of Agriculture. PHRC&D assists citizens, community organizations, and local government with the implementation of projects that improve and enhance the social, economic, and environmental conditions of the region. PHRC&D has historically been a significant player in assisting with the design and delivery of BMPs in both the agricultural and stormwater sector. PHRC&D has a full-time coordinator and administrative staff that serve the 8-county area.

United States Department of Agriculture – Farm Service Agency (FSA)

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 also continues the long-standing tradition of conserving the nation’s natural resources through the Conservation Reserve Program (CRP).

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.

CRP is a voluntary program for agricultural landowners. Annual rental payments, cost share assistance, and incentive payments are provided to establish long term, resource conserving covers on eligible farmland. As available in West Virginia, CRP is basically separated into three different program aspects as follows:

General Signup - a nationally competitive option that is only available during designated signup periods. Producers bid against other producers to improve their chances at getting their land accepted into the program.

Continuous Signup – as stated, a continuous signup allowing environmentally desirable land to be devoted to certain conservation practices at any time and acceptance is not subject to competitive bidding. Practices available are designed to address the most environmentally sensitive land.

Conservation Reserve Enhancement Program – also a continuous signup, CREP is an enhanced version of CRP that takes advantage of federal, state, and local partnering to enable increased payments and improved technical services, and to promote increased enrollment and protection of state identified priority areas. Practices to establish cover are specific to the most environmentally sensitive resource concerns of the area/state.

FSA administers CRP, while technical support functions are typically provided by NRCS, state forestry, 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.

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. 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).

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.

Other agencies are also able to achieve environmental benefits through CRP/CREP. An example includes the Department of Interior’s Fish and Wildlife Service (USFWS). USFWS’s partnership in West Virginia with FSA through CREP has afforded USFWS a unique opportunity to couple enrolled CRP/CREP acres into their environmental program, Partners for Wildlife. Furthermore, USFWS, partnering with Trout Unlimited (outside of CREP), has resulted in more agencies working together and has also led to further reaching environmental benefits through other organizations’ activities. This represents a win-win situation for everyone involved, especially the environment.

Conservation Loan Program:

A new program/initiative offered by FSA and introduced by the 2008 Farm Bill, this program affords agriculture producers the availability of low interest loans to achieve implementation of

conservation practices planned within an approved Conservation Plan of Operations. This extra available resource is designed to permit producers with the lack of “instant income” an opportunity to take advantage of other federal, state, and local programs in which they may not be able to participate due to necessary matching funds. Although required to be repaid, the timeframe of repayment will be matched with the producer’s personal situation thus increasing the opportunities to get conservation benefits on the ground when needed.

The chart below details the current staffing capacities of USDA-FSA:

OFFICE	SERVICE CENTER	CED	PT	TEMPORARY	LOAN MGR/OFCR	FLPT	Total (2010)
BERKELEY-MORGAN	Martinsburg	1	1	1	Vacancy	1	
GRANT	Petersburg	1	1		2	1	
HAMPSHIRE	Romney	1	1	1			
HARDY	Moorefield	1	1				
JEFFERSON	Ranson	1	1	1			
MINERAL	Keyser	1	1				
PENDLETON	Franklin	1	1				
Total		7	7	3	2	2	21

CED is County Executive Director, PT is Program Technician, and FLPT is Farm Loan Program Technician.

West Virginia Conservation Agency (WVCA)
Potomac Valley Conservation District (PVCD)
Eastern Panhandle Conservation District (EPCD)

The 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 EPCD and PVCD comprise fourteen percent (14%) of the State of West Virginia that drains into the Potomac River and on to the Chesapeake Bay.

The EPCD is comprised of Morgan, Jefferson and Berkeley counties and has a six person Board of Supervisors with three Associate Supervisors, one Administrative Officer and one Outreach and Education Specialist. The EPCD offers four no-till seeders, a lime spreader, a weed wiper and a litter spreader for lease.

The PVCD is comprised of Hardy, Grant, Hampshire, Mineral and Pendleton Counties and has a ten person Board of Supervisors with one Associate and one Administrative Officer. The PVCD

offers the following equipment for rental to cooperators: a no-till seeder, two billion seeders, two litter spreaders, and 1 lime spreader.

Both Conservation Districts offer cost-share assistance through a state cost share match on Conservation Reserve Enhancement Program, with cost-share funding up to 50% on bulk lime and delivery. A multi-flora rose program offers a cost share rate of 50% on chemicals and application. The EPCD and PVCD manage the administrative and monetary components of the 319 programs within their respective counties.

The Agricultural Enhancement Program (AEP) was developed as pilot project in West Virginia in 2008 through special state legislative funding. The EPCD was one of the first priority districts chosen throughout the state. All future funding is contingent upon legislative support and it is anticipated that the agency will expand this program into the counties of the Potomac Valley Conservation District within the next two years. The program focuses on agricultural BMP installation and the goal is to entice producers to participate by lessening the administrative element of contract development. The program currently focuses on lime for cropland, fencing, cover crops, alternative water and riparian buffers. Each Conservation District has the ability to develop a working group who has the responsibility of prioritizing the practices that will most impact water quality efforts within their respective area. WVCA will work with the Districts to continue to target priority areas and practice implementation. AEP has been well received by landowners and will be an important part of making water quality improvements in the Eastern Panhandle as West Virginia moves forward with agricultural implementation. Cost-share percentage and limitations vary according to the practice, up to 90%.

The WVCA 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 agency'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 helping the agency realize and target specific problems in specific areas. This approach will be instrumental in addressing the nutrient and sediment resource concerns as West Virginia strives to meet its Cap Loads. Currently, the WVCA employs three technical staff within the two Conservation Districts to promote and provide technical oversight for agricultural programs. These individuals hold WV Nutrient Management Certification and Conservation Planner certification.

Section 319 funds are utilized to voluntarily target TMDL reduction of pollutants from nonpoint sources. Currently there are four funded 319 projects in place within the drainage inclusive of Mill Creek of the South Branch of the Potomac, Sleepy Creek, Lost River and Mill Creek of the Opequon. Two additional plans are being reviewed by EPA for Tuscarora of the Opequon and Elks Run. These TMDLs address fecal coliform and biological impairments. Agricultural targeting results in cost-share opportunities for farmers to install riparian buffers, streambank fencing, feedlot relocations, alternative watering systems and waste storage structures. Cost

share rates vary up to 75%. Wastewater is also being addressed in several of the projects. The intent of the 319 program as it relates to agriculture is to fill the gaps for those agricultural producers who do not qualify or will not participate in Farm Bill programs. All practices are installed to NRCS specifications and spot checked annually for the life of the contract. WVCA will seek additional funding and staffing to serve the needs of the Chesapeake Bay. Our ability to deliver technical services to the public is dependent upon adequate funding and staff to deliver the program. Please refer to chart below detailing current and future WVDA, WVCA and Conservation District staffing:

WVDA/WVCA/Conservation District Staff Capacity *			
	2009	2010	2011
Nutrient Management Planner dedicated to Berkeley and Jefferson Counties	0	1	3
Nutrient Management Planner dedicated to Grant, Hardy, Hampshire, Mineral, Morgan and Pendleton Counties	1	2	2
CAFO Specialist	1	1	1
Tracking and Reporting Specialist	0	1	2
Conservation Specialist	1	3	3
Outreach Specialist (Morgan, Jefferson and Berkeley Counties)	1	1	1
Administrative Officers	2	2	2
Watershed Clerk	1	1	1
District Crew	2	2	2
Conservation District Supervisors	16	16	16
Associate	3	3	3

Supervisors (EPCD)			
Watershed Program Coordinator	1	1	1
Environmental Technicians	2	2	2
Assistant Director – Environmental Laboratories	1	1	1
Chemist	1	1	1
Microbiologist	2	2	2
Environmental Specialist	1	1	1
Assistant Director – Environmental Programs	1	1	1
Total	37	42	45

* If counties or areas are not listed specifically, then employees are available to work in all eight (8) counties in West Virginia’s Potomac drainage.

West Virginia Department of Agriculture (WVDA)

The West Virginia Department of Agriculture is currently expanding its staff to assist the Agricultural community in achieving the ambitious goals set forth in the Watershed Implementation Plan. For example, during the timeframe of the development of this document, the Department has hired a new Environmental Specialist that will work on outreach and education. The Department has also hired a Concentrated Animal Feeding Operation (CAFO) Specialist, Nutrient Management Specialist and Tracking and Reporting Specialist that will both be working in targeted counties. The Department is also working in cooperation with the West Virginia Conservation Agency to hire and oversee two more Nutrient Management Specialists working in targeted watersheds as well as a Tracking and Reporting Specialist that will work in the Potomac Valley.

The WVDA has participated in outreach through educational programs presented at schools, youth camps, farmer and landowner forums, fairs, meetings with city and county officials, and through opportunities at other public events. Education and outreach has been and will continue to be a priority to ensure that the public understands the importance of both agricultural and environmental issues. In the past, WVDA has held a Watershed Education Retreat that is targeted toward educators to help get information out about agriculture and environmental issues. The Department plans to continue to work with schools to implement

agricultural and environmental lessons. As a part of education and outreach, the Department completed a Potomac Headwaters Water Quality Report (July 1998-June 2008). The Department also plans to complete a Water Quality Report focusing on a different stream each year.

The West Virginia Department of Agriculture also has a Nutrient Management laboratory in Moorefield that analyzes manure/litter for ammonia, phosphorus, total Kjeldahl nitrogen, calcium, magnesium, copper, potassium, and percent moisture. These results are instrumental in nutrient management plans written in West Virginia. Soil sample collection and analysis, Nutrient Management planning and manure analysis are all offered free of charge to ALL West Virginia agricultural producers. Approximately 140-150 litter, manure and compost samples have been analyzed each year, and have generated approximately 2,800 determinations each year.

The West Virginia Department of Agriculture has a robust Nutrient Management Program. Nutrient Management Specialists are Nutrient Management certified and work on continuing their education to maintain Nutrient Management, Conservation Planning and Certified Crop Advisor certifications. By continuing their education, they have been better able to serve WV farmers and make farming operations more productive and environmentally sound. The two planners that are on staff over the last year and a half have written 52 Nutrient Management Plans, and assisted 104 producers/farmers. These planners along with the former CAFO Specialist have held 27 educational presentations.

The WVDA also has a robust water quality monitoring program, which is perhaps the most extensive programs of its kind in the state, that began in 1998 to collect water quality data five (5) times a month on the South Branch of the Potomac River with 22 collection sites, Lost River with 6 collection sites, and Patterson Creek with 10 collection sites, and one (1) time per month on the North Fork of the South Branch with 5 collection sites, the South Fork of the South Branch with 10 collection sites, Mill Creek with 14 collection sites, Bear's Hell with 2 collection sites, Opequon Creek with 7 collection sites, Sleepy Creek with 6 collection sites, Rockymarsh Run with 3 collection sites, Elks Run with 2 collection sites, Elks Branch with 3 collection sites and Bullskin Run with 3 collection sites (see Figure 5). The WVDA collects and tests approximately 2,900 water samples each year.

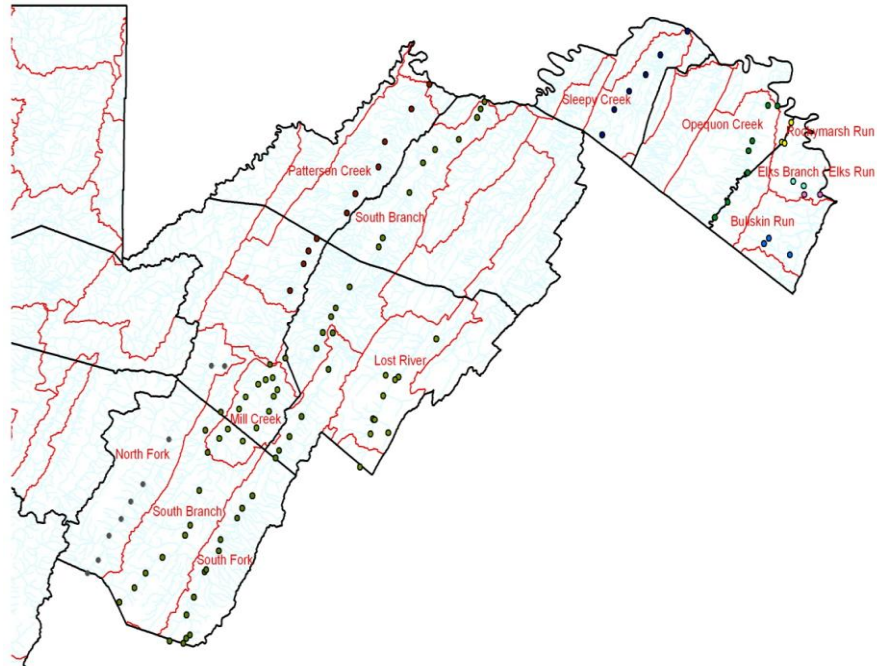


Figure 5. WVDA Water Quality Monitoring Stations (2010)

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

- pH
- Conductivity
- Temperature
- Dissolved Oxygen
- Nitrate
- Nitrite
- Ammonia
- Total Phosphorous
- Orthophosphate
- Turbidity
- Total Suspended Solids
- Fecal Coli form Bacteria

Data collected by this program has been used, and will continue to be used, by a variety of groups including the West Virginia Department of Environmental Protection, Chesapeake Bay Program, Elks Run Study Committee, and West Virginia University. This robust dataset has been invaluable for assessing water quality trends over a long period of time as well as prioritizing installation of nutrient and sediment reducing BMPs.

The WVDA is currently partnering with WVCA on the Bear's Hell Run project. The Department will collect and analyze water samples at two sites in this watershed, once per month, to calculate nutrient reductions as a result of BMPs installed in the watershed.

The WVDA collected water quality monitoring samples in the Mill Creek (Grant County) watershed from 1998 to 2005. With a sufficient baseline of water quality data this program was discontinued. In 2008, this watershed was named as a priority watershed for Chesapeake Bay restoration. At this time the WVDA has resumed water quality monitoring in the Mill Creek watershed to determine nutrient and sediment reductions in the watershed as a result of increased installation of BMPs.

WVDA's Poultry Program has been essential in helping inform the public about issues in relation to the poultry industry. The Poultry & Environmental Specialist serves as primary contact between the poultry industry and the WVDA. The Poultry & Environmental Specialist also focuses on issues regarding poultry waste relating to both West Virginia water quality and the Chesapeake Bay Program. The Specialist will provide assistance with development, implementation and tracking of poultry litter movement. The Poultry Program has and will continue to provide educational opportunities to farmers about poultry issues.

Depending on the sufficient funding from the State of West Virginia, Chesapeake Bay Implementation Grant (CBIG), Chesapeake Bay Regulatory and Accountability Program Grant (CBRAP) and other funding sources, the afore mentioned programs and specialists will continue to impact both agriculture and the environment positively over the next 15 years.

Atrazine Monitoring Project

The WVDA Atrazine Monitoring Project was initiated to determine if atrazine is detectable in select West Virginia streams, and if so, determine the concentration of atrazine. Atrazine is a widely used herbicide on corn production on the ground for the control of broadleaf and grassy weeds. Starting in January 2006, nine sites from the Patterson Creek, South Fork, and South Branch Potomac River watersheds were sampled at least monthly to test for the presence and levels of Atrazine. This project was completed in December 2006.

The findings of this report, revealed some unexpected positive occurrences, so it was decided to follow up with a two-year study to evaluate the presence of this herbicide in area surface waters. The first samples for the additional study were collected in April 2008. The project was completed in March 2010 with no additional detections during this time period.

Non-tidal Monitoring

The WVDA, WVDEP, U.S. Geological Survey (USGS), and Chesapeake Bay Program/Non-Tidal Water Quality Workgroup developed a list of sampling sites in West Virginia. The monitoring results from these sites are used to calibrate the Chesapeake Bay model with trend and load estimates. Starting in June 2005, WVDA and WVDEP contracted with USGS to lead the effort for collecting and analyzing water samples for this project. WVDA Environmental Technicians are assisting in the collection of these samples on a bi-monthly basis. The sampling includes monthly trend samples as well as eight storm samples throughout the year along the South Branch of the Potomac River, Patterson Creek, Opequon Creek and Cacapon River.

West Virginia University Extension and Davis College

West Virginia University is prepared to provide educational, research, demonstration and service activities to improve water quality in the WV portion of the Chesapeake Bay watershed. These activities will include:

County agents will provide record keeping training to farmers that are adding nutrient management planning and implementation of nutrient management plans to their farming operations. CAFO record keeping will also be a major educational effort for the county faculty along with field days that demonstrate BMP effects to encourage adoption. Other field day and workshop activities will demonstrate low calf cow production systems, adaptive nutrient management methods, manure application equipment calibration to local farmers and nutrient management planners.

The Davis College Experiment Station in Hardy County will be used as a demonstration site for enhanced nutrient management systems, examples of CAFO record keeping, nutrient management planning and implementation of nutrient management planning system.

State specialists will provide assistance with the WV certified nutrient management planners program, develop and evaluate new BMP systems to mitigate nitrogen losses from crop and pasture land. The low cost calf production project will continue and be used as a teaching tool for other farmers to adopt. Extension leadership will continue to work with State elected officials to encourage additional funding to provide assistance to farmers to install additional BMPs.

The chart below details the current and future staffing capacities of WVU Extension and Davis College:

	Berkeley/ Morgan	Jefferson	Grant	Hampshire	Hardy	Mineral	Pendleton	State	Total
ANR County Extension Agent	1	1	1	1	1	1	1		7
Ext. Spec. Bio-Systems Eng.								1	1
Ext. Spec. Nutrient Management								1	1
Ext. Spec. Forage Agronomist								1	1
Assoc.								1	1

Director Org. Dev.									
Farm Manager WVU Exp. Station					.2				.2
TOTAL	1	1	1	1	1.2	1	1	4	11.2

8A.a.2. OTHER PROGRAMS

Nutrient Management

To make the greatest strides in meeting Chesapeake Bay goals, West Virginia has committed to greatly increase the number of acres in West Virginia under Nutrient Management Plans. This effort includes the targeting of the two counties that have the highest Nitrogen Delivery factor to the Chesapeake Bay. **Berkeley and Jefferson Counties will have 95% of agricultural acres under Nutrient Management Plans by 2025.**

The West Virginia Department of Agriculture and the West Virginia Conservation Agency work together to fund and supervise Nutrient Management Specialists. All services including soil sampling, soil analysis and Nutrient Management Plan writing are offered to West Virginia’s farmers free of charge. It is also expected that Technical Service Providers (TSPs) and private planners will be able to assist greatly in this effort.

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 per plan ranges from \$3,100 to \$8,700 per plan depending on the size and type of operation.

The WV nutrient management certification program is now being written into the State Code to formalize this program. This addition to State Code will designate Nutrient Management committee membership and determine requirements for awarding of and maintaining a nutrient management certification. To enable nutrient management planners to collect BMP adoption, operation and maintenance information, new record keeping systems will be developed and will be introduced to all certified planners in the next 24 months during continuing education programs. This record keeping system will also be introduced to landowners during watershed educational workshops within the same time frame. This record keeping system will be a key self reporting mechanism for individual farmers to demonstrate BMP adoption and implementation of the added BMPs. Record keeping systems will be reviewed by nutrient management planners during development of nutrient management plans and then at three year intervals during updating of nutrient management plans. The

planner will collect BMP adoption rates, which will then be tabulated and published on a county basis.

Agriculture as an industry operates on a thin margin of profit, and its sustainability as an industry depends upon the individual farmers' ability to balance the inputs and costs of operations with his return on investment. Unseen to most observers is the intimate linkage that exists between on farm natural resources and a farmer's need to conserve and recycle resources on the farm to maintain sustainability. The agricultural producer has the most to lose by allowing nutrients, sediment, and other resources to leave the farm in runoff, thus changing resources or assets, to pollutants, or liabilities that affect the waters of the state. On the obverse, the farmer has the most to gain by keeping nutrient and soil resources on the farm and cycling through his production process, which will ultimately affect his bottom line and the sustainability of his or her operation.

For these reasons, and the recognition that nonpoint pollution from agricultural landscapes was difficult to pinpoint, or quantify, and equally difficult to treat during storm events, that early water quality policies focused on farmers having a conservation plan and actively implementing it as evidence of compliance with the Clean Water Act. Current law and federal guidelines related to TMDLs in watersheds has affected how agriculture is viewed among all the loads in a watershed. The state has worked to promote conservation planning and water quality protection philosophies with agriculture for many years. It continues to coordinate and implement programs and projects that help producers reduce the losses of resources off farm that then become pollutants to water.

Since the early 1990s, West Virginia identified the WV Natural Resources Conservation Service Field Office Technical Guide (FOTG) Practices as the standard for nonpoint source pollution prevention and control for agriculture and construction land use activities. There was broad recognition that the practice standards were developed and maintained continuously and were developed with water quality considerations and off farm impacts as a major component of their development.

One of the key components of the state's WIP to manage nutrients from agricultural operations is the implementation of the Nutrient Management (590) practice on farms that have potential to discharge nutrients in storm water runoff. The WVDA developed a Certified Nutrient Management Planner program over ten years ago to insure that nutrient management plans on farms were done by professionals trained in the science and art of nutrient management. Concurrently, the NRCS, Conservation Districts and the WVCA began to develop a cadre of certified conservation planners also certified as Nutrient Management Planners under the WVDA program to assist producers with nutrient management. Currently there are over 60 certified nutrient managers in the state working to assist farmers with this practice. WVDA has recently hired several full-time planners to help in the Potomac Headwaters region of the Chesapeake Bay Watershed. The NRCS and WVDA have cooperated to jointly fund an increased number of these certified nutrient management planners to increase the implementation of

nutrient management in the watershed as a major joint initiative. Through the State's Chesapeake Bay grant, WVCA was able to acquire funding in 2010 to employ two summer interns who were located within the Eastern Panhandle and Potomac Valley Conservation Districts. These students worked specifically with landowners and plan writers to collect soil samples for future plan development.

Additionally, NRCS standards are being updated to include the use of time release and slow release fertilizer formulations that help fine tune nutrient availability and movement. Through targeted efforts the state is working with operations that have the highest potential to discharge nutrients and developing conservation plans that include nutrient management as a focus of the pollution prevention effort.

The Nutrient Management Practice (590) as documented in the West Virginia NRCS FOTG is available for use by anyone. Simply put, the practice seeks:

- To manage the amount, source, placement, form and timing of the application of nutrients and soil amendments
- To budget and supply nutrients for plant production
- To properly utilize manure or organic by-products as a plant nutrient source
- To minimize agricultural nonpoint source pollution of surface and ground water resources
- To protect air quality by reducing nitrogen and/or particulate emissions to the atmosphere
- To maintain or improve the physical, chemical and biological condition of soil

Nutrient management applies to all lands where plant nutrients and soil amendments are applied. West Virginia plans for nutrient management are required to comply with all applicable federal, state and local laws and regulations. As mentioned above, persons who review or approve plans for nutrient management must be certified by the WVDA's Nutrient Management Certification program. Plans for nutrient management are often an element of a more comprehensive conservation plan. Such a plan would be one to address animal manures or poultry litter, and must meet other requirements (an example would be a Comprehensive Nutrient Management Plan as part of an Animal Feeding Operation or Concentrated Animal Feeding Operation). Modern nutrient management plans include a nutrient budget for nitrogen, phosphorus, and potassium that considers all potential sources of nutrients (animal manure, organic by-products, waste water, commercial fertilizer, crop residues and legume credits.) The Practice standard includes easy to use *Nutrient Budget Worksheets* which help producers estimate realistic yield goals established based on soil productivity information (soil survey), client's historical yield data, climatic conditions, level of management and/or local research on similar soil, cropping systems, and soil and manure/organic by-products. Plans for nutrient management specify the form, source, amount, timing and method of application of nutrients on each field to achieve realistic yield goals, while minimizing nitrogen and/or phosphorus movement to surface and/or ground waters. Erosion and runoff control practices

are installed on fields that receive nutrients to reduce potential nutrient losses to acceptable levels. In all cases, soil loss is managed to below the tolerable level.

Nutrient planning in the state is based on current West Virginia University (WVU) soil test results or equivalent commercial laboratory results. Current soil tests are those that are no older than three years. If a soil test is not available, the plan will be based upon crop requirements for the expected yield. Plant tissue sampling and analysis, where used, is done in accordance with Land Grant University recommendations and guidance. Another important component of nutrient management planning includes the timing of nutrient application. A requirement of proper nutrient management planning is that nutrient application must correspond as closely as possible with the crop nutrient uptake characteristics. Nutrient applications are not made on frozen, snow covered, or water saturated soils. Nutrient applications associated with irrigation systems are done according to the Irrigation Water Management Practice 449.

Recommended soil amendments and nutrient application rates are based on WVU soil tests for pH, P₂O₅ and K₂O. Nitrogen application is based upon realistic yield goals. Planned nitrogen application rates account for the residual amount of nitrogen in the soil and crop residue using FOTG Reference, University of Maryland Mineralization Rates, March 04 http://www.agnr.umd.edu/users/agron/nutrient/Plan/plan_min_rates.pdf and Appendix 6 (Adapted from Penn State Agronomy Guide). Use FOTG Reference, Penn State Agronomy Guide – Nitrogen Recommendations for Agronomic Crops (Table 1.2-6; <http://agguide.agronomy.psu.edu/cm/sec2/table1-2-6.cfm>) and/or Fertilizer Recommendations (Table 1.2-5; <http://agguide.agronomy.psu.edu/CM/PDF/table1-2-5.pdf>) to determine nitrogen recommendation based upon a realistic yield goal. Potassium application on permanent pasture, avoid applying heavy rates of potash in early spring in order to minimize potential for grass tetany. Mg availability is reduced if the forage is high in potassium; instead, make late spring, summer, or fall applications of potash. Starter fertilizers containing nitrogen, phosphorus and potassium may be applied in accordance with WVU recommendations. When starter fertilizers are used they shall be included in the nutrient budget. If litter, manure or other organic by-products are a source of nutrients they will be analyzed prior to land application based on laboratory report provided by the landowner. A manure sample shall be submitted each year for analysis and the nutrient management plan modified to reflect changes in the nutrient content of manures. When organic fertilizers are used, the planned rates of nitrogen and phosphorus application recorded in the plan shall be determined based on the following:

Statewide

Manure or litter may be applied at the nitrogen based application rate when soil test phosphorus levels are low to medium. If the current soil test indicates the soil phosphorus level is high, a phosphorus based application rate of up to 1.5 times the crop removal rate will be used. If the phosphorus level is very high, greater than 80lbs/ac, manure or litter will be applied at the crops estimated phosphorus removal rate. If the phosphorus level does not exceed 120

lbs., a single application of phosphorus applied as manure may be made at a rate equal to the recommended phosphorus application or estimated phosphorus removal in harvested plant biomass for a maximum period of three years. When such application is made the nitrogen application rate will not exceed crop needs during the year of organic fertilizer application. If excess litter, manure or organic byproducts are generated on the farm the plan will identify the quantity, and the planned use of the excess as outlined in the Waste Utilization Standard 633. The calibration of application equipment to insure accuracy and uniformity of manure or litter application and documentation of same is a part of the plan.

Phosphorus management in the headwaters of the Potomac River will include the use of a Phosphorus Field Loss Risk Assessment when animal manures or other organic byproducts are applied and the current soil test indicates the soil phosphorus level is very high, greater than 80lbs/ac, a field-specific assessment of the potential for phosphorus transport from the field will be completed. For fields with high or very high potential losses, appropriate conservation practices identified in the West Virginia phosphorus index will be installed to reduce the vulnerability to offsite phosphorus transport. A record of the assessment rating for each field or sub-field, and information about conservation practices and management activities that can reduce the potential for phosphorus movement from the site, will be included in the plan. When such assessments are done, the results of the assessment and recommendations shall be discussed with the producer during the development of the plan. In situations where the plan is being implemented on a phosphorus standard, and additional application of inorganic nitrogen may be required, N application will be based upon Pre Side Dress Nitrogen Test or estimated crop needs. In areas where there are state and/or locally identified or designated nitrogen-related water quality impairments, (for example: karst and well-head protection areas), an assessment shall be completed of the potential for nitrogen using the Leaching Index. The results of these assessments and recommendations shall be discussed with the producer and included in the plan. Plans developed to minimize agricultural nonpoint source pollution of surface or ground water resources shall include practices and/or management activities that can reduce the risk of nitrogen movement from the field. Handle and apply poultry litter or other dry types of animal manures when weather conditions are calm and there is less potential for blowing and emission of particulates into the atmosphere. A spreading pattern will be followed that minimizes applicator exposure to airborne particulates. When developing the nutrient management plan, consider application methods and timing that further reduce the risk of nutrients being transported to ground and surface waters, or into the atmosphere. Suggestions include:

1. Split applications of nitrogen to provide nutrients at the times of maximum crop utilization
2. On cropland incorporate surface applications of solid forms of manure or some commercial fertilizer nitrogen formulations (i.e. Urea) into the soil within 24 hours of application
3. Avoiding fall or winter nutrient application for spring seeded crops
4. Band applications of phosphorus near the seed row

5. Applying nutrient materials uniformly to application areas
6. Rotate livestock feeding areas to minimize build up of manure and nutrients
7. Delayed field application of animal manures if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application
8. Consider micronutrient deficiencies of nutrients due to excessive levels of other nutrients. (e.g. zinc, manganese, and boron)
9. Consider additional practices to improve soil nutrient and water storage, infiltration, aeration, tilth, diversity of soil organisms and to protect or improve water quality
10. Consider cover crops and their harvest whenever possible to utilize and reduce residual nitrogen
11. Priority areas for land application of manure should be on slopes less than 15% and located a minimum of 50 ft from waterways, sinkholes and other water bodies. It is preferable to apply manure on pastures and hay land soon after cutting or grazing before re-growth has occurred
12. Consider the potential problems from odors associated with the land application of animal manures, especially when applied near or upwind of residences
13. Consider avoiding, when possible, the land application of animal manures during weekends and holidays
14. Consider nitrogen volatilization losses associated with the land application of animal manures. Volatilization losses can become significant, if manure is not immediately incorporated into the soil after application
15. Consider the potential to affect National Register listed or eligible cultural resources
16. Consider using soil test and manure or litter analysis information no older than one year when developing new plans, particularly if animal manures are to be a nutrient source
17. On sites on which there are special environmental concerns, consider other sampling techniques to monitor soil fertility. (For example: Pre- Side dress Nitrogen Test (PSNT), or soil surface sampling for phosphorus accumulation or pH changes)
18. Consider utilizing crops with higher phosphorus uptake in correlation with no application of phosphorus on fields where soil test P is greater than 120 lbs (See FOTG reference <http://www.nrcs.usda.gov/technical/l and/pubs/nlapp1a.html> (Crop nutrient uptake and removal))

Any nutrient management plan developed in West Virginia will describe the requirements to achieve its intended purpose; that of using nutrients to achieve production goals and to prevent and minimize water quality impairment. A typical Nutrient Management Plan will include the following:

- Aerial photograph/and or map, and a soil map of the site
- Current and/or planned plant production
- Sequence of crop rotation
- Results of soil, plant, water, manure sample analyses
- Realistic yield goals for the crops in the rotation
- Quantification of nutrient sources for N, P and K

- Recommended nutrient rates, timing, form, and method of application and incorporation
- Location of designated sensitive areas or resources and the associated nutrient management restriction
- Guidance for implementation, operation, maintenance, and recordkeeping
- Complete nutrient budget for nitrogen, phosphorus, and potassium for the rotation or crop sequence
- Manure or litter spreader rate calibrations and the desired application rate
- A statement that the plan was developed based on the requirements of the current standard and any applicable federal, state or local regulations or policies; and that changes in any of these requirements may necessitate a revision of the plan
- Signature of a West Virginia Certified Nutrient Management Planner and certificate number

The land owner/operator is responsible for safe operation and maintenance of any practice including all equipment. Operation and maintenance requires the following:

- Periodic (3 years maximum) plan review to determine if adjustments or modifications to the plan are needed.
- Protection of fertilizer storage facilities from weather and accidental leakage or spillage.
- Calibration of all fertilizer application equipment to ensure uniform distribution of material at planned rates.
- Maintaining records to document plan implementation.
- Records include: (a) soil test results and recommendations for nutrient application (b) quantities (c) analyses and sources of nutrients applied (d) dates and method of nutrient applications (e) crops planted (f) planting and harvest dates (g) yields, and crop residues removed (h) application rate of nutrients (i) results of water and plant heavy metal analyses (if applicable) (k) dates of review and person performing the review, and recommendations that resulted from the review.
- Records should be maintained for a minimum of five years or longer if required by other federal, state, or local ordinances.

Conclusion

Nutrients (e.g., P and N) and other water-soluble chemicals can be transported from agricultural land by surface runoff and subsurface leaching to surface freshwater bodies. Management activities on cultivated land in areas of high rainfall may pose a risk to water quality. The NRCS exploratory technique utilizes existing climatic, hydrologic, and soil survey databases to estimate the loss of nutrients and chemicals by runoff and leaching from agricultural land. The technique applies runoff and percolation models to estimate water loss from agricultural watersheds. The interaction between both runoff and leaching waters and dissolved nutrients in the root zone of the soil is used to estimate the loss of nutrients from the soil. GIS software, which utilizes available spatial soil and land cover layers as well as the predicted data for water and nutrient losses, can be applied to develop digital maps. These

maps improve data presentation and communication with the clientele and help to identify trouble areas within a watershed.

Phosphorus and most nutrients are mainly lost from soils by runoff to surface freshwater bodies. In sandy soils, P can also be lost by leaching to ground water. Nitrate, however, because of its high mobility in the soil profile, can be transported from agricultural land by both surface runoff and subsurface leaching. Nutrients and agricultural chemicals are released from a thin layer of surface soil that interacts with rainfall and runoff water. The thickness of the interaction zone used in NRCS studies is ten mm; it was assumed that only a fraction of the chemical present in this depth interacts with rain water. Even in the absence of potential sources of P contamination, such as animal feedlots, intensive cattle grazing, heavy P fertilization, or P-enriched soil minerals, the agricultural land still can release enough P in runoff to cause eutrophication of freshwater bodies. In fact, certain natural subwatersheds of this region are known to discharge P or N from enriched soil minerals without any significant anthropomorphic source or activity. Compliance with the recommended P limits for confined and flowing water systems appears to be a formidable task. Management practices or nutrient attenuation mechanisms (e.g., riparian wetland) that can reduce P concentrations in runoff waters before they are discharged into freshwater bodies should be considered. To be most effective, P management efforts should be targeted to identify “hot spots” within a watershed, or areas that are most vulnerable to P loss.

Alternative Uses of Poultry Litter

Turning Chesapeake Bay Watershed Poultry Manure and Litter into Energy: An Analysis of the Impediments and the Feasibility of Implementing Energy Technologies in the Chesapeake Bay Watershed in Order to Improve Water Quality

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Sally Bradley, Chesapeake Research Consortium

Chesapeake Bay Program Office

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Demonstration Project: On-Farm Gasification System, Frye Poultry Farm (West Virginia)

Based on the results of the above mentioned project, a small scale gasification unit has been constructed by Coaltec Energy on a poultry farm owned by Josh Frye in Wardensville, West Virginia. The purpose of this demonstration project is to prove the economic viability and feasibility of converting poultry litter into energy using a gasifier unit. At the time that this report was written, the first test burns had been conducted and the equipment optimization had taken place.

The system on the Frye farm is a fixed bed gasification unit that is used to produce heat from poultry manure in order to provide heating for the farm’s three chicken houses. Although this unit will only be heating three houses, it has the ability to heat up to a total of six houses. In addition to saving the farmer money on propane costs, heating the chicken houses with heat generated by this unit rather than by propane is expected to improve bird health since it

provides dryer heat to the houses, thus reducing the humidity level in the house and lowering ammonia generation and exhaust.

The moisture content of the manure varies depending on where in the chicken house it was collected and whether or not there was a hole in the roof through which the rain could drain onto the floor of the house, thus increasing the manure's moisture content. Wetter fuel makes it more difficult to maintain the gasification process and causes less energy to be gained from the process. The three houses on the Frye farm will be cleaned after every flock (six weeks), which provides a total of approximately 70 tons of litter. On occasions when the litter is too wet, it will be blended with wood chips. This is what happened on the first day of the test burn. The mortality will also be gasified in the unit. The preliminary results showed improvement in the performance of the gasifier when the dead birds were mixed with the litter. The reason for this is uncertain, but one possibility is that the fat of the birds improved the process. The labor required to maintain and feed this unit is very low because it is equipped with a control panel that can be managed remotely, the temperature and emissions are measured with automatic sensors, and the computer calls for fuel when it's needed. A hopper will be attached to the unit which will gradually feed the gasifier. This hopper will need to be filled with fuel every three days, except for when the fuel requirement is relatively low, such as in the summer when the hopper will need to be filled even less frequently, perhaps only once a week. The litter doesn't need any preparation; it will be used as it is when it comes out of the barn. Two storage facilities will be built on the farm close to the gasifier, one for the litter and one for the ash/char. In the primary stage of the process used by this system, a relatively low temperature (around 1300 °F) and oxygen starved conditions are maintained. The resulting product is a gas mixture (synthesis gas or syngas) which is burned in the secondary chamber at 2000 °F to generate heat. The volume of the ash that is produced is significantly lower than the original litter, causing it to be cheaper to transport. The ash content of the litter is expected to range between 18%-20%, thus if 750 tons of litter were gasified in this system per year, then they should be left with approximately 150 tons of ash per year. The ash is odor and pathogen free and has characteristics that make it suitable for land application. Another end product that this system could produce, rather than ash, is bio-char. The bio-char product would contain all of the phosphorus, potassium, and micronutrients that were originally present in the litter. The fertilizer value of char is higher than that of the ash because it contains a portion of the nitrogen that was not oxidized in the gasification process. It also contains some of the carbon that was not totally oxidized. What is special about bio-char is that it is much more effective than other organic matter, such as common leaf litter, compost, or manures, in retaining most nutrients and keeping them available for plants. Interestingly, this is also true for phosphorus which is not at all retained by 'normal' soil organic matter. Bio-char also behaves as a carbon sink which is effective in the mitigation of climate change. However, because the benefits of biochar are just now beginning to be understood and studied, the Frye Farm does not expect to be able to find a market for it any time in the near future. Therefore, they have decided that they will instead make and try to market the conventional ash. It is thought that cultivating a viable market for this product is much more realistic, especially in the near term.

The equipment being installed on the Frye farm is manufactured by Westwood Energy and costs approximately \$600,000. Funding for portions of this project has been provided by the Natural Resources Conservation Services through a Conservation Innovation Grant and from the WVDA. The poultry grower also expects to receive payback from the propane savings, which is expected to total about \$30,000-\$40,000 per year. Additional income could also potentially be gained by trading nutrient and carbon credits and selling the char as agricultural fertilizer.

Several other poultry litter fueled gasification units have been proposed in the Chesapeake Bay watershed and throughout the United States, but many of them have not actually been constructed.

Litter Transfer

The West Virginia Conservation Agency and the USDA Natural Resources Conservation Service have finalized a Litter Transfer Program that will greatly increase the amount of poultry litter that is transported out of the Chesapeake Bay watershed. NRCS has committed \$400,000 per year for the next three years to transfer litter from the Bay to locations outside of the Bay drainage area. NRCS is currently offering a payment rate of \$10.00 per ton for producers of poultry litter within the priority watersheds of the WV Bay drainage area.

Since the 1990s, NRCS and the WVCA have worked together to implement a successful litter value added and litter transfer program for the Potomac Valley and Eastern Panhandle. A variety of approaches have been promoted with variable successes. The Potomac Valley Conservation District established and operated a litter composting demonstration site to demonstrate 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 was the value of creating consistent physical properties of the compost, an important consideration for uniform, calibrated spreading on land as a soil amendment. The success of any litter transfer program is directly influenced by the continuously fluctuating commercial fertilizer market and equally so the cost of fuel and transportation. Government programs lack the flexibility to rapidly adjust to outside market forces. Additionally, supply of and demand for litter fluctuations, depending on the season, add an additional variable to manage within the context of a government program.

Federal, state and local agencies are exploring the concept of a centralized storage facility in north central West Virginia that could be operated by a non-governmental entity. There may be an opportunity to partner with a private business that could offer litter along with other commercial fertilizer products. This would facilitate the movement of litter from the Chesapeake Bay to western areas of the state. The ability to store litter in a large, centralized location could also bridge the supply and demand gaps. There are opportunities within existing NRCS programs to offer differential incentive payments to the producer and receiver if some of the marketing externalities could be minimized. NRCS will continue to develop this concept as

well as other litter transfer opportunities including the promotion and evaluation of a bagging system as utilized in northwest Arkansas and eastern Oklahoma to transfer raw litter or to produce and transfer composted product out of the watershed.

West Virginia will continue to explore alternative uses of poultry litter. Subsidies on litter transport out of the watershed have been effective in the past and funding has been obtained to continue these programs into the future. The PVCD is also in the process of working with sister Conservation Districts outside of the Bay drainage to set up central distribution sites for litter marketing.

The PVCD has strongly supported commercialized composting over the past ten years and has been successful in the start-up of two private composting businesses that are bagging and marketing the finished product out-of-state. The composting process significantly reduces the nitrogen content of the finished product. Well over 50,000 tons of poultry litter have been processed and exported through these businesses over the past five years. 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 and outside of the watershed marketing of poultry litter for fertilizer.

A litter transport program will enable the agriculture sector to more easily reach their goal. Litter transport out of the watershed is an extremely effective nutrient reducing BMP. In 2001 to 2002 a \$75,000 pilot litter transport program, funded by the West Virginia Governor's office and Wampler Foods (now Pilgrim's Pride) was initiated. During this project, 7,000 tons of litter was transported from the watershed giving West Virginia a very significant nutrient reduction. This program not only helped us move closer to meeting our CLA, but allowed farmers in the central part of West Virginia to improve their soil. If a litter transport program is not utilized yearly in West Virginia, a significant mix of BMPs that equals the effectiveness of a litter transport program would have to be installed in order to meet the CLA.

Poultry litter can be converted to highly usable biodiesel fuel using current technology. For example, the U.S. Department of Energy's Regional Biomass Energy Program helped fund a demonstration project to develop technology that can convert poultry litter into bio-fuel. In addition, West Virginia University has discovered a relatively simple chemical process for converting agricultural waste into liquid fuel. Testing has shown that this prototype biodiesel fuel compares favorably in all respects with petroleum based diesel fuel. The university hopes to commercialize this technology within the next decade and provide educational support for on-farm conversion of agricultural wastes. The demonstration reactor is capable of converting 1-2 tons of poultry litter per day into biodiesel fuel. Continued support of this technology will be important both environmentally and economically to all poultry producers within the Bay drainage.

Another concept that has been explored is putting together a demonstration project that could reduce the over-application of poultry litter to agricultural fields in the Upper Potomac River

Basin by substituting the use of poultry litter as a fertilizer in the Chesapeake watershed with nitrogen fertilizer. This will be achieved by using a redistribution incentive fee combined with the replacement cost of the nitrogen value found in the poultry litter. While field testing a draft revised P-index system in the Upper Potomac River Basin area it became apparent that poultry producers primarily value the poultry manure as a nitrogen fertilizer. An informal survey of poultry producers showed willingness to accept replacement commercial nitrogen vouchers in exchange for the sale of poultry litter to individuals outside of the Chesapeake Bay Watershed.

While the P-index will reduce risk of delivery of P to receiving waters, it does not address the continued application of P above crop need. Poultry litter nutrient content commonly contains approximately an N-P-K of 3-3-3, potentially resulting in soil test P levels being above what is needed for crop utilization. It is obvious following years of poultry litter applications that soil test P levels will potentially exceed crop needs. Providing an incentive to poultry producers to use Urea fertilizer as an alternative to poultry manure will eliminate an unnecessary application of approximately 50 pounds of phosphorous for each ton of poultry litter excluded. Additionally reductions in Nitrogen application quantified by pre side dress nitrate testing associated with the application of Urea fertilizer may potentially reduce the amount of nitrogen application. Providing an equitable transfer incentive will cause poultry litter to be transferred from application to sensitive watershed and soils, to the Ohio watersheds that have soils with lower P levels that will respond favorably to the application of poultry litter as a fertilizer.

Natural Stream Restoration

Natural Stream Restoration (NSR) is a new and evolving technology within West Virginia. The intent of NSR design is to restore conditions that will allow natural fluvial processes to create a stream bed that is both stable and complex. This 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. The WVCA is a strong proponent of this emerging technology and has successfully installed several demonstration projects within the Bay drainage. Additional projects are currently in the planning stages and will be implemented within the next year. Of these demonstrations, one particular project site was estimated, based upon bank pinnings, to be contributing 3000 tons of sediment to the Potomac River annually before installation. West Virginia will continue to support this technology and promote funding opportunities which will have a significant impact upon sediment loading to the Bay.

Farm Land Easements

Conservation easements will be used basin-wide to help prevent transition of agricultural land, with minimal impervious surfaces, to suburban or urban uses. A conservation easement is a flexible legal tool that enables landowners to permanently protect the natural, scenic, and historic values of their property from development and subdivision. Because an easement is perpetual, it is transferred with the property when it is sold, thereby protecting the land

forever. While many easements are donated to county and state governments or qualified non-profit organizations, there are several programs in West Virginia that, if funded, could purchase conservation easements on important farmlands. The Farm and Ranch Land Protection Program coupled with the county-based Farmland Protection Boards springing up throughout West Virginia can work together to purchase development rights from farms, keep farmers working on their land, and provide money that may enable farmers to install more BMPs. Funding should be sought to match federal funding for agricultural easements and assistance and support should be made available to counties and local organizations wishing to accept conservation easements in West Virginia.

Nutrient Trading Program

From the *West Virginia Water Quality Nutrient Credit Trading Program* guidance document:

“Currently, West Virginia does not have sector specific regulatory control requirements applicable to agricultural nonpoint sources. At a minimum, a current nutrient management plan must be developed before credits can be generated. Any additional baseline requirements will be calculated and applied on a basin by basin basis to reflect the specific trading and watershed situation. Case-by-case requirements may be imposed on agricultural operations in areas where runoff impairs surface water quality or where groundwater is declared to be at risk.

The WVDEP recognizes that there are factors of uncertainty and risk in the ultimate success of nutrient reductions that are to serve as the basis for tradable credits. This uncertainty and risk will be addressed in several ways:

a) We have established in this guidance that a baseline is necessary before you can trade. Uncertainty is accounted for in the calculation of ratios applied to point-to-nonpoint trades.

b) Conservative assumptions. The department will use conservative assumptions and methodologies for calculating credits. In the Potomac, these assumptions have been employed within Nutrient Net credit calculation methodologies... The department will continue to confer with experts in agronomics and other specialized areas in order to employ the best available science when applying its credit calculation protocols.

Where appropriate, trading ratios will be applied to account for uncertainties inherent in estimating the delivered loads and reductions in the absence of daily site or stream monitoring and other cost-prohibitive measures. Despite conservative estimation methodologies, remaining uncertainty can include but is not limited to estimating the effect of temporal, spatial, and water quality factors specific to reductions that cannot be captured by models and methodologies - these uncertainties can include: the variation in annual/seasonal weather, in the fields and crops, in human practices, in receiving

streams, in the estimation of past loadings, and in the equivalency of various forms of pollutants (e.g. bound vs. biologically available phosphorous).

c) Reserve Ratio. The department will adjust all load reductions available for credit generation to populate an annual risk reserve of credits to be used in the event of natural or otherwise unforeseeable/uncontrollable causes of project failures.

d) Verification. The department and/or its agents retain the right to conduct audits or verifications of baseline and reduction activities/technologies. The department will also require a level of monitoring and verification of the point sources using credits for permit compliance, or their agents, to ensure the integrity of credit generating activities. Sampling and other monitoring will be conducted when/where appropriate.

For instance, the department regularly conducts water quality monitoring at monitoring stations throughout the state, and this data can be used to assist in the evaluation of any impacts from use of trades in NPDES permits. It should be noted that the data derived from water quality monitoring sites within the Chesapeake Bay drainage area is provided to the EPA Chesapeake Bay Program to help calibrate the model and evaluate changes in nutrient loadings over time.

e) Transparency. A registry of credits generated and verification records will be maintained and made publicly available as part of the NPDES permit process.

f) Other. The department will evaluate this trading program at least every five years or more frequently if the department deems appropriate. Based on these reviews, the department may determine program enhancements are needed and the appropriate changes can be made. These may be shown on the department's Nutrient Trading website. Stakeholder input will be obtained prior to the changes, as appropriate."

Concentrated Animal Feeding Operations(CAFO) Regulations (See Section 8B)

The state of West Virginia plans to work with animal feeding operations that fall under the definition of a large or medium CAFO or that are designated as a CAFO to help them comply with current NPDES / CAFO rules that were enacted by the West Virginia Legislature in 2010.

The WVDA plans to work with Animal Feeding Operations / CAFOs to assist them in complying with West Virginia's current CAFO regulations:

- Assist producers in certifying that they have no discharge
- If producers have discharge, assist them in correcting discharge
- Assist producers with applications for NPDES permits when necessary
- Assist producers with CAFO related record keeping

- Assist producers with Annual Reporting
- Write Nutrient Management Plans

WVDA CAFO Program will continue to educate producers and agency personnel on the rule and its impact to the agricultural community. The CAFO Specialist will work with farmers and determine if a CAFO permit is required for their farming operation. A permit is required for those producers in West Virginia who have, or propose to discharge on their agricultural operation. The CAFO Specialist will implement this rule by educating operators about CAFO regulations through meetings and permit compliance materials. The CAFO Specialist will work with WVDEP to assist producers who need help to come into compliance. The CAFO Specialist will also work with other environmental issues that affect West Virginia.

Animal Waste Management Structures

Animal waste storage facilities are present and being fully utilized on the majority of the dairy operations in West Virginia's Potomac Basin. Herd sizes have increased over the years making these facilities less able to hold liquid manure for the prescribed number of storage days in the nutrient management plans.

To alleviate this growth factor that has occurred, USDA NRCS has prioritized EQIP funds to target the dairy farms with undersized liquid manure storage systems and will add capacity to meet the required number of storage days. 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.

Cover Crops

The Chesapeake Bay Drainage in West Virginia has a surface area of 3,505 mi². This drainage is the Potomac Headwaters watershed in West Virginia which drains parts of two distinct physiographic provinces: the Appalachian Plateau and the Ridge and Valley. The general land uses of this area are forestry (48%), agriculture (28%), urban (7%) and mixed-open (17%). Eight WV counties are located in this area: Berkeley, Jefferson, Morgan, Hampshire, Hardy, Grant, Mineral, and Pendleton. The agricultural acres in the Potomac headwaters area is approximately 583,000. The crop acres reported for 2007 by the National Agricultural Statistics Service (NASS) are as follows: Corn for silage, 11,200 acres, Corn for Grain, 15,800 acres, Soybeans 9,800 acres, Wheat for Grain 5,200 acres, all Hay 120,400 acres, Alfalfa 8,500 acres. The potential acres that could have a cover crop incorporated into a crop rotation would be approximately 42,000 acres or 7.2 % of agricultural land. The 8-county area has two distinct cropping regions. They are the Ridge and Valley area with elevations ranging from 800 to 4800 ft. and the Great Shenandoah Valley with elevations in the 450 to 550 ft. above sea level. See Figure 6.

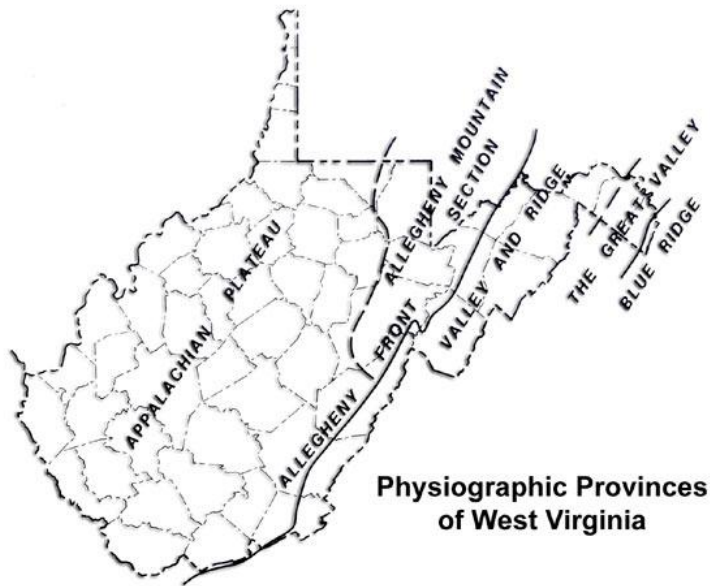


Figure 6

Currently, a high percentage of the corn for grain crop is left fallow. This is approximately 15,800 acres that could have an improved cover crop management system developed. 80% of the corn silage acres are left fallow. This is 4,480 acres that could have improved cover crop programs. 80% of soybean acres are left fallow and 80% of winter wheat that is harvested for grain, straw is then harvested and the fields are left fallow. If both the soybean and wheat crop could have a cover crop system included, the potential acres would be 5,840. The total potential additional cover crop acres of all crops would be 26,120. Incentive payments to promote cover crop adoption are available through EQIP and an increased emphasis to add this BMP will be made by agricultural agency staff.

The WVCA, in cooperation with West Virginia University (WVU) Extension Service and NRCS has successfully secured grant funding through a nationwide opportunity with the Agricultural Water Enhancement Program. This grant is tied to EQIP thru NRCS and provides special state funding for water quality improvements. The program is administered through NRCS with the state/local role being served by WVCA and WVU Extension Service with technical planning assistance. Currently, West Virginia is in year three of a five year grant and provides additional funding for cover crops within both Conservation Districts.

Enhanced Nutrient Management

- A) Adaptive Management Cover Crop.** Adoption of cover crops is a useful BMP, but to provide the nitrogen management benefit additional management steps are required. A Cooperative Conservation Partnership Initiative (CCPI) grant has been funded that adds Pre

side-dress nitrogen soil testing and fall corn stalk nitrate testing to the cover crop incentive program. When these BMPs are combined the nitrogen system can be adjusted by the farmer in a timely manner insuring that full scavenging of nitrogen by cover crops is quantified and over application of nitrogen does not occur.

- B)** Precision agriculture methods are being evaluated in the Eastern Panhandle Conservation District funded from a USDA Conservation Innovation Grant. This incentive program includes precision soil sampling, variable rate application of P, K, lime, distance hauling of animal manures, split N application, precision software on the farm and precision software, hardware for the commercial applicator. The evaluation of these conservation practices is ongoing until September of 2011, then if any of these are effective and readily adopted by landowners, USDA NRCS has the option of adding them to their Conservation Practice Standard list and farm bill cost sharing. A Project Directors report follows:
A Conservation Innovation Grant was issued through the WVU Extension Service for the purpose of encouraging the improvement in the efficient use of nutrients. Twelve producers (11 in Jefferson and 1 in Berkeley Counties) have initially signed up for the program.

Precision Soil Sampling – Monies to sample 2500 acres of forage and cropland was budgeted. As of this writing, 1,047 acres have been applied for and of those, over 350 have been sampled and recommendations developed and returned to the producer. The other acreage will be sampled this fall. Additional acreage outside the grant was also sampled or will be sampled this fall.

Variable rate applications of lime and fertilizer - Monies to apply 2,500 acres of phosphorous or potassium and 2,500 acres of lime requirements have been budgeted. As of this writing, no application of prescriptions developed from the precision soil sampling has been applied. It is hoped they will be applied this fall. The difficulty is finding a commercial applicator that is willing to invest in the technology. One producer plans to invest in a “pull behind” spreader to meet the needs on his 1,000 acre crop farm. ** Payments for precision soil sampling are not made to the applicant unless the recommended nutrients are applied at a variable rate, so no payments on either of these practices have been made at this time.

Nitrogen Evaluation for Corn\ Split Application of N – Monies to evaluate 60 fields for the need for additional nitrogen after the initial application and apply additional N to 1,375 acres was allocated. A requirement of the program was that no more than 50 pounds of N be applied at planting. Farmers from forty fields applied for the practice, but most of the fields had applied more than 50 pounds at planting which made them ineligible for the program. Only 16 fields totaling 534 acres qualified for the two programs. Several producers vowed to apply less nitrogen in the spring during the 2011

corn crop year. Several of the fields that were evaluated did not need additional N and all fields applied less N than would have been applied if the evaluation had not been made. The total commercial N not applied was 23,090 pounds. This saved producers over \$11,000 in nitrogen costs.

Late Season Corn Nitrate Test\ Cover Crop - Monies were allocated for 60 fields to be evaluated for late season corn nitrate testing. Fields must be in the optimum or high range to qualify for the cost share on cover crops. If the acreage was in soybeans, the acreage also qualified for the cover crop program. All acreage must be planted by October 15th. Farmers from 38 fields applied for the testing program, and 1,600 acres are being considered for the cover crop program. Late season nitrate stalk testing is being conducted in August.

Utilizing Precision Technology— Monies were allocated to pay producers on 4,575 acres to utilize yield monitoring and variable rate planting equipment to affect the production of crops and application of nutrients based on the potential or actual production within a field. Two farmers planted approximately 244 acres of corn at a variable rate based on soil types, elevation and previous yield maps. Applications have been accepted for 4,149 acres to be harvested with GPS guided yield monitors. Farmers and custom harvesters are investing in equipment and expertise to gather the data and develop yield maps for producers.

Manure Hauling – A program was developed to encourage dairy producers to haul liquid manure more than a half of a mile away from the farmstead where it was created. A payment of \$2.50 per loaded mile was developed with an allocation of \$10,000 for this practice. Two dairy farmers have participated in this program. Of the 4,000 miles allocated, 3,467 have been driven moving just less than 4 million gallons of liquid dairy off the farmstead. The cost share covers approximately 22% of the cost of hauling and spreading the manure. Manure samples were taken, and application was made within the needs of the growing crop.

Riparian and Grass Buffers

The adoption of buffers in West Virginia has largely occurred voluntarily and has not fully been documented. To quantify the actual length and width of riparian zone development on individual farms, a record keeping mechanism will be added to the WV record keeping manual so this data can be added to county data sets of adoption and implementation.

WV has had tremendous success with FSA's CREP program to fund forested riparian areas in Hampshire County. As landowners become more aware of the incentives in this program and the need to protect water quality, it is expected that more will choose to install riparian buffers through CREP. An effort will be made to educate and work with farmers to implement the CREP program in the other counties in the Potomac drainage.

New Litter Transfer Technology

A) Loading Ramp: A new conservation practice standard has been added in WV. For many poultry producers, participation in litter transfer on a large scale is limited by their ability to load large high-sided trailers with conventional farm equipment. To solve this problem, and increase the volume of litter and nutrients transported out of the Chesapeake Bay watershed, a new standard design for a structure to aid in loading of commercial trucks by typical farm tractors has been developed and approved by the WV NRCS State Conservation Engineer. This loading-dock type structure is intended to be constructed near existing and future litter storage sheds and will be cost-shareable through a number of programs (e.g., EQIP, 319, and WVCA's AEP). The structure falls under the NRCS Conservation Practice Standard #634 (Manure Transfer), and will further facilitate litter transfer and complement a proposed litter transfer program.

B) Litter Baler: Litter transfer is a materials handling challenge. A new technology that solves handling and storage of poultry litter has been developed in Arkansas. This new piece of machinery needs to be evaluated in WV. A demonstration of this technology can be viewed at this website: http://www.youtube.com/watch?v=wqSemSX_s5Q A single baler located in the center of the WV poultry producing counties could generate a standard quantity of poultry litter that could be placed in a receiving farm field without risk of nutrient losses and could be transported by any flat bed truck capable of handling the weight of the three ton bales.

While the litter loading ramp and the baler do not have efficiencies associated with them, the objective is that these structures and piece of equipment will increase participation in litter transfer. Therefore, the effectiveness of these BMPs will be reflected in the increased amount of poultry litter transferred after installation.

Pasture Fertility Management

While there are several acres of Potomac Valley pastureland that have not received any litter and need nutrients that could be provided from poultry litter, reduction of pasture loading of poultry litter is a method that will be explored by West Virginia. Farmer's state that the reason they continue to apply poultry litter to pastures in the Potomac Valley is to utilize the nitrogen fraction of the poultry litter. Research has shown that varying rates of nitrogen of poultry litter push sward dynamics toward fescue dominated pasture, due to clover suppression and grass stimulation (Templeton and Taylor, 1966). Other research has shown that if legumes are established and maintained at about a third of the total pasture component, additional nitrogen fertilization is unnecessary. Research at Michigan State University shows that different combinations of four cool-season grasses with three clover species produce, on average, 14% more forage than the same grasses grown alone and fertilized with 200 pounds per acre of nitrogen. The conclusion is that it doesn't pay to apply nitrogen to pastures with 30% or greater

mix of legumes (Leep et. al.2005). Also, inclusion of legumes in pastures increases beef cattle growth rate from 0.25 to 0.50 lbs/head/day (Blazer 1969, Rayburn, 2006). We suggest that the best strategy for Potomac Valley famers that use poultry litter as a nitrogen source is to sell the litter, ship it outside the watershed (nutrient trading) and transition the pasture to at least 30% legume content to remove any need for additional nitrogen fertility

To educate and effect the change of pasture production systems to zero nitrogen inputs from poultry litter in the Potomac Valley area we would like to accomplish three tasks. The first is to select up to 15 pastures that have nutrient management records for the last five to ten years, including loading rates and frequency of applications. The selected pastures will be segregated into three groups; limited application of litter, once every 3-5 years, moderate litter applications every other year and heavy applications annual applications of poultry litter. The second task will be to collect soil samples from each selected pasture, 0-2 inch, and 2 – 4inch soil depth and submit for standard WVU soil test. The third task will to collect photographic grid pictures from the same selected pastures and determine the legume and grass content. The fertility and sward content will be evaluated to see if they have any correlation.

These data will then be used for a concerted educational effort to show farmers that nitrogen in poultry litter can reduce forage quality and the pastures without poultry litter can be as productive with higher quality forage, due to additional clover content.

Feed Management

Our goal is the continued use of these enzyme feed additives so reduced P supplements are added to feed formulations. Recent Virginia estimates show that a reduction of 30% is being achieved by the feeding of Phytase to broilers. It has been documented that West Virginia poultry is using the same feed formulations as Virginia. Modification of mineral supplements or reduction of amount used that contain phosphorus for beef cattle and horses could be new method of reducing P inputs into the watershed. This would take an educational effort to show livestock and horse owners that pasture, hay and concentrated feed contain sufficient levels of phosphorus and additional mineral supplements are not needed.

Animal Feeding Operations

Nutrient Management Plans are an important component of a CAFO operation and USDA NRCS has prioritized EQIP funds to support farms costs in developing these planning documents. EQIP funds will also be prioritized to assist AFO farmers complete NMPs. CAFO regulations are new to West Virginia, as recently as early 2010. As such, we anticipate water and waste handling within the production area of animal feeding operations to improve as producers act to meet the new requirements. Also as a result, a number of new nutrient management plans will be developed for operations that previously did not have one, and existing/outdated plans will be accordingly updated. In short, the actions taken to meet WV's new CAFO regulations

will increase the number of implemented BMPs and reduce nutrient loss, having the added benefit of furthering our efforts to achieve the Bay TMDL.

Reduced Tillage on Crop Land

This farming practice has been identified as a major cause of nitrogen loss in WV. During the next three years the actual tillage methods used on all crop land will be quantified by cooperating farmers using nutrient management plans and record keeping systems describing actual field activities. Our goal is to reduce conventional tillage by 30% within the three year period. Combining conservation tillage with increased nutrient management acres, especially in the heavily targeted counties of Berkeley and Jefferson will most definitely result in lower nutrient delivery factors to local streams and thus the Bay.

P index System

The new P index accounts for the solubility of the source of phosphorus being land applied. The Revised Universal Soil Loss Equation v.2 (RUSLE 2) has been incorporated into the P index and is now used to calculate the sediment delivery factors to edge of field. Soil drainage class has been included to account for the potential of subsurface loss of phosphorus.

Technical review and update is being developed by WVU's College of Agriculture, Division of Plant and Soil Sciences faculty to insure that current phosphorus land management science is being used. This update will be added to the WV-NRCS Nutrient Management (590) Conservation Practice Standard in 2011 and will serve as guidance for all nutrient management plans. The standard will include nutrient management strategies that offer the no application recommendation when soil test results indicate a high level of phosphorus. It is anticipated that an updated P-Index will further reduce the amount of phosphorus loss to surface water within the state. West Virginia will continue to evaluate the changes that are being made and see how they will be adaptable to West Virginia's soils.

8A.a.3. OTHER APPROACHES TO IMPLEMENTATION

Education

The size and scope of educational programs within the Chesapeake Bay Watershed areas are vast, but conducted by relatively few personnel within a limited number of producer and government organizations. By working together, farmers and support agencies enable agriculture to remain competitive, and profitable, thus ensuring the sustainability of the family farm and the rural way of life. West Virginia leads the nation in the percentage of family farms and recognizes the value of sustaining this tradition.

Through the efforts of the NRCS, Conservation Districts, WVDA, WVCA, WVU Extension Service and producer organizations, West Virginia has had a very strong educational initiative for agriculture throughout the Potomac Headwaters region. Farmers have voluntarily participated in federal and state cost share programs that have been recognized as success stories both regionally and nationally. Educational outreach provided by the technical agencies was instrumental in the success of these programs.

The agricultural sector promotes increased educational opportunities for development and implementation of agriculture nutrient management plans and new BMPs. Therefore, support through additional financial resources for agencies developing nutrient management plans and encouraging BMP installation would help in reducing nutrients to the Chesapeake Bay. Continued outreach to producers with existing nutrient management plans on the importance of maintaining and following their plans will be invaluable in limiting the over-application of nutrients.

West Virginia can also turn to other states and organizations to find programs that are beneficial to the agriculture community and continue to educate them on the importance of being good stewards of the land. Programs such as Ohio's Livestock Environmental Assurance Program, The National Pork Producers, Cattleman's Association Programs and Grazing schools are all important tools that can be utilized for farmer education.

One approach to education that is under consideration by WVU Extension service is found in the Journal of Soil and Water Conservation. It is titled, "People in Ecosystems/Watershed Integration: A dynamic watershed tool for linking agroecosystem outputs to land use and land cover" (2010).

Funding

Farm Bill Program funding for WV

Environmental Quality Incentives Program (EQIP) funding is anticipated to double by FY 2012 and additional fund may be available on a request basis to support accelerated practice implementation in the bay region and in West Virginia. The NRCS is poised to work with landowners through the EQIP and WHIP Programs to augment streamside buffers and natural stream stabilization techniques to reduce soil loss from critically eroding streambanks in the watershed. As mentioned earlier in the WIP, NRCS is committed to increasing 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.

WVCA - State Funding

WVCA is committed to seeking increased 319 funds within the drainage. Watersheds will be evaluated and ranked for watershed based planning and funding as staff allows. The state will continue to put Agricultural Enhancement Program (AEP) dollars on the ground in the Eastern

Panhandle Conservation District and initiate the development of a working group to bring additional funds into the Potomac Valley Conservation District for implementation of agricultural practices.

Agriculture Water Quality Loan Program

The Agriculture Water Quality Loan Program works cooperatively with the WVCA and the State Revolving Fund Program (SRF) to provide low interest loans through local banking institutions for agricultural and conservation improvements.

WVDA – State Funding

WVDA has requested supplemental appropriations for the current budget year and for an improvement package for subsequent budgets from the West Virginia legislature. If approved, this money will fund a Nutrient Management Planner and another Tracking and Reporting Specialist.

Chesapeake Bay Grants

State agencies plan to utilize federal grants for implementation of portions of the Watershed Implementation Plan.

The WVDA plans to use its portion of the Chesapeake Bay Implementation Grant (CBIG) to continue employing a nutrient management specialist to update and increase acreage under Nutrient Management Plans. The WVDA will also continue its water quality monitoring program, and outreach and education efforts. This grant will also allow staff to travel to Chesapeake Bay related meetings.

The WVDA is planning to use its Chesapeake Bay Regulatory and Accountability Program (CBRAP) Grant to employ a CAFO specialist, tracking and reporting specialist and a watershed implementation plan coordinator to expedite the development and implementation of West Virginia's Implementation Plan.

Account & Report all BMPs

Farmers in West Virginia have historically worked to maintain and improve water quality on their operations. Many farmers also install practices without federal or state cost share dollars and these are unaccounted for by state or federal programs. It is WV's priority to account for all previously installed BMPs. West Virginia may provide data demonstrating the efficiencies of and accounting for BMPs that are not currently recognized by the Chesapeake Bay Program but have confirmed reductions of nutrients and sediment entering the stream. Unrecognized BMPs will be developed and proven by using data and research from NRCS, WVU and Extension scientists, and presented to the Chesapeake Bay Program for review.

West Virginia is currently working with EPA, NACD and other Bay jurisdictions to develop protocols for tracking and reporting non cost share BMPs. This effort will pay off in two ways;

first it will help to make base assumptions in the model more accurate and second, it will help with buy in, which should in turn, increase BMP adoption and implementation rates. It is important for West Virginia's agricultural community to know that they are receiving credit for ALL the conservation work they have done.

The state of West Virginia must also work to verify and correct agricultural practices and land uses that are misrepresented in the Chesapeake Bay Model. It is believed that a significant amount of agricultural baseline data in the model does not reflect reality causing practices that have been installed (i.e., low till and no till) to receive no credit and land uses that are over reported (such as assumed AFO land that does not exist) to appear as large agricultural loadings when they may not exist.

Development of New BMPs

Research on new and innovative BMPs will be pursued. Research should be initiated to develop BMPs that provide additional revenue to the farmer through improved production and profit as well as substantial environmental efficiencies. West Virginia will also encourage the development and acceptance of BMPs that are currently not recognized by the Bay Program. Rip-rap is a practice not recognized by the Bay Program, yet installation reduces sediment and phosphorus loss by holding stream bank soil in place.

Research by universities, the NRCS and other resource agencies will continue to measure the effectiveness of current BMPs as well as develop area-specific BMPs. Research on soil types and their nutrient holding capacities will also be very valuable in helping West Virginia understand BMP efficiencies. Emerging technologies, including genetic engineering, feed efficiency and new feed additives, have the potential to decrease supplementation of additional nutrients within livestock and poultry rations. Enhanced utilization of micro and macro mineral components and increased efficiencies of nutrient class conversions (protein, energy) could become prevalent in future BMP scenarios.

8A.a.4. CHALLENGES TO IMPLEMENTATION

West Virginia has been actively involved in pollution reduction programs for more than 20 years. Many of the region's farmers have participated in these voluntary programs, clear evidence of a grassroots movement to reduce the flow of agricultural pollutants into our waterways, including the nutrients and sediment that then flow downstream to the Chesapeake Bay. A well recognized problem is that the WIP process was set up on such a tight timeline that the final product may not be as desirable as some would like. The West Virginia Agricultural Subcommittee offers the following comments/concerns regarding the Watershed Implementation Plan process:

The Chesapeake Bay Watershed Model is known to be flawed.

Agricultural land uses and reductions from BMPs applied to these land uses seem to be misrepresented in the model. West Virginia must embark on a large scale project to inventory and evaluate what is truly on the ground.

Undue scrutiny has been placed upon the agricultural sector to reduce nutrients and sediment to the Chesapeake Bay. Much effort and investment by the landowner and the government has been directed at agriculture over the past decade and much has been accomplished. It is the opinion of West Virginia that the nutrient reductions have not been fairly proportioned with other sources of nutrients and sediment to the Chesapeake Bay.

It is believed that BMPs which farmers have been encouraged to install have not been given adequate efficiencies in the Chesapeake Bay Model. These practices are now considered to be less efficient than at the time of installation. These reduced efficiencies now require additional BMP installation, and there is concern about the efficiencies not adequately reflecting the true nutrient and sediment reductions.

West Virginia is not receiving credit for installation of non-cost share BMPs. Many local farmers opt out of government cost share programs due to the competitiveness of the cost share dollars and have installed land management practices without the benefit of government assistance. It will be a huge burden on the state to track and report all of these practices.

The expense of installing additional practices should come with stronger incentives. Currently, landowner match is required for installation of additional BMPs, therefore reducing farm profitability and increasing tax burdens on some producers. Unlike private industry or municipal treatment plants, the farming community does not have the luxury of raising the price of the commodities produced to recover the costs of additional BMPs. It is the desire of the agricultural community to seek grant based funds for additional BMP installation as well as supplementary funds to cover maintenance and taxes.

Everyone should help clean up the Chesapeake Bay but not at the cost of farm families being forced out of business. The nation's food supply relies upon the sustainability of the family farm. Installation of practices and the removal of prime farmland is expensive and affects the farmers' bottom line.

8A.b. Accounting for Growth

To account for growth within the agriculture sector of West Virginia's portion of the Chesapeake Bay watershed, an analysis of documented trends in county-level agriculture census data was performed (i.e., NASS). While the exact future is uncertain, especially given recent economic conditions, these trends are sufficiently defensible and derived from public-accessible published data.

This analysis was based on trends of the following indicators:

1. Land area used for agricultural production
2. Poultry sector
3. Inventory of cattle
4. Other livestock

Land area used for agricultural production

This land area includes all cropland, whether it was harvested or used for crop production. It also includes pasture land, regardless of whether animals were actually pastured. A decrease in agricultural land is evident in Figure 7. This decrease has occurred every census year since 1987, with the rate of decline becoming more significant from 1997 to 2007. This decrease is perceived as a result of an aging farm population combined with increased pressure on open lands for residential development.

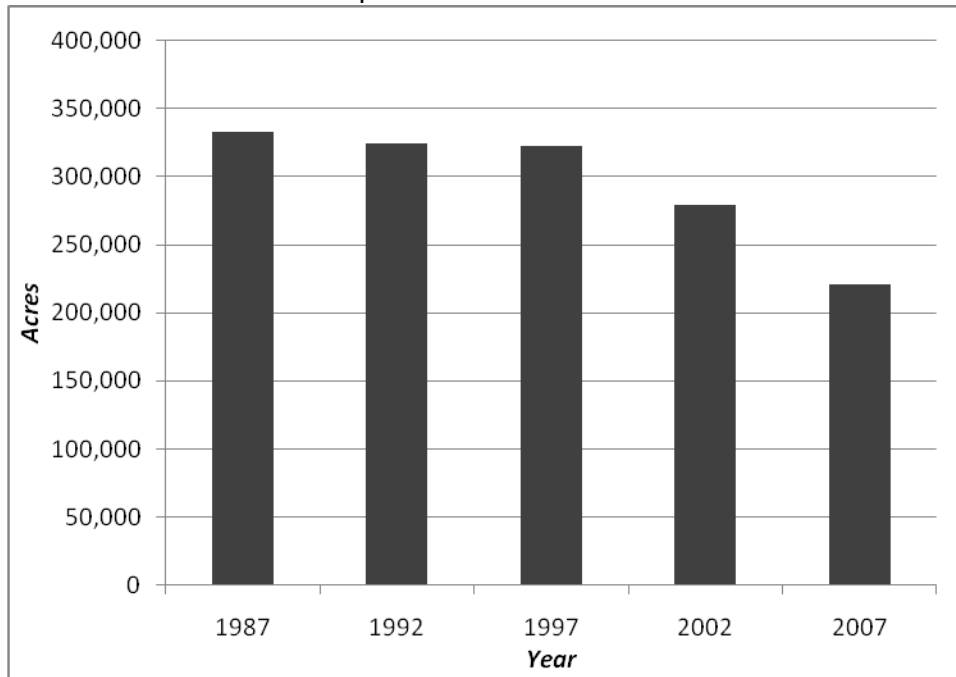


Figure 7: West Virginia Chesapeake Bay Watershed Cropland by Agriculture Census Year.

Poultry sector

The poultry sector is the dominant agricultural sector in the West Virginia counties located within the Chesapeake Bay watershed and accounts for a significant portion of modeled delivered agricultural nutrient loads. The metrics used to establish trends in this sector were the number of broilers, pullets, and turkeys sold, as well as the inventory of layers during each agriculture census year. Broilers and replacement pullets comprise the vast majority of poultry numbers within West Virginia, as can be seen in Figure 8. This sector experienced rapid growth in the 1980s and 1990s, but has since leveled off. Industry analysts predict a slight growth in U.S. production (i.e., 2% per year) over the next 15 years. Turkeys and layers are a much smaller portion of the poultry sector, and have both experienced a reduction in numbers from 2002 to 2007.

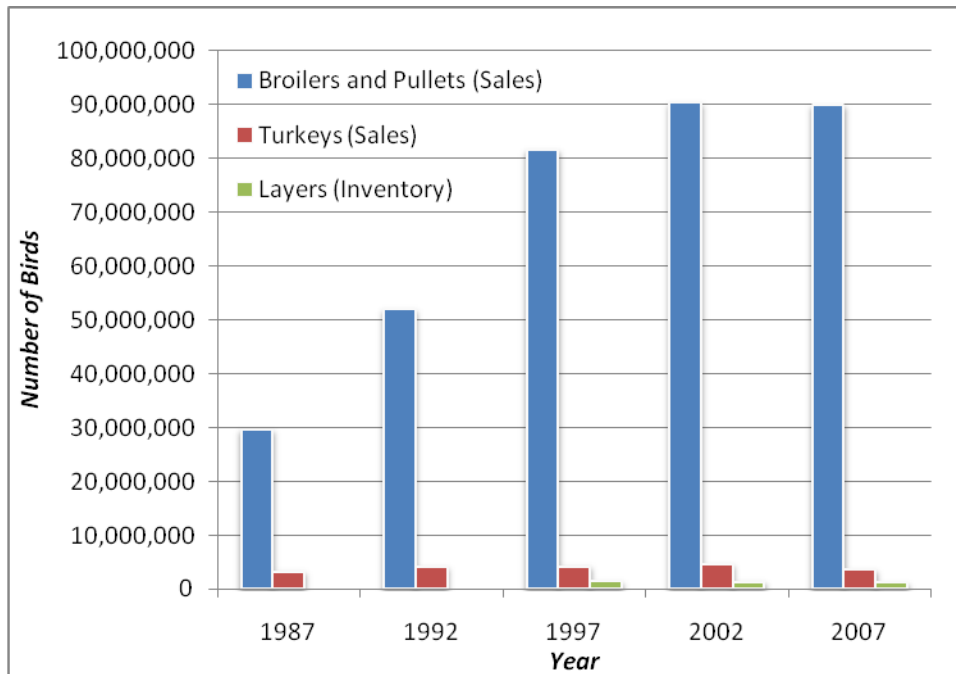


Figure 8: Poultry Sales and Inventory in West Virginia Chesapeake Bay Watershed by Agriculture Census Year (Layer data not available for 1987 and 1992) †

Inventory of cattle

The inventory of cattle includes dairy and beef, as well as all calves. In general, dairy is a very small part of the West Virginia agricultural industry, and was therefore combined with beef. The beef sector has remained fairly consistent over the past 20 years (Figure 9). No growth is expected within this sector; in contrast, a decrease in numbers may be realized as pasture acreage continues to decline.

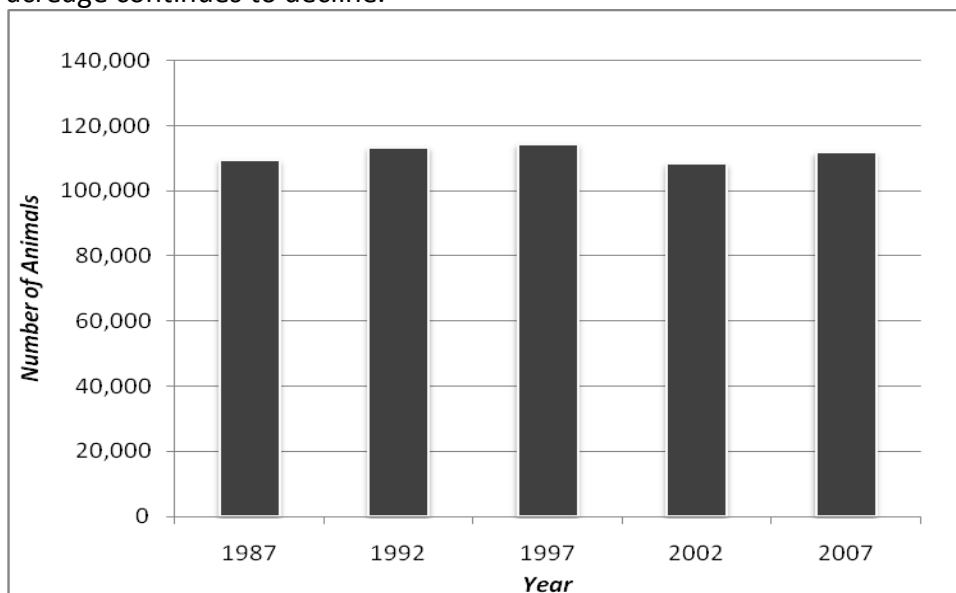


Figure 9: Inventory of Beef and Dairy Cattle and Calves in West Virginia Chesapeake Bay Watershed by Agriculture Census Year

Other livestock

The metrics used to establish trends in other livestock were sales of sheep, goats, and hogs during each agriculture census year. These sales are displayed in Figure 10. There has been a significant decline in hog and sheep sales over the past 20 years. It is not expected that sheep or hog sales will increase to previous levels. Goat sales increased from 2002 to 2007, but remain a very small portion of the agriculture industry.

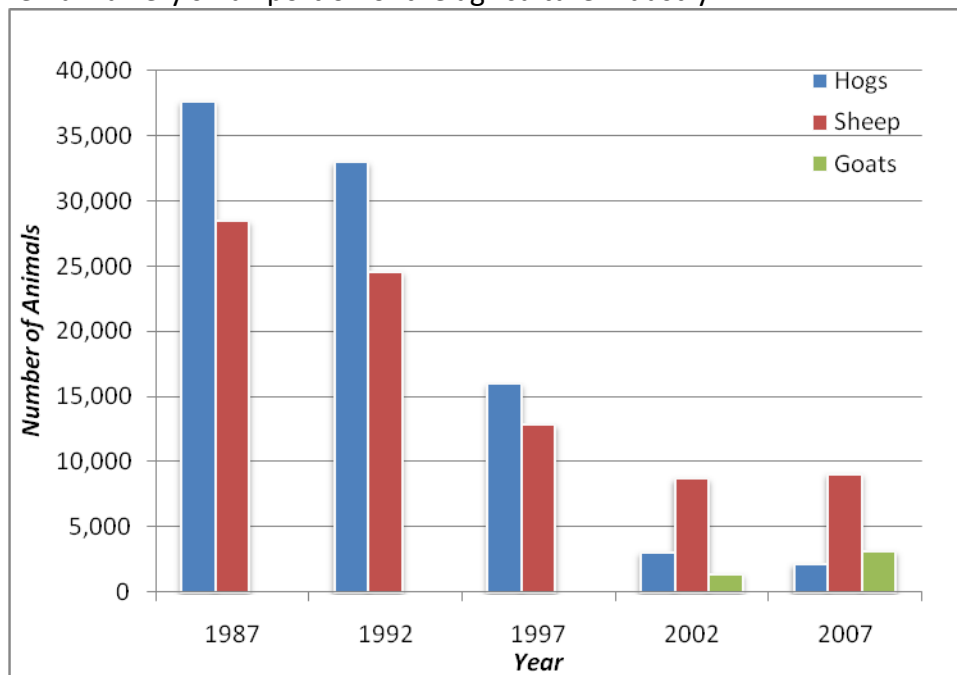


Figure 10: Sheep, Goat, and Hog Sales in West Virginia Chesapeake Bay Watershed by Agriculture Census Year (Goat data not available until 2002)†

After a brief investigation of trends, it is apparent that there is not likely to be any significant or meaningful growth or nutrient loading increases within the agriculture sector of the eight West Virginia counties that are located with the Chesapeake Bay watershed. As further evidence of decreased nutrient loads from agriculture, the Chesapeake Bay Model 5.3 'No Action' scenarios for 1985 and 2010 are referenced. These scenarios indicate that the edge-of-stream nutrient loads from agriculture decreased over this time period. Specifically, edge-of-stream total nitrogen loads decreased from 14.2 to 12.5 million lb/year, while edge-of-stream total phosphorus loads decreased by over 50,000 lb/yr. These 'No-Action' decreases were realized even though the broiler industry experienced significant growth over this time period. We hypothesize that these decreased loadings were a direct result of land-use change, and the decline in agricultural land area, a trend that is likely to continue. In conclusion, census and modeled data indicated that there may very well be a continued decline in agricultural activity across these counties that will result in an attrition of delivered agricultural-derived nutrient and sediment loads to the Chesapeake Bay.

†Animal numbers were not included if not disclosed in census for privacy reasons (i.e., counties that only contained a single farm of a specific animal type)

8A.c. Gap Analysis and Strategy to Fill Gaps

West Virginia's sixth iteration of its input deck meets all necessary reductions for nitrogen, phosphorus and sediment. The input deck includes a variety of agriculture BMPs including nutrient management, animal waste storage, barnyard runoff and mortality composting for AFOs and CAFOs, litter transfer, cover crops, conservation tillage, pasture management and limiting livestock access to streams. Given continued targeted funding to NRCS for the Chesapeake Bay Program, it is our estimate at the current time that the technical and financial resources will be available to install and/or document the needed practices through 2017. Agricultural agencies are committed to ramping up programs as necessary to meet all goals and avoid any gaps.

8A.e. Contingencies

West Virginia is counting on the success of its voluntary approach in implementing the non-regulated agricultural portions of its WIP. The state will review its progress at the end of each two year milestone and make decisions accordingly. This adaptive management approach will allow the state to redirect funds and programs to make them the most effective

The first approach West Virginia will use is to request additional federal funds. These funds will be best spent on increased staff. Federal and state agencies will both add staff to increase educational and outreach efforts which will lead to increased adoption and installation of BMPs.

Another approach will be to request a modification of existing grants such as the Chesapeake Bay Regulatory and Accountability Program (CBRAP) grant to allow funds to be used for "on the ground" implementation of practices as opposed to focusing solely on regulatory controls and compliance rates.

8A.f. Tracking and Reporting Protocols

Federal agencies such as NRCS and FSA currently have robust tracking and reporting protocols built into their traditional BMP programs. Other agencies who do not have these protocols in place will work to develop them and account for non cost share practices that have been installed by agricultural producers in West Virginia's Potomac drainage. This may include practices such as grass buffers, forest riparian buffers, waste storage structures, cover crops, off stream watering etc. This will be accomplished with a combination of self reporting and verification.

The WVDA has recently hired one full time employee to focus on tracking and reporting and is preparing to work with a second tracking and reporting specialist that will be employed by the West Virginia Conservation Agency. The WVDA also plans to utilize currently employed nutrient management planners to take part in tracking and reporting activities while they are in the field. Once this data is collected the WVDA will work with EPA to incorporate it into the model.

8A.g. 2-Year Milestones

The West Virginia Department of Agriculture (WVDA)

WVDA is using an approach that involves building a robust Nutrient Management Program over a period of several years. At the outset of the development of the WIP, the WVDA employed two Nutrient Management Specialists. In November, 2010 a third nutrient management specialist was brought on board to focus solely on Jefferson and Berkeley Counties where delivery factors are much higher for Nitrogen. The WVDA is now working in cooperation with WVCA to hire additional nutrient management planners, and a request has been prepared to present to the Legislature this year to hire one additional nutrient management planner. With this level of commitment, the WVDA is prepared to complete:

- 35% of its Nutrient Management Goal by 2011
- 87% of its Nutrient Management Goal by 2013
- 95% of its Nutrient Management Goal by 2015
- 100% of its Nutrient Management Goal by 2017
- Maintain 100% of its Nutrient Management Goal each year from 2017 through 2025

	Acreage Under Nutrient Management Plan				
	2011	2013	2015	2017	2025
County	Amount	Amount	Amount	Amount	Amount
% of Goal in Berkeley County	0.35	0.87	0.95	1	1
Grant (acres)	2740	6850	7535	7910	7910
% of Goal	0.35	0.87	0.95	1	1
Hampshire (acres)	1600	4000	4400	4625	4625
% of Goal	0.35	0.86	0.95	1	1
Hardy (acres)	6600	16500	18150	19060	19060
% of Goal	0.35	0.87	0.95	1.00	1.00
% of Goal in Jefferson County	0.35	0.87	0.95	1	1
Mineral (acres)	1600	4000	4400	4625	4625
% of Goal	0.35	0.86	0.95	1.00	1.00
Morgan (acres)	750	2500	2750	2895	2895
% of Goal	0.26	0.86	0.95	1.00	1.00
Pendleton (acres)	4800	12000	13200	13865	13865
% of Goal	0.35	0.87	0.95	1.00	1.00

West Virginia Conservation Agency(WVCA)

The WVCA has recently acquired funding to place two new conservation specialists on staff. One will be located out of the Potomac Valley Conservation District and the other within the Eastern Panhandle Conservation District. These two positions will be geared towards implementation of 319 watershed projects. It is expected that we will continue to prioritize watersheds, develop watershed based plans and seek funding for implementation. We will also be presenting a proposal for Legislative funding to broaden the Agricultural Enhancement Program (AEP) into the Potomac Valley Conservation District in 2012. Again, this would be contingent upon Legislative support.

Projected WVCA Agricultural Implementation Goals				
Milestone	Cover Crops	Streambank Fencing	Buffers	Litter Transfer
2011	12%	17%	20%	12%
2013	24%	36%	37%	25%
2015	36%	54%	52%	37%
2017	63%	68%	67%	50%
2019	75%	80%	77%	62%
2021	87%	89%	87%	75%
2023	99%	95%	95%	87%
2025	100%	100%	100%	100%

Agricultural Strategy for James Watershed

There is currently a TMDL on the James watershed in West Virginia citing fecal coliform as the main impairment. Agricultural operations in the watershed will be working over the next several years to implement fecal coliform reducing BMPs. These practices will in turn help to reduce associated nitrogen, phosphorus and sediment.

From the Watershed Based Plan: "Potts Creek and Sweet Springs Creek of the James River Watershed are located in the southeastern corner of Monroe County West Virginia. These two tributaries comprise approximately 71 square miles of drainage. According to the James River TMDL, these streams are impaired for fecal coliform due to the surrounding land use of agriculture and failing septic systems, and are included on West Virginia's 2006 303(d) list. Potts Creek is a well known fishery and also habitat for endangered freshwater mussels. It serves as a water source for livestock and as a recreational stream for campers visiting the nearby national forest. Sweet Springs Creek is utilized by agriculture almost exclusively. These streams are the only watershed in West Virginia, south of the Potomac Valley, to be located in the Chesapeake Bay Watershed.

The West Virginia Conservation Agency and Greenbrier Valley Conservation District are working in cooperation to develop a watershed based plan for this area to address the environmental issues at hand. The partnership proposes to subcontract with a private consultant to develop an EPA approvable watershed based plan by: organizing a new watershed association, bringing together stakeholders and developing partnerships, and conducting source tracking.”

This proposal has been fully funded and a technical planning committee and watershed based plan is currently in the development. It is expected that all BMPs implemented will have N & P reducing qualities. Practices will be recorded and tracked as appropriate.

SECTION 8B. Agriculture -- Regulated Sectors: CAFO/AFO

In 2010, the West Virginia Legislature revised 47CSR10-13 to be consistent with the 2008 Federal CAFO Rule. Under the new rule, all concentrated animal feeding operations (CAFOs) are point sources subject to NPDES permitting requirements (47CSR10-13.1.a). CAFOs are animal feeding operations (AFOs) (47CSR10-13.1.b.1) that meet the definitions of large CAFO (47CSR10-13.1.b.4) or medium CAFO (47CSR10-13.1.b.6), or that are small AFOs that are designated as CAFOs because they are significant contributors of pollutants to the waters of West Virginia (47CSR10-13.1.c) or because they contribute to the impairment in a downstream water (47CSR10-13.1.c.1).

The owner or operator of any AFO that is defined or designated as a CAFO must provide substantive controls on the discharge of pollutants from production areas. Discharges from CAFO production areas are point sources and are to be classified within the wasteload allocation component of the TMDL.

47CSR10-13 also prohibits a CAFO from land application of manure, litter or production water unless a nutrient management plan is implemented for all lands under its control. If a nutrient management plan is implemented, then the precipitation-related discharges from land application areas are agricultural stormwater discharges that are not subject to NPDES requirements. Discharges from compliant CAFO land application areas are nonpoint sources and are to be classified in the load allocation component of the TMDL.

The Bay model establishes an AFO landuse that is intended to represent the pollutant loadings from the production areas of all AFOs. The TMDL allocation process relative to AFO loadings must differentiate wasteload allocations for CAFO production areas and load allocations for non-CAFO production areas. The wasteload allocations for the discharges from the production areas of compliant CAFOs should represent the residual pollutant discharges after implementation of applicable BMPs.

Because the loading associated with all AFOs in the West Virginia Bay watershed contributes to Bay impairments, 47CSR10-13.1.c.1 suggests that the EPA Regional Administrator could

designate all Bay watershed AFOs as CAFOs. West Virginia recognizes that many small AFO operations, although technically contributing to Bay impairments, are not significant contributors of pollutants to West Virginia waters or the Chesapeake Bay, and does not intend universal CAFO designation.

The production area discharge loadings of all defined large and medium CAFOs will need to be included in the wasteload allocations. Without BMP application, the production area loadings of some small AFOs would constitute a significant contribution of pollutants to West Virginia waters. A portion of those facilities may be designated as CAFOs, which would necessitate wasteload allocations for their production area loadings.

Because implementation of the new CAFO rules has only recently been initiated, the number of operations (or the percentages of animals, by type) that will ultimately constitute the universe of CAFOs cannot be accurately determined at this time. Because of this uncertainty, the Phase I WIP point source/nonpoint source delineation is based upon the best estimates of West Virginia agricultural professionals. Those estimates will be further evaluated in 2011 and any necessary refinements will be included in the Phase II WIP. Delineation of the wasteload allocation component of the AFO landuse for the Phase I WIP is based upon the proportion of the AFO landuse area represented by:

- 95% of poultry
- 80% of swine in Berkeley County
- 10% of dairy heifers
- 33% of horses in Jefferson County
- 0% of goats
- 0% of sheep and lambs
- 0% of beef heifers
- 0% of "other cattle"
- 5% of all AFO area associated with the animals not identified above

The wasteload allocation delineation incorporates best estimates of the operations that would meet the large or medium CAFO definition and provides a small allowance for uncertainty relative to defined CAFOs and future small AFO designations. The AFO wasteload allocation component was derived by applying animal waste management, barn runoff control and mortality composting BMPs to 100% of the portion of AFO area estimated to be associated with CAFOs. Attainment of the pollutant reductions associated with the wasteload allocations is targeted prior to 2017.

The production area pollutant loadings from the remaining AFO acreage are initially classified as nonpoint sources. Implementation plans shall focus compliance assistance activities on BMP implementation and pollution abatement that will avoid CAFO designation and associated permitting requirements, and allow residual AFO loadings to be maintained within the load allocation component of the TMDL. The AFO load allocation component was derived by

applying the animal waste management BMP to the proportion of the AFO landuse area represented by:

- 100% of dairy heifers not included in the wasteload allocation
- 20% of beef heifers and other cattle
- 70% horses in Berkeley County and 80% of horses in Jefferson County that are not included in the wasteload allocation
- 5% of sheep and lambs

Attainment of the pollutant reductions associated with the load allocations is targeted prior to 2017, contingent upon our ability to document and count existing controls and to discount non-AFO operations as discussed below.

Through the use of the Chesapeake Bay Regulatory and Accountability Grant, Environmental Enforcement (EE) is currently in the process of hiring a dedicated inspector to ensure compliance with West Virginia's CAFO rule and implementation of the CAFO portion of West Virginia's WIP in the Potomac watershed. Interviews have been completed, a candidate has been recommended, and the position is expected to be filled early in the first quarter of 2011. The new inspector will coordinate CAFO control by existing inspectors across the watershed and will seek their assistance when necessary to accomplish program objectives.

Like the permitting process, the WVDEP's compliance assessment and enforcement program relative to CAFO is in its infancy. Specific details relative to inspection types, evaluation protocols and frequencies will be determined after gaining additional experience. In the spring of 2011, WVDEP and EPA Region III will coordinate joint site reviews at probable CAFO operations to ensure consistency of state reviews pursuant to federal expectations. The WVDEP and the WVDA are also in the process of developing a Memorandum of Understanding to facilitate CAFO implementation. The MOU will detail the roles and responsibilities of each agency.

CAFO compliance and enforcement actions will be consistent with established NPDES protocols. Noncompliant facilities will be notified of violations and afforded a reasonable period to attain compliance. Significant instances of noncompliance and continued chronic noncompliance would subject permittees to escalating enforcement actions. At the outset, West Virginia will also focus on ensuring required permit coverage. West Virginia has a general understanding of types of operations that meet the "large CAFO" and "medium CAFO" definitions. If suspected operations do not apply for NPDES permits, inspections will be conducted and actions initiated directing permittees to apply for permits. In its execution of CAFO responsibilities, WVDEP will also note potential problematic AFOs that do not meet the CAFO definitions, but nonetheless present existing conditions that may warrant CAFO designation. WVDEP will initially coordinate with the WVDA and other agricultural agencies in the hope of timely corrective action that will avoid CAFO designation.

Many of the animal agriculture operations with AFOs, regardless of size or CAFO applicability, have implemented appropriate production area controls. Because verification protocols have not been fully implemented, progress relative to production area controls has been under-reported in previous Chesapeake Bay progress reports. Future implementation tracking must couple verification of existing controls with installation of new controls in order to accurately characterize the pollutant loadings associated with this land use. Furthermore, the methodology used to establish the AFO landuse in the existing model provides a constant AFO area, by animal type, for each farm identified in the Agricultural Census. It does not set apart farms that do not include animal feeding operations as defined at 47CSR10-13.1.b.1. WVDEP has been advised that the methodology used to represent the AFO land use will be addressed in the upcoming model revision and anticipates guidance and/or protocols that may be used to reduce AFO loadings upon documentation of operations where AFOs are absent. Any such refinements will be incorporated in the Phase II WIP.

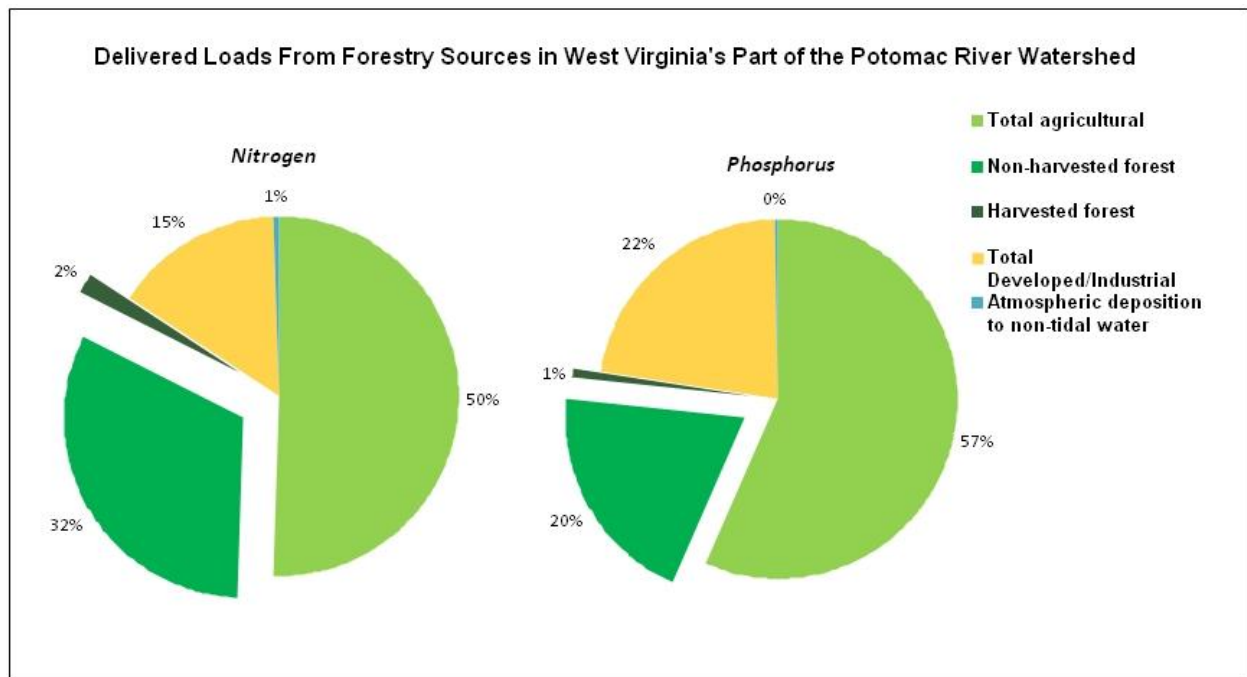
In response to West Virginia's draft Phase I WIP, EPA advised that it had not yet approved all of the proposed revisions of West Virginia Legislative Rules 47CSR10 that are necessary to implement the federal CAFO requirements. Of particular concern were the provisions of Sections 13.1.b.4.B, 13.1.b.4.B.1 and 13.1.b.4.B.2 that significantly narrow the federal definition of "Large CAFO". WVDEP agrees that the three subsections are inconsistent with the federal definition and will pursue amending 47CSR10 by deleting them. The amendment is included in the WVDEP legislative rule package prepared and submitted for consideration by the 2011 session of the West Virginia Legislature. WVDEP will use the federal "Large CAFO" definition in the interim and does not believe that the inconsistency will create any obstacles to CAFO permitting or TMDL implementation. As necessary, WVDEP will defend the amendment in the upcoming legislative session so as to allow complete EPA approval of West Virginia CAFO rules.

SECTION 9. Forestry

Forestry Section at a Glance

For the purposes of this document, Forestry constitutes that portion of the forest load from all forest harvesting activities in the Potomac Highlands of West Virginia. No new programs in addition to those already required are proposed for this section.

According to the Chesapeake Bay Watershed Model, the “forestry” sector is responsible for two percent of the total delivered nitrogen load and one percent of the total delivered phosphorus load.



Introduction

West Virginia contains 24,640 square miles, of which approximately 19,200 square miles (78%) are forested, making WV the third most heavily forested state in the nation. Eighty-eight percent (88%) of WV's timberland is held by private landowners, with the remaining 12% owned by local, state and federal governments.

Ninety-four percent (94%) of the state's forest is comprised of hardwoods. These forests contribute more than \$3.2 billion annually to the state's economy and are the only natural resource industry found in every West Virginia county. The Eastern Panhandle's eight counties consist of 3,574 square miles, with roughly 1,600 square miles in the non-industrial forest land base. A study done by WVU in 1995 indicated that the Eastern Panhandle's forest industry contributes \$374 million (12%) to the economy and 3,562 jobs (12% of area's total).

Between 2000 and 2009, the average annual timber harvest in WV's Potomac watershed was 19,237 acres per year. 2010 is on a pace to be less than 10,000 acres. During the 10-year period, 12% of the region's forested lands were harvested, 90% by selection cutting. Due to the present economic slowdown, low harvested acreages should be the trend for 3-5 more years before a slow recovery to 2005-2007 levels. An estimated average of 14,048 acres per year from 2011-2025 equals a projected 210,720 acres harvest during that period.

West Virginia's forests remain critical to the health of the Bay. Forests capture rainfall, reduce runoff and filter nutrients and sediment. Mature trees are vital to holding soils in place. It is the harvesting operations that become the problem for water quality. Forestry's approach toward minimizing pollution from these operations and, therefore, their method for developing a forestry strategy, is best understood through a historical perspective.

9a. Current Programs and Capacities

Logging

Nearly all of West Virginia's Bay forests had been harvested by 1910, and the logging practices in common use at that time caused substantial erosion of WV's lands, which resulted in sedimentation problems for many WV streams. As the forest renewed itself and began to mature, sustainability of West Virginia's forest resource became a concern. During the 1960's, Forest Practice Standards were adopted and generally agreed upon by industry, academia (colleges and universities), federal, and state agencies in order to ensure the forest's future. These Forest Practice Standards were designed to ensure clean water and a healthy productive forest. In 1972, the Forest Practice Standards were revised and voluntary compliance was implemented until 1992.

While cutting trees itself does not typically cause erosion, activities associated with logging, such as haul roads, skid trails, and log landings, as well as silvicultural activities such as site preparation and mechanical tree planting, can cause erosion and thus sedimentation if not done properly. In 1992, the West Virginia Legislature enacted the **Logging Sediment Control Act (LSCA) -WV Code 19-1B-12**. This measure was passed to control nonpoint sources of sedimentation from logging operations. Public lands in the Eastern Panhandle, which include all State and Federal Forests, are also subject to the LSCA Best Management Practices (BMPs). The LSCA addresses these activities and is summarized as follows:

Best Management Practices (BMPs) are required by law in West Virginia to be used by timber operators. BMPs are reviewed every three years by a panel of experts to ensure the latest technology is being utilized:

- Timber Operators are required to be licensed and have a certified logger on site. Small landowners who operate are not required to have a license but must file for an exemption. The exemption process only excludes the operator from the licensing and certification but they must comply with BMPs to the same degree as those licensed.

- Timber Operators are required to be trained every three years in BMPs, chainsaw safety, and first aid. Recertification training covers subjects in reclamation, silviculture, business management, sustainable forestry, equipment safety, etc.
- Emphasis has been placed on Streamside Management Zones (SMZ) to prevent exposure of mineral soil and potential erosion. The minimum SMZ width for perennial or intermittent streams is 100 feet slope distance. On ephemeral streams the SMZ is 25 feet. Soil disturbance in these areas must be minimized.
- The WV Division of Forestry (WVDFO) is mandated to inspect and enforce regulations pertaining to logging operations. The law empowers the WVDFO to issue compliance orders, suspend logging activities, seek civil penalties to prevent sedimentation, and/or issues citations under 19-1B-12.
- BMP standards require roads to be seeded and mulched to control erosion once a logging operation has been completed.

Wildfires

Since 1949, approximately 3.5 million acres of West Virginia forest lands have burned. The destructive results of these fires include timber mortality and degraded value, wildlife habitat destruction and reduction of aesthetic appeal. Extensive erosion also results from these wildfires, caused by the loss of the forest understory and leaf litter that protects the underlying soil from rainfall. This results in a major avenue for sediment to enter stream channels following a rainfall event. Studies of stream sedimentation from nonpoint sources in West Virginia indicate that wildfires on land with a history of repeated burns can have a greater impact on water quality than other potential sources, such as oil and gas, agriculture, construction and logging operations. W.Va. Code Chapter 20-3 empowers the DOF to write citations and impose fines on individuals who violate this section of the Code.

The potential for sedimentation due to forest fires is tremendous, with erosion rates ranging from 55 tons/acre to over 250 tons/acre per year following forest fires. In the West Virginia counties of concern to the WV WIP, 754 fires burned 1,430 acres of forested land over the past five-years, an average of 150 fires and 290 acres burned per year. The number and magnitude of fires was fairly consistent from year to year. Historically, drought years such as 2000 and 2002 had severe fires that burned many acres of land (3,199 and 2,769 acres, respectively), while during 2003 unusually wet conditions suppressed the potential for fires and only 89 acres burned.

The WVDFO is mandated by law to enforce the State Code that relates to wildfires. WVDFO personnel work with the public to:

- prevent fires through the education of school children and landowners
- detect fires through aircraft detection and reporting by 911 centers
- suppress fires if they should occur
- investigate the cause of fires and
- enforce wildfire law violations; Chapter 20-3.

Although some forestry landowner incentive practices such as the fire line stabilization under the Forest Land Enhancement Program (FLEP) have been discontinued, EQIP (described below) still carries provisions for grading, seeding, and mulching of critical areas and access roads.

Landowner Assistance Programs In West Virginia

Nearly 80% of the private land holdings in West Virginia are owned by 260,000 non-industrial private woodland owners. Demographics indicate that ownership size is an average of less than 47 acres per parcel, many do not live on their property, and management objectives for the properties vary immensely.

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 landowner wishing to manage their forest resource:

Environmental Quality Incentives Program (EQIP) provides forestry incentives to carry out “on the ground” practices relating to water quality measures in riparian zones, forest stand improvement, and tree planting.

Forest Legacy provides federal cost-share dollars to the state for the purchase of, in fee or by easement, private properties that are environmentally significant. The program assures that the forest resource will continue as a “working forest” forever.

Sustainable Forestry Initiative (SFI) A sustainable forest management and certification standard administered by industry to demonstrate that foresters, landowners, loggers, and wood and paper producers can operate and be an economically viable industry in an environmentally responsible manner.

Stewardship Program provides cost share assistance to non- industrial private woodland owners for preparation of a comprehensive management plan for their forest land acreage. The plan incorporates the objectives of the landowner and provides a 10-year cycle of recommendations for managing and protecting the woodland acres. The Stewardship Plan qualifies the landowner for forestry incentives for cultural and water quality based practices and the Managed Timberland initiative which includes a potential tax base reduction. Currently, 1,143 Stewardship Plans for 224,130 acres are in place in WV’s Eastern Panhandle counties.

Managed Timberland Program provides a tax reduction for landowners who properly plan and manage their forestland. (The properties are certified prior to placement in the Program and are monitored and inspected for retention in the Program.) There are currently 286,256 acres under certified Managed Timberland protection in WV’s Eastern Panhandle counties, representing a total of 1,312 landowner contracts.

Tree Farm Program is comprised of industry, state agencies, consulting foresters, and landowners. The program, which recognizes landowner achievements to properly manage their forest land, relies on training and education of the public to do responsible forest management. Cooperative Forest Management (CFM) Programs are derived from major forest products industries that conduct forest management programs which include reforestation. Since 1985, CFM programs plus mining reclamation plantings have reforested over 7,000 acres.

Current WV Division of Forestry Staffing

The WV Division of Forestry currently employs 11 foresters that work in the Bay drainage counties. Of these 11, three LSCA foresters actively inspect harvest operations and one LSCA specialist supervises these three foresters. This specialist also supervises the Chesapeake watershed forester who covers the eight counties in the Bay drainage.

There are two landowner assistance foresters who administer the stewardship and managed timberland programs. There is one NRCS forester who works directly with the Farm Bill forestry programs in the Bay counties. Lastly there are three fire foresters who handle wildfire suppression in these counties, although every forester maintains fire proficiency and readiness.

Forest Land Conservation

In 2006, the Chesapeake Executive Council recognized that retaining, expanding, and sustainably managing forest lands is essential to restoring a healthy Bay. This resulted in Directive 06-01. In response to this Directive, specific actions were later written to conserve and restore forests in the watershed. Although not signers of this response, which lists states' commitment to certain acreages of forest protection through 2020, West Virginia has informally committed to protecting an additional 1,200 acres of forestland per year. This cannot be achieved without the help of federal, state and local governments and non government organizations.

Subsequently, in 2008 and 2009 we have reported to the Bay Program, 2,886 forested acres that have been protected. This includes reports from Forest Legacy, Cacapon and Lost River Land Trust, Land Trust of the Eastern Panhandle, Potomac Conservancy, The Nature Conservancy, and Farm Land Preservation. Most of these forests were in areas considered "high-value" forests. WV will continue to commit to protecting 1,000 acres of forest land per year.

9b. Accounting for Growth

Harvesting Trends. Until 2007, the number of acres logged had been consistent over the past 20 years. However, due to the current economic slow down, trends indicate that timber harvest acreages utilizing BMPs over the past 2 years are at a 20 year low and are expected to continue through 2010. This trend of 12,836 average acreage harvested per year is expected to stay at this level through 2015, when a modest 4% growth will occur for at least three years. By

2017, harvested timber will equal 2008 levels. Then steady harvest levels through 2023 would be a result of urban sprawl, change in landowner attitudes, the prohibitive high cost of doing business, and increased environmental regulation. We do not see 2000 – 2004 levels returning until possibly the 2020's.

In the 2020's many hardwoods will be entering their third growth cutting cycle. In addition, there will be several thousand acres of loblolly pine planted starting from 1985 that will be reaching maturity. We see a possible increase in logging sometime in the 2020's.

9c. Gap Analysis

We do not anticipate the forestry sector playing a major role in filling any gaps in capacity to achieve final nutrient reduction targets. Since our harvest BMPs are regulated by law, compliance is near 100% due to strict inspection standards. Clearly we recognize that the blanket reduction of acreages receiving BMPs overestimate the amount of nutrient and sediment reductions being achieved. Currently there are studies that break down specific harvest BMPs that will allow more accurate reporting. For example, reporting will include how many water bars are installed, feet of haul road that have erosion control measures, or acreage of seed and mulch applied. When these studies are completed, more stringent reporting can be used to compute more specific reductions. An outcome would be that harvest operations on large flat tracts will have fewer reductions than smaller operations on mountainous tracts. Or harvesting on land that is to be developed may have fewer harvest BMPs applied.

9d. Strategy to Fill the Gaps

See previous section.

9e. Contingencies

Harvesting Improvement Strategy

- Maintain logger education regarding BMP standards and water quality
- Maintain technical assistance to timber operators
- Maintain current level of logging inspections by the WVDOF
- Maintain a toll free message center for loggers to easily notify the DOF of changes to the notification or harvest operation

Wildfire Hazard

Acres burned are directly influenced by weather and season of the year. Trends indicate that with the increase of urban sprawl, the landscape is becoming more fragmented. Landowner attitudes in the Eastern Panhandle are shifting toward preservation rather than conservation of the resource, which will increase fuel loads leading to more hazardous situations. Even though acres burned in the Bay area are not significant, occurrence and risk are equal to or greater than any other part of the state. Therefore, the risk of a catastrophic conflagration cannot be

ignored (see WVDOF Wildfire Hazard Chart). Fire danger will also increase due to insect and disease influence that is persistent in the area.

Legislative changes in the LSCA

Currently in West Virginia, harvesting can occur in the Streamside Management Zone (SMZ). Equipment operation in this area is limited to points where the stream must be crossed. If further reductions in nutrient and sediment are needed on harvested forests, a contingency exists for changing the law on a state level, by limiting the percent basal area cut in the SMZ, or by enacting this law for the Bay counties only. Another option is enacting an optional no-cut law in the SMZ during harvest operations, with tax incentives provided to land owners who choose not to cut. Changing the law would indeed be a difficult road and may take a few years to legislate.

SECTION 10. Air Deposition - 2013 SIP

Reserved

SECTION 11. Not used

SECTION 12. Air

Reserved

SECTION 13. Federal Facilities

Reserved

SECTION 14. PHASE II IMPLEMENTATION APPROACH

Reserved

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APPENDIX A: West Virginia Potomac River Basin Water Quality Nutrient Trading Program

List of Appendices

Appendices will be available on the web at www.wvca.us/bay by 11/30/2010.

Appendix A.1 Significant Municipal Facilities

Appendix A.2 Significant Facility Compliance Status

Appendix A.3 Typical Permit Requirements

Appendix A.4 Nonsignificant Municipal Facilities

Appendix A.5 Combined Sewer Overflow Facilities

Appendix B.1 Significant Industrial Facilities

Appendix B.2 Nonsignificant Industrial Facilities

Appendix B.3 Industrial Stormwater Summary

Appendix B.4 Anhydrous Ammonia (NH₃) Use

Appendix B.5 Mining Permits Summary

Appendix B.6 Construction Stormwater General Permit

Appendix C. Sources of Nitrogen and Phosphorus in WV Potomac Counties

Appendix D. Delivered loads of nitrogen, phosphorus, and sediment from different regions in West Virginia's Potomac Highlands.