

WV Potomac Nutrient Credit Bank and Trade Program

NRCS Conservation Innovation Grant

Final Report

**West Virginia Water Research Institute
West Virginia University
PO Box 6064
Morgantown, WV 26506**

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1.0 Executive Summary

This is the final report of a four year project to develop and implement a nutrient credit bank and trade program in the West Virginia drainage to the Potomac River (3,500 mi. sq. including eight counties). The West Virginia Water Research Institute (WVWRI), subcontractor The World Resources Institute (WRI) and multiple stakeholders have developed both a West Virginia (WV) statewide nutrient trading guidance and a Potomac basin specific nutrient trading guidance that were approved and adopted by West Virginia Department of Environmental Protection (WVDEP). The trading guidance incorporates key attributes of the Maryland, Pennsylvania and Virginia nutrient trading programs in recognition of the potential development of an interstate Chesapeake Bay-wide trading program.

NutrientNet (NN), the automated on-line baseline and credit calculation tool has been modified and upgraded to accommodate provisions of the Potomac trading guidance. The WRI, NutrientNet developer has agreed to allow West Virginia DEP to leave the West Virginia NutrientNet application on the WRI servers until such a time as an interstate trading platform has been developed and is available to West Virginia users. However, the Potomac trading guidance and the NutrientNet credit calculation tool will require modifications to the agricultural baseline, edge of stream (EOS) and delivery factors as a result of the impending Bay TMDL to be issued by USEPA in late December 2010.

Implementation of the trading program has been delayed due to the following factors:

- The TMDL is not final therefore there is not a clear and immediate regulatory driver for either point or nonpoint sources;
- The significant workload imposed on the WVDEP by the USEPA for development of watershed Implementation Plans (WIPs) as part of the Chesapeake Bay TMDL development has limited WVDEP's ability to support trading program implementation;
- The stakeholder committee recommended that the trading bank be embedded within the conservation districts with support provided by the WV Conservation Agency (WVCA). However, after extensive discussions, the WVDEP and the WVCA have decided that as state agencies they do not have fiduciary authority to act as credit brokers/aggregators;
- The uncertainty associated with implementation of the TMDL has, thus far, discouraged third party aggregators/brokers from assuming this role; and
- Several bills have been introduced in Congress that would provide funding for a Bay-wide trading program that WVDEP views as preferable to expending resources to implement the Potomac program.

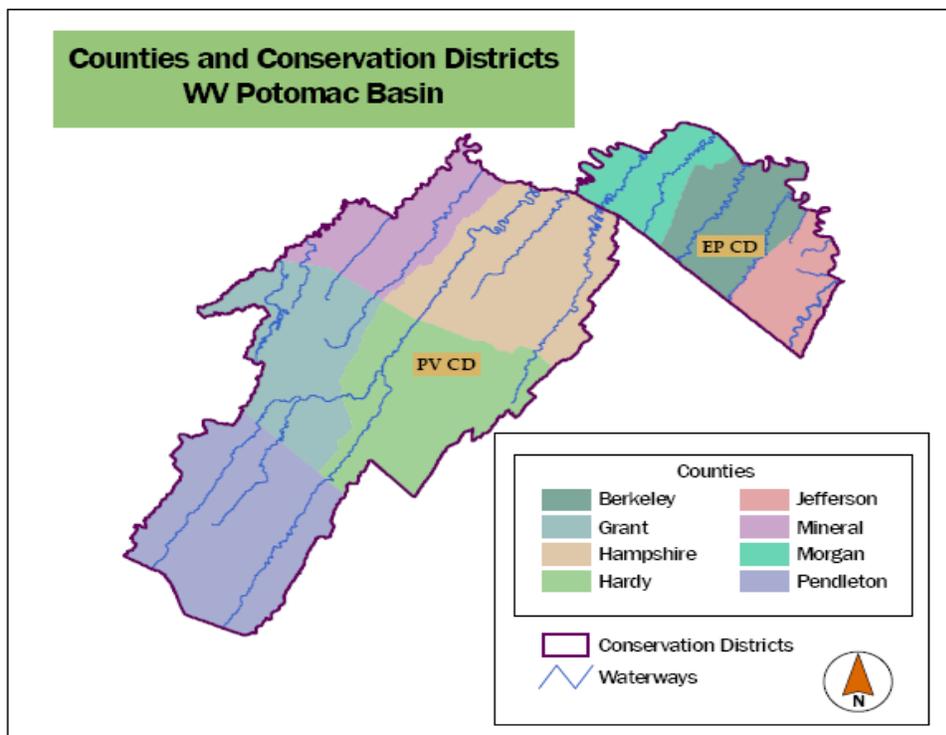
The first WV credit trade is pending between the Jefferson County Public service District (JCPSD) and Red Barn Trading, a private credit aggregator and broker located in Pennsylvania. The JCPSD has entered into a forward contract with Red Barn to provide 5,000 pounds of nutrient offsets for the new Flowing Springs WWTP. If approved by the

WVDEP and the WV Public Service Commission (PSC) this will be the first WV as well as an interstate trade.

1.0 Introduction

The primary goal and purpose of this project was to develop and implement an incentive-based trading program to more cost-effectively achieve the Chesapeake Bay cap load allocations (CLAs) for nutrients and sediment in the Potomac River drainage of West Virginia. The secondary goals were to provide for sustainable economic development in the watershed and provide a nutrient trading framework that would be transferable to other watersheds. Our objective was to develop a stakeholder driven water quality trading credit market that will provide funds from point sources to offset the cost of additional BMP installation and maintenance on agriculture operations.

The project area includes the WV drainage to the Potomac River, encompassing 3,485sq.mi including eight counties in two conservation districts: The Eastern Panhandle and Potomac Valley CDs (Figure 1).



The initial effort in this project was convening and structuring a broad and diverse stakeholder process composed of individuals from the various land use sectors (agriculture, Urban and mixed open, forestry, wastewater treatment) and state and federal agency and environmental representatives. Informed stakeholder input into the development of the trading framework and infrastructure was critical to improve the trading program design and increase stakeholder trust and support for it. A project steering committee, (at project website

<http://wwwri.nrcce.wvu.edu/programs/pwqb/index.cfm>), was formed to serve the project team in an advisory capacity and assist with outreach to both the agricultural and point source sectors. Stakeholders addressed and resolved critical trading infrastructure and element issues such as structure and function of the bank or board of trade, trading ratios, liability for non-compliance, enforcement, eligibility for trades, baselines, oversight, legal authority, transparency, etc. The project team developed and presented to the steering committee a number of comparison tables of the structure and components of the PA, VA, OH and MD nutrient trading programs attributes that were used by the steering committee to guide framework development. During this process workgroups (NutrientNet, Point Source, NPS-ag and forestry and NPS- Urban and mixed open) were formed to resolve issues that were too numerous and or complex to be addressed by the full steering committee. In order to inform the process project staff participated in numerous activities such as workshops and forums to ensure that the Potomac trading program design reflected lessons learned from other trading programs and that it would not preclude future interstate trading opportunities.

During the stakeholder process WVDEP requested that the project team develop a general nutrient trading guidance document that would have statewide application and a separate Potomac River specific guidance that would apply to the eight counties in WV's Eastern Panhandle. This approach was undertaken in recognition of the constraints the Chesapeake Bay Program and Model places on development of a nutrient trading program in the Potomac basin versus the development of a future nutrient trading program in WV's Ohio River drainage. The outcome of this process produced consensus-based nutrient and sediment trading program guidance that has been public noticed and adopted by WV DEP (Attachments A and B and at <http://wwwri.nrcce.wvu.edu/programs/pwqb/index.cfm>). However, the Potomac trading guidance and the NutrientNet credit calculation tool will require modifications to the agricultural baseline, edge of stream (EOS) and delivery factors as a result of the impending Bay TMDL to be issued by USEPA in late December 2010. Moreover, if and when a Chesapeake Bay wide trading program is developed additional modifications of the guidance may be necessary.

In addition, project partner The World Resources Institute (WRI) has completed development of WV-NutrientNet credit calculator pending modifications that will be required as a result of the final Bay TMDL. WRI Developers will finalize the NutrientNet registry, marketplace, and calculation tools based on feedback from WVDEP and WV Conservation Agency (WVCA). WRI has engaged with the West Virginia Department of Environmental Protection regarding future hosting scenarios for NutrientNet, the possibility of including West Virginia within an expanded Bay-wide NutrientNet trading tool, and future options for incorporating dynamic mapping within NutrientNet (Attachment C).

2.0 Results and Lessons Learned

2.1 Final Trading Program Guidance

The trading program guidance is final pending potential modifications to agricultural baselines EOS and delivery factors that will be required as a result of the final Chesapeake Bay TMDL. Due to the workload imposed on WVDEP by EPA in implementing the Bay TMDL the agency does not currently have the capacity to work with the WVCA agency in developing the infrastructure to support the trading program. However, WVDEP has stated that in the meantime they are willing to entertain and evaluate any trading proposals that may come forward on a case by case basis.

During the stakeholder process committee members carefully evaluated and compared the structure, major elements and attributes of the PA, MD, VA, and OH trading programs for potential adoption within the Potomac, WV trading program. Critical to success of the Potomac program was recognition that the design and implementation of a trading framework must integrate the technical and policy aspects of the program with the cultural, socio-economic and political realities within the watershed. The major program attributes and the rationale for adoption follows:

2.1.1 Policy v/s Regulation

Because the Clean Water Act does not specifically exclude trading as an option for obtaining and maintaining the physical, chemical and biological integrity of the Nation's waters trading program authority can be based on either state agency policy (PA and MD) or statute and regulation (VA and OH). According to representatives from the various state trading programs who discussed this issue with the stakeholder committee policy provides more flexibility for program adaption as needed to ensure program success. Whereas statute and regulation provides more certainty to program participants. Based on the other state trading program representative recommendation and the recognition that an EPA TMDL would likely change trading program requirements the stakeholder committee decided it would be best to develop the trading program as policy guidance with the recognition it could be adopted as statute at a later date if necessary.

2.1.2 Who Can Trade

Any combination of point sources, nonpoint sources and third party aggregators and brokers can trade. Credit trading may occur anywhere within the Potomac Basin including interstate trading with Maryland (MD) and Pennsylvania (PA), but no trade may cause an impairment of any local water quality. There was some contention over including third parties for fear that a private entity could corner and distort such a small market. However, the stakeholder committee believed that a private third party could more efficiently aggregate and broker credits than a public entity that may or may not have the experience as well as fiduciary authority in a private marketplace. Moreover many believed that a third party could more readily assume at least partial responsibility for project or credit failure by developing a pool of excess credits that could be applied to assure permit compliance.

2.1.3 Baselines

In order to be eligible to trade a point (PS) or nonpoint source (NPS) entity must first meet the baseline requirement. A point source facility must have an NPDES permitted nutrient allocation for nitrogen and/or phosphorus, and must not cause or contribute to a localized water quality problem. For point sources to sell credits the baseline is compliance with the nutrient allocation requirement in the NPDES permit. However, point sources may purchase credits to achieve compliance with their permitted nutrient allocation.

Determination of the baseline requirement for agricultural nonpoint sources was perhaps the most contentious issue addressed by the stakeholder committee. Many argued that there should not be a baseline requirement for NPS in order to encourage maximum farmer participation in the trading program. However, the issue of equity between those “good actors” who have installed and maintained BMPs and “bad actors” who have done nothing compelled WVDEP to require establishment of a baseline.

It was generally agreed by the steering committee to apply a baseline on a specific field nutrient loading rate (pounds/yr v/s whole-farm such as the MD program) as opposed to prescribing implementation of certain minimum practices (VA and PA programs) as well as a current whole-farm nutrient management plan before credits can be generated. The key issue addressed by the group was the level of loading that must first be met on a field basis. By running various scenarios in Nutrient Net we were able to determine that the most equitable baseline is the 2005 average Chesapeake Bay Model Edge of Field (EOF) loading rates for the specific land uses (High Till, Pasture, Hay and Manure) within each segment. These rates were incorporated into the trading guidance with recognition that they would have to be modified to reflect the Bay TMDL agricultural nutrient allocations when final.

2.1.4 Credit Calculation

Credits are calculated for both point and nonpoint sources from activities that reduce the amount of nutrients beyond the baseline requirement that are delivered to the Chesapeake Bay similar to the PA, MD and VA trading programs. For credits generated by agriculture the Potomac program uses NutrientNet to calculate both the baseline and the nutrient reduction that results from the implementation of various approved Chesapeake Bay BMPs using specified edge of field and delivery factors and trading ratios. However, The Department may consider, on a case-by-case basis, other calculation approaches for practices not included in the NutrientNet program.

2.1.5 Use of Credits

Credits that are certified by the WVDEP can be used by NPDES permittees to both obtain compliance with a nutrient allocation (without installing nutrient removal technology) as well as to offset a new or increased nutrient discharge. This approach is similar to PA but differs from MD and VA who require NPDES permittees to install enhanced Nutrient removal (ENR) technology before credits can be bought or sold.

2.1.6 Credit Trading Ratios

Trading ratios or discount factors are applied to all credit purchases to ensure that credits applied for NPDES compliance offset plant loads in excess of nutrient allocations and excess credits are generated that can be applied in the event of natural or uncontrollable credit failure. Three trading ratios are to be applied to each credit purchase: Reserve Ratio; Uncertainty Ratio; and Special Concerns Ratio. The Reserve Ratio is a set aside of a percent of the load reduction to be held as a “Credit Reserve”. The Reserve Ratio is 0.1 for WWTPs and 0.2 for MS4s and agricultural sources.

The Uncertainty Ratio accounts for relative uncertainty in the relationship between credit generation efforts and actual resulting nutrient and sediment reductions in local waters and ultimately the Bay – this accounts for uncertainties related to the absence of monitoring data and the challenge of estimating how individual actions affect stream loads over time and space. Similar to the MD trading program Uncertainty Ratios are not applied when nutrient reduction performance is measured or when a Chesapeake Bay approved BMP with associated effectiveness factor is applied. All other nutrient reduction practices require application of an Uncertainty Ratio to be prescribed by the Department.

The Special Concerns Ratio provides WVDEP discretion to apply an additional credit discount factor in watersheds which the Department deems to be of special water quality concern such as those located on impaired or high quality streams and/or their tributaries.

In addition to the above trading ratios all credits must be further discounted with an appropriate Delivery Factor derived from the Chesapeake Bay Model (CBM) to account for the portion of the nutrient load that is expected to be delivered from the watershed segment to the fall line of the Chesapeake Bay. It represents the effective delivery of the nutrient/sediment load to the Chesapeake Bay and the related estimated diminution of the effect of the nutrient reductions between upstream and downstream points. In addition the appropriate CBM Edge of Segment (EOS) factor is applied to nonpoint source generated credits to represent the fraction of the nutrient or sediment load originating from a given land use type that is delivered to the edge of the corresponding watershed segment. This factor also accounts for average soil types, topography, hydrology, land use, and other factors within the segment. Both of these factors are included in NutrientNet and are automatically applied to each credit calculation.

2.1.7 Credit Duration

Nutrient credits will be expressed as delivered pounds per year, and will be valid for one year. For credit-generating projects that have a longer life span than a year, credits can be generated for the life of a project but they must be verified each year. Credits cannot be banked for future years but rather must be applied in the year that they are generated in order to comply with Chesapeake Bay Program requirements.

2.2 Program Implementation

Implementation of the Potomac, WV trading program encountered many of the same obstacles and difficulties encountered by other developing trading programs:

- The lack of an immediate and clear regulatory driver and the political will to enforce compliance that will encourage point source dischargers to evaluate the economic benefits of purchasing credits to achieve compliance v/s technology upgrades. Although WVDEP has reissued a number of NPDES permits with nutrient limitations in accordance with the Potomac Tributary Strategy many have been legally challenged. Therefore, until nutrient allocations resulting from the TMDL are certain and implemented in NPDES permits and WVDEP sends a strong signal that they will be enforced point sources have little/no incentive to evaluate trading and purchase credits as a compliance option. Furthermore, until several trades are demonstrated there is a perceived uncertainty associated with the duration, and cost of credits as well as the risk of credit default inhibits publically owned treatment facilities from participating in trading;
- Under the Clean Water Act the agricultural community does not face a regulatory obligation to reduce nutrient runoff and thus is unlikely to participate in trading unless there is a large and certain financial incentive. Farmers by nature are suspect of government programs and furthermore do not believe that agriculture represents the largest nutrient loading to the Bay. Therefore, by participating in trading farmers are implicitly admitting that they are a source of nutrients and sediment. Moreover, farmers are reluctant to participate in trading because they don't want regulators on their land inspecting their operations;
- The capacity of the WVDEP to support program implementation has been taxed due to the demands placed on the agency by USEPA to develop watershed implementation plans (WIPs) to guide implementation of the Bay TMDL. However, once the TMDL is final the agency will have more resources to turn to addressing the mandate of WV SB 715 requiring the agency to develop and implement a nutrient trading program by June of 2011;
- Municipal facility stakeholders have expressed an interest in a watershed based permit to provide for the possibility of trading among point source dischargers. However, to date the WVDEP has been unresponsive to requests from permit holders. We believe that a watershed permit in the Potomac basin would likely spur point-to-point source trading providing a forum for participants to become familiar with the opportunities associated with trading including point to non-point trades that will be needed as offset credits for new facilities as well as facility expansions;
- The trading program infrastructure recommended by the stakeholder committee is to embed credit aggregation and brokering within the Potomac Valley and Eastern Panhandle Conservation Districts (CDs) with program support and outreach provided by the WV Conservation Agency and WVU Extension. The

CDs as a subdivision of state government have fiscal responsibility for implementing and managing various conservation and flood control projects. Unfortunately the agencies have determined that they do not have or want fiduciary responsibility and prefer to allow a private third party entity to assume responsibility for generating, aggregating and brokering credits. The agencies have agreed, however, to develop a memorandum of understanding (MOU) describing their respective responsibilities for supporting the trading program.

To date the only third party offering aggregating and brokering services is Red Barn Trading located and supplying credits/offsets from Pennsylvania. However the project team has had discussions with another private entity interested in serving as a credit aggregator and broker. Unfortunately, the company remains skeptical of the business opportunity due to uncertainties associated with the outcome of the Bay TMDL as well as WVDEP's ability and political will to implement it. The downside of a private entity brokering credits v/s a public agency (as expressed by several farmers) is that it is likely less revenue will flow to the farm community for generating and selling credits, therefore fewer farmer will be incentivized to participate;

- Many recognize the potential market benefits of developing a Bay-wide (interstate or inter-basin) trading program and several bills have been introduced in Congress to accomplish this. Moreover, NRCS recently awarded the World Resources Institute a Conservation Innovation Grant to develop an electronic credit calculation tool applicable within the Bay watershed that will facilitate interstate trading. Given this uncertainty WVDEP prefers to delay program implementation rather than to expend limited resources to implement the Potomac program which could be overridden by a federal trading program; and
- The market capacity in the eight county region of WV's Eastern Panhandle that can support a trading program is limited. During WV tributary Strategy development WVDEP made a policy decision to exempt WWTPs with discharge flows of less than 50,000 gpd from nutrient allocation requirements. Furthermore, during development of the watershed Implementation plan (WIP) to implement the TMDL WVDEP recently decided to further exempt all major facilities with discharge flows of 400,000 gpd or less from nutrient allocation requirements. Moreover, as a result of WVDEP's objection to the EPA's draft nutrient allocation to WV, EPA agreed to reduce WV's nitrogen allocation. These policy changes reduce the potential overall credit demand by limiting credit demand from the number of NPDES permitted facilities that could choose to purchase either nitrogen or phosphorus credits to achieve compliance with nutrient allocations to only nineteen, two of which are currently in compliance. These actions reduce the potential robustness and success of the trading program unless an interstate program is developed. Furthermore, the majority of the point source sector believes that exclusion of a subset of nutrient dischargers from reduction requirements is inequitable, placing an increased burden on larger dischargers.

2.2.1 First Bilateral Trade

In the state's first potential trade the Jefferson County Public Service District (JCPSD) has proposed to purchase credits needed to offset a new POTW from Red Barn Trading Company located in the Pennsylvania portion of the Potomac watershed. The forward contract to purchase credits from a Pennsylvania company was made in lieu of the availability of certified WV nutrient credits. The JCPSD needed the offsets immediately in order to obtain an NPDES permit so that it could secure financing for facility construction. The Interstate Commission on the Potomac River Basin (ICPRB) has stepped in to voluntarily verify and certify to the state that the offsets that will be supplied by Red Barn are valid. Although the JCPSD and a number of stakeholders would have preferred that the offsets were obtained from local farmers the WVDEP has tentatively approved the purchase because WV offsets are not currently available. Nonetheless this action has spurred significant interest in the potential economic benefits that nutrient trading could have in WV's Eastern Panhandle.

3.0 Project Outcomes

The primary outcome of this project is the development of a nutrient trading framework that will not only provide for more cost effective compliance with the impending Bay TMDL but will also provide credits that can be used to offset future economic development in the watershed. Furthermore, development of the WV Potomac trading program along with PA, MD and VA sets the stage for development of an interstate, Bay-wide trading program that many believe will provide the robustness that will be necessary to achieve compliance with the Bay TMDL.

Without this project it is unlikely that WVDEP would have had the capacity and political will to develop the Potomac Nutrient Trading Program. The trading guidance puts WVDEP in a position to positively respond to WV Senate Bill 715 that requires the agency to develop and implement a nutrient trading program in the Potomac River watershed by June, 2011.

Although to date there has only been one contract executed for a future offset trade it has piqued interest in trading and will serve to educate others on the benefits and process for participating in the market. It is anticipated that initially the offset market will serve to drive the credit compliance market. The reality is that if growth is to occur within the watershed nutrient credits will be required to offset any new or expanding nutrient load. It is anticipated that once several offset credit trades have been made confidence in the market will grow and point source discharges facing significant compliance costs will look to the market for cost effective compliance credits. Assuming of course that the WVDEP has the political will to implement and enforce the TMDL. The problem, however, is that if the Conservation Districts and/or a private third party do not move forward to aggregate and broker credits from WV farmers credit revenues will flow to adjoining states thereby reducing the potential economic benefit to WV agriculture.

In addition to the trading program framework the following additional outputs were created as a result of the stakeholder committee process:

- Recommended trading program infrastructure (Attachment D),
- Nutrient Trading Program outreach fact sheet (Attachment E), and
- Recommended poultry litter transport program for generating nutrient credits (Attachment F).

Attachment A:

**West Virginia Water Quality Nutrient Credit Trading
Program**

West Virginia Water Quality Nutrient Credit Trading Program

The purpose of this document is to provide guidance for the generation and trading of nutrient reduction credits in West Virginia's river basins. Nutrient reduction credits may also include trades associated with sediment related to nutrient reduction. The Department of Environmental Protection (WVDEP) allows the voluntary generation and trading of nutrient reduction credits to meet water quality requirements under applicable laws and regulations. The guidance is also intended to assist individuals through the process of submitting proposals for the approval, certification, verification and registration of credits, and to describe how nutrient reduction credits may be used to fulfill a permit requirement.

The guidance procedures herein are not adjudication or a regulation. This document establishes the framework, within which the Department exercises its administrative discretion to deviate from this guidance if circumstances warrant.

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INTRODUCTION

The Department recognizes the many potential benefits of using market mechanisms to efficiently and effectively address environmental challenges by providing flexibility for the regulated community to meet legal requirements, especially when done on a watershed basis.

Water quality credit trading is one approach to improve and maintain water quality using market mechanisms to produce nutrient reductions at lower costs. Participation in the *voluntary* trading program is an option for point sources to provide for achievement of their environmental obligations by purchasing pollutant reductions from another point source or non point source that can more cost effectively reduce their pollutant discharge. It is also an opportunity for unregulated non point sources who desire to improve water quality (and produce other environmental benefits) to generate nutrient reductions which can be used as tradable credits and sold to others who are seeking nutrient reduction credits.

DEFINITIONS

“Aggregator/Broker”- *An individual or entity that can purchase, collect and compile credits from individual sources. These credits can then either be sold on the credit marketplace, or sold directly to a point source or developer.*

“Baseline”- *The compliance activities and performance standards which must be achieved before an entity can generate credits.*

“Basin” – *The three major river basins of West Virginia include the Potomac, Ohio and James Rivers and their watersheds, subwatersheds and tributaries. See “Watershed”.*

"Best management practice" or "BMP" - *Structural, vegetative, or managerial practices that reduce, minimize, or prevent the discharge of pollutants to waters of the state.*

“Certification”- *The approval, by the Department, of credits generated by a credit development proposal as verified by the Department or a delegated entity.*

“Conservation Plan”- *A farm specific plan, developed by the NRCS or others, that contains information on why and where the practice is applied, and sets forth the minimum quality criteria that must be met during the application of that practice in order for it to achieve its intended purpose(s).*

“Credit” – *The unit of compliance that corresponds with a pound of nutrient reduction per unit time as recognized by the Department which, when registered by the Department, may be used in a trade.*

“Credit Marketplace” - *The credit marketplace is an on-line marketplace that facilitates exchange of nutrient credits among buyers, sellers, aggregators, and brokers by posting guidance, credit prices, the credit registry, and the credit calculator, NutrientNet.*

“Credit Registry” - *The Department’s official system that tracks and records credits needed, generated, and traded among point sources and non-point sources.*

“Credit Reserve” – *Credits set aside by the Department to address natural or otherwise unexpected failure of credit generating activities.*

“Delegated entity”- *An entity designated by the Department to carry out specific tasks related to the Nutrient Trading Program.*

“Department” - *West Virginia Department of Environmental Protection*

“DMR” or “Discharge Monitoring Report” - *The EPA uniform national form, for the reporting of self monitoring results by the NPDES permittees including any subsequent additions, revisions, or modifications, that may be necessary for the self-monitoring and tracking of credits.*

“Non-point Source” – *A source of potential water pollution that is not a point source. Non-point source pollution, sometimes referred to as “polluted runoff”, is generally caused by stormwater runoff across the land. Examples of non-point sources include, but are not limited to: agriculture, abandoned oil and gas wells, atmospheric deposition, failing on-lot sewage systems, and silviculture (forestry).*

“NPDES” – *National Pollutant Discharge Elimination System, the permit program required under the federal Water Pollution Control Act (also known as the “Clean Water Act”), administered by the Department.*

“NRCS”- *The Natural Resources Conservation Service, a division of the United States Department of Agriculture*

“Nutrient” – *Nitrogen, phosphorus, including sediment associated with nitrogen and phosphorus reduction.*

“Nutrient Allocation” - *The amount of nutrient discharge allowable by an NPDES permit.*

“NutrientNet” – *Web based software program created by the World Resources Institute (WRI), to provide an interface for administering the trading program by standardizing nutrient reduction calculations, establishing a credit registry and provides for tracking of credits and trades.*

“Nutrient Balance” - *A component of the Nutrient Management Plan that calculates the total nutrient runoff potential for all farm fields under current land use practices. Where BMPs have been installed and properly maintained the farm nutrient balance shall reflect the nutrient reductions achieved by these practices. Nutrient Net can be used to calculate the farm nutrient balance.*

“Nutrient Management Plan (NMP)” – A plan to assist landholders in managing the mass balance of nutrients developed by the WV Department of Agriculture, the WV Conservation Agency, the Natural Resources Conservation Service or another Department-approved entity.

“Nutrient Reduction”- Reductions of nutrient discharges to waters or of nutrients within waters achieved by activities such as best management practices, application of wastewater treatment upgrades, and activities that quantifiably increase waters’ assimilative capacity compared to the applicable baseline.

“Nutrient Trading” – Transactions that involve the exchange of quantifiable nutrient reduction credits, registered with and approved by the Department.

“Offset”— A unit (equivalent pounds) of nutrient load reduction approved by the Department that can be used by a facility to meet its NPDES nutrient requirements.

“Point Source” – For the purposes of this guidance, any NPDES-permitted discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, landfill leachate collection system, or vessel or other floating craft, from which nutrients are or may be discharged.

“Permittee” - An NPDES permit holder with nutrient discharge limits or other nutrient related requirements.

“Point source-point source trade” - A trade in which the person using water quality credits and the person generating water quality credits are both permittees.

“Point source-nonpoint source trade” - A trade in which the person using water quality credits is a permittee and the person generating water quality credits is a nonpoint source.

“Person”- An individual, corporation, organization or other legal entity whose actions or activities contribute to or reduce nutrient loadings.

“Sediment”- Particles, derived from rocks or biological materials, which transport phosphorus and are suspended or settled in water.

“Stream Segment” – The portion of stream/river that flows through its corresponding watershed segment. See also: “Watershed segment”.

“TMDL” – Total Maximum Daily Load, is the sum of individual waste load allocations for point sources, load allocations for non-point sources and a margin of safety expressed in terms of mass per time, toxicity or other appropriate measures.

“Third Party”- Any entity that does not discharge nutrients or create nutrient credits and that participates in the trading program to validate and/or inspect credit development proposals. This entity could include, but is not limited to, environmental groups, developers, watershed associations, aggregators/brokers, businesses, and nonprofit organizations.

“Trading Ratios” or “Trading Calculation Factors”- *Discount factors applied to nutrient reductions, to account for uncertainty, delivery, credit reserve or special need concerns.*

- **“Delivery Ratio” or “Delivery Factor”-** *The factor that compensates for the natural attenuation or loss of nutrients as they travel in water.*
- **“Reserve Ratio”-** *The proportion of the credits generated by a nutrient reduction set aside in the credit reserve for the purposes of insurance against risk of nutrient reduction project failure for natural or unexpected causes.*
- **“Special Concerns Ratio”-** *Additional ratios applied to credits generated in watersheds of impaired streams (303d-listed) and otherwise as the Department deems necessary in areas of special water quality concern.*
- **“Uncertainty Ratio”-** *Ratio applied to point-to-nonpoint trades to account for uncertainty in modeling and BMP performance.*

“True Up Period”- *Two month period at the end of each Credit accounting year during which time permittees may obtain or secure credits needed to meet their compliance obligation.*

“Verification”- *The process by which the Department determines that a credit represents a real reduction in nutrient loading that is eligible for trading.*

“Water quality trade”- *The purchase, sale, conveyance or other transfer of a credit from one person to another person.*

“Watershed”- *An area of land as determined by the Department that drains to any waters of the state which may encompass a large river mainstem or any of its subwatersheds and tributaries. See “Basin.”*

“Watershed Segment” – *A hydrological-based unit of land with a numeric code or Hydrologic Unit Code, which uniquely identifies its relationship to smaller and larger watershed/basin delineations.*

FUNDAMENTALS

General

Nutrient Trading has the potential to achieve water quality and other environmental benefits more cost-effectively and generate greater economic and environmental benefits than traditional regulatory programs. Nutrient trading under these guidelines must be consistent with legal requirements under applicable laws and regulations, including the federal Clean Water Act, or CWA.

Trading in a broader watershed area must not cause localized water quality impairment. Where a TMDL is established, trading must be consistent with the TMDL and associated implementation plans, approved by the Department.

Nutrients Traded

This guidance deals primarily with the nutrients nitrogen and phosphorus, the principal constituents determined to lead to or cause eutrophication of local and downstream waters. The Department lists certain waters overly enriched by nutrients as water quality impaired under section 303(d) of the CWA, however other waters similarly impacted may not yet have been adequately documented..

Trading Guidelines

Trading must occur within the same basin. Trading may be limited to smaller watersheds within basins if the Department determines that greater efficiencies can be obtained for implementing a TMDL or for avoiding localized water quality impairment. Interstate trading of nutrient credits may be permissible within the same basin and in compliance with applicable state policies, rules or laws.

Trading can occur among the sources within that basin for that nutrient on the condition that the discharges covered by the trades do not exceed water quality standards nor any nutrient cap load established for the basin.

Under this guidance several principles apply throughout: (1) trades must involve comparable parameters (e.g. nitrogen must be traded for nitrogen); (2) trades must be expressed as mass per unit time (e.g. pounds per year); (3) trades can occur only between eligible parties; and (4) credits generated by trading cannot be used to comply with existing technology-based effluent limits except as may be expressly authorized by federal regulations.

Eligibility

Trading may take place between any combinations of eligible point sources, nonpoint sources and approved third parties such as credit aggregators/brokers. Both public and private entities are eligible to participate. Each credit generating entity must meet the applicable baseline requirements described below before credits can be certified, registered and sold.

Baseline Levels

All sources must meet baseline requirements before additional nutrient reductions will be considered eligible for credit development and trade by the Department. This applies to those activities and performance standards associated directly or indirectly with the

pollutants being traded. More restrictive limits may apply if a TMDL is established, as discussed in section K of this guidance.

For most point sources to be eligible to generate credits, the baseline is the more restrictive of any technology based or water quality based effluent limitation or cap load allocation over the applicable time period, expressed in an NPDES permit.

MS4 related urban point source reductions must first achieve “maximum extent practicable” compliance with MS4 NPDES permit requirements to be eligible to generate credits from additional reductions.

Where a numeric effluent limitation is otherwise not applied, the permittee is similarly obligated to meet the applicable management requirements to the maximum extent practicable. The discharge must therefore be in compliance with any expressed baseline requirements or management requirements in order to generate tradable credits of nutrient reductions. For non-point sources, baseline is the set of regulatory and or trading program requirements applicable to the credit generator:

Agriculture -

Currently, WV does not have sector specific regulatory control requirements applicable to agricultural non-point 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.

Forestry -

Forestry practices must first comply with W.V. Code 19-1B-5 before credits can be generated.

Other -

Other sectors must also meet the established baseline requirements such as nutrient treatment on septic tanks

Process for Generating, Approving and Tracking Credits

The Department is responsible for approving and tracking all credits. A credit generation practice must be approved, and trades must be registered, by the Department under this process before they can be used for NPDES permit compliance.

The Department, or its delegated entity, will use the following elements in its process of approving and tracking the generation and use of credits in the trading program. The process is summarized in the process chart following this section.

Farmland and Open Space Concerns

The Trading Program is not intended to accelerate development of productive farmland or open space. Therefore, credit generation for converting farmland into commercial, industrial or residential developments even though the conversion may result in a reduced nutrient load is not encouraged.

The Department does, however, recognize that farmland and open space will continue to be converted to alternate land uses and does encourage and supports the use of sustainable development principles. Therefore, where an investment is made in land development or redevelopment which yields nutrient load reductions beyond traditional development practices or existing conditions (due to implementation of green infrastructure, low impact development, and smart growth practices above and beyond federal, state, county or local legal development requirements) the Department will, on a case by case basis, accept and review proposals for generation of nutrient credits. In scenarios of development of farmland or open space, credits can only be generated from the difference between the enhanced and the traditional/baseline development practices for the same category of land use.

Calculation of Credits

All credit generation calculations must be approved by the Department.

- a) Basic calculation. The Department will provide a pre-approved calculation methodology for estimating available credits from various BMP applications. For example, the pre-approved credit calculation methodologies and calculation tool for nutrient trading in the Potomac basin is WV NutrientNet as described in Appendix A. The Department will also consider other scientifically-based calculation approaches.

For non-point sources generally, the Department expects that proposals will contain scientifically-recognized methods to demonstrate nutrient reductions (e.g. methods employed by NutrientNet).

Credits must be expressed in terms that correspond to the unit of compliance (e.g., pounds), and a time period, all specified in the applicable permit discharge limits.

For example, credits will be expressed as pounds per year, and will be valid for one year or longer dependent upon Department approval.

This means that credits need to be measured, verified and accounted for according to the approved time period. For example, if a BMP has a longer lifespan than a year, credits can be generated for the life of the project but may need to be re-verified and must be accounted for each year. This can be accomplished through a request to the Department or through the Department's own initiative. Proposals to generate credits must include adequate provisions for verification throughout the credit generating life span of the project.

Groups of credits for discrete nutrient reduction activities will be assigned a unique identifier by the Department, and will have a “shelf life” of one calendar year.

Credits cannot be banked for future years. For example, if a BMP generates 100 credits each year and has a life span of five years, 500 credits cannot be applied to a permit in year five. Credits must be applied in the year that they are generated.

- b) Application of trading ratios or credit calculation factors.** Nutrient reductions must be calculated in a manner that accounts for factors such as location, reserve/risk, uncertainty, and/or other special needs. Trading ratios need to be considered and used as appropriate to ensure that trading provides the desired level of nutrient reductions and water quality benefits. Examples of ratios that would apply to trades are provided below and their specific application to the Potomac program is explained in Appendix A.

Delivery Ratio is a function of the distance from the location where the nutrient reduction activities are carried out, to the compliance point and the related estimated diminution of the effect of the nutrient reductions between upstream and downstream points.

Reserve Ratio is applied where the Department determines that it is necessary to provide for possible failures in nutrient reduction efforts.

Uncertainty Ratio can be applied to point-to-nonpoint trades to account for uncertainty in modeling and variation in BMP performance.

Special Concerns Ratio – Additional ratios may be applied to credits generated in watersheds which the Department deems to be of special water quality concern such as those with impaired streams (303d-listed) and otherwise as the Department deems necessary.

Guidelines for Proposals to Establish Reduction Credits

- a) General.** All credits generated in this program must be based on proposals reviewed and approved by the Department.
- b) Elements Needed for Potential Credit-Generating Projects.** The general information normally required for credit proposal submittals is outlined below. Credit certification application forms tailored to specific trading programs will be made available by the Department. To ensure accuracy the Department or third party will assist the applicant, when necessary, with supplying certain of the following information.

1) Credit Generator Information

Credit Generator/Producer

Generator Type

Name of Responsible Party

Phone Number/Email of Responsible Party
Generator Address
Generator County and State
Generator Zip Code
Latitude and Longitude
Receiving Stream

2) *Watershed Information*

Watersheds and Watershed Segment Number for the trading proposal.
“Designated use of the receiving water” (e.g., cold water fishery) and any listed impairments.

3) *Current Practices/Baseline Information*

Current land use
Currently installed BMPs
Eligibility information
Date practice implemented/completed
BMP units (acres, feet)

4) *Credits to be Generated Information*

Point or Non-point
Reduction Description
Area of Reduction
Nutrient Reduced
Nutrient Source
Ratios Applied
Credit Calculation Method
Project Lifespan

5) *Restrictions*

Identify if a funding source that was used to pay for a nutrient reduction activity restricts or limits in any way the sale or income from credit generation.

6) *Verification*

Describe the method of verification (e.g., records of BMP implementation, nutrient application and crop yields to be maintained by the landowner). Verification may be defined for a trading program or tailored by situation.

7) *Risk mitigation plan*

Describe the plan to manage any potential risks of BMPs failure.

8) *Previous efforts*

Indicate if any preservation/conservation easements exist on lands where credit generating BMPs are to be implemented.

9) *Ancillary benefits*

List any known or anticipated ancillary local benefits that may result from the implementation of the nutrient reduction activity (e.g., source water protection, trout habitat restoration/protection, stormwater flow management, green space protection, green house gas (GHG) reductions, etc.).

10) *Credit-Submitting Entity Information*

Submit name, address and contact information for the submitting entity if the proposal is submitted on behalf of the credit generator.

11) *Operation and Maintenance Information*

Include a plan to ensure that the practice will be properly operated and maintained for the life of the credit.

Proposal Review

- a) **Proposal Review Process.** Proposals will be reviewed by a panel of selected experts, approved by the Department, for technical acceptability, and consistency with program guidelines. For example, for reductions at agricultural operations, experts may include representatives from the West Virginia Conservation Agency, WV Department of Agriculture, and the USDA Natural Resources Conservation Service (NRCS). The Department may identify additional experts as needed. The Department shall make every effort to provide a response to the proposal within 60 days.
- b) **Proposal Approval.** Following proposal review, the Department will respond in writing to the applicant with its determination.

If a proposal is not approved, the response will include the basis for disapproval such as why the proposed activities will not generate the requested reduction credits and/or what additional information may be needed for further consideration of credit certification.

The Department will provide public notice of complete proposals for credit generating activities. Approvals of credits and trades of credits will be posted on the Department's Nutrient Trading website including any applicable on-line marketplace (e.g. NutrientNet).

Verification

- a) **General.** Every proposal for use of credits must include a credit sale or purchase agreement which contains a plan for inspecting and verifying the nutrient reductions by a qualified and approved third party professional. The inspector shall have the education, knowledge and experience to determine if the control is properly installed, operated and maintained to achieve the nutrient reductions approved and certified by the Department.

In addition, the Department will use a combination of record keeping, monitoring, reporting, inspections, self-certifications, and compliance audits to further ensure that the credit-generating obligations are being met. The Department may also conduct inspections of credit generating projects, and the applicant's verification activities, to ensure certified practices and activities are being implemented and properly operated and maintained.

- b) Baseline verification.** The Department will verify that the generator of the credits meets the baseline requirements of the trading program. This may involve a site visit by Department staff or a delegated entity, self-verification by the generator of the credits by means of a process established by the Department, or a combination thereof. This step must occur before credit approval.

For agricultural operations, baseline compliance will be verified through a site visit or by review of applicable plans such as a Nutrient Management Plan, Erosion and Sedimentation Control Plan, Conservation Plan, Manure Management Plan, or a combination thereof as required by the specific trading program and any applicable requirements. Compliance must be verified by the Department, a Conservation District, or other entity approved by the Department.

- c) Nutrient Reduction.** The Department, and the generator of the credits, will have a process to verify that the reduction efforts have occurred as planned. The types of verification will depend upon the individual project proposal. Verification may occur at any time during the life of the credit attributed to a particular activity. Examples of verification methods which can be approved for use by project applicants include engineering plans (if appropriate), photographic documentation of the installed BMP or receipts confirming BMP activities, such as documentation showing the results of a truck that was weighed to haul manure/litter.

- d) Operation and Maintenance.** The Department, and the generator of the credits, will have a process for verifying that the operation and maintenance of any nutrient reduction effort is being implemented as planned. The verification process will depend upon the individual project but will be outlined in the credit proposal.

- e) Other.** The Department may allow qualified and approved third parties to perform verifications on behalf of the Department. For a third party to qualify to verify credits, the Department requires that the party:

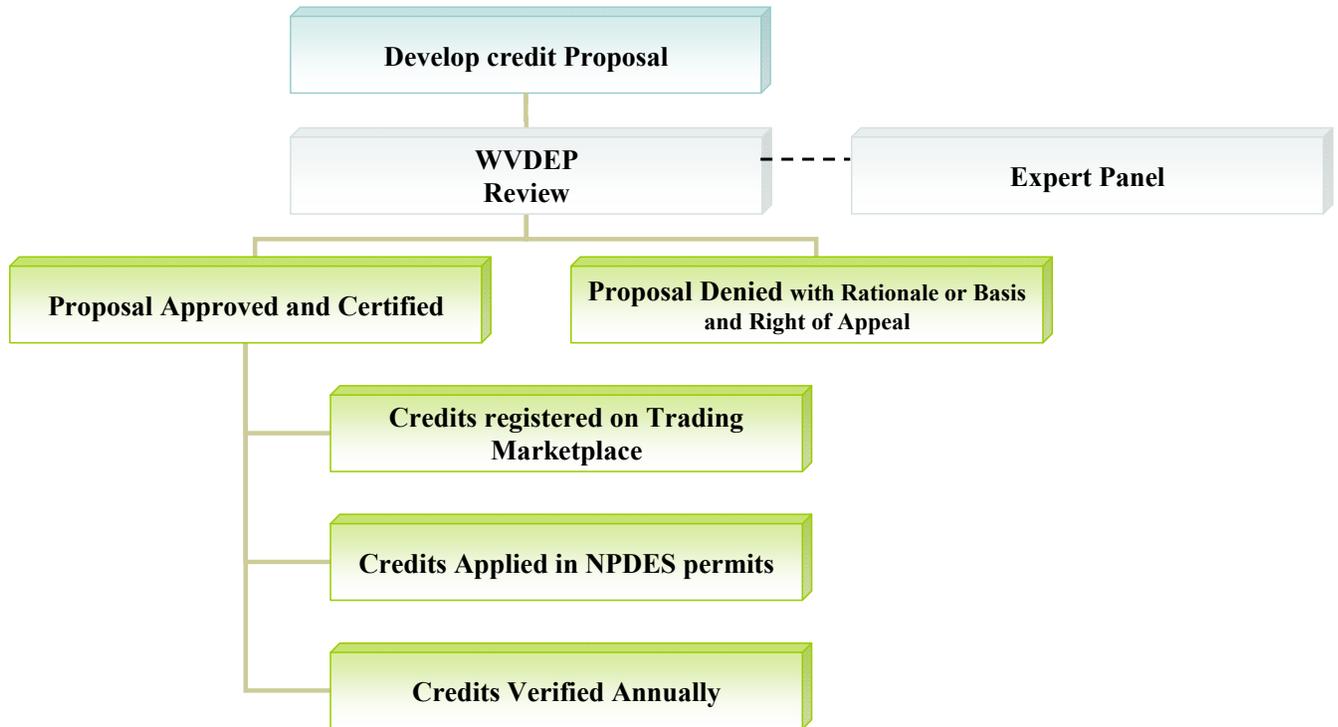
- Have the necessary qualifications to perform the verification (e.g. a certified nutrient management planner, technical service provider, soil scientist, conservation planner, registered professional engineer, etc.);
- Provide potential trading partners with information on the program;
- Calculate credits based on the Department's trading guidance;
- Accurately provide the Department with the information listed in the Elements Needed for Potential Credit-Generating Projects;

- Confirm in writing that the activities intended to generate credits have occurred or are scheduled to occur prior to the end of the calendar year.
- Not be in a position to profit directly or indirectly from sale or purchase of credits; and
- Confirm in a certified written statement that the credit-generating entity meets all trading program criteria.

Registration and Tracking

- a) **Registration and Tracking.** Trades must be registered before the credits can be used to meet permit limits. The Department will operate an on-line marketplace tool (e.g. NutrientNet) that will assist with the calculation, registration, tracking and application of credits. The registration system will be used by Department staff when credits are proposed to be used in a NPDES permit. The registration system may also be used by buyers and sellers to determine whether credits are available and to verify that their trades have been approved by the Department.

PROCESS CHART FOR GENERATING, APPROVING AND TRACKING CREDITS



Use of Credits in NPDES Permits

NPDES permittees are authorized under this program to use registered and certified credits to achieve compliance with permit effluent limits under the following conditions:

- Permittees are responsible for ensuring that the credits they obtain and apply to their permits for compliance purposes are approved by the Department (i.e., are certified and registered by the Department).
- Permittees must report in the Discharge Monitoring Reports (DMRs) or in another acceptable form the number of credits that are being applied to achieve compliance with their permit limits.
- Permittees are responsible for assuring adherence to the terms of their credit purchase agreements. Where credits have been procured through a Department-approved broker/aggregator, it becomes the responsibility of this agent to ensure the credit supplier abides by the purchase agreement. Where a credit supplier fails to comply with a contractual agreement resulting in noncompliance with the permit, the Department may decertify the credits in question. Permittees can acquire supplemental credits, or in the case of a Department-verified case of credit loss from natural disaster or other unforeseen/uncontrollable causes, credits could be obtained from the credit reserve pool.

The Department may exercise enforcement discretion with respect to permittees in the year in which credits are determined to be invalid, as long as (1) the credit failure is not due to negligence or willfulness on the part of the permittee and (2) the permittee replaces the credits in a “true up” period.

Use of Credits to Offset New and Expanding Discharges

When applicable, in accordance with nutrient reduction requirements of the relevant facility NPDES permit, permittees are required to obtain credits to offset all nutrient loadings from all new or expanded sources.

Public Participation

The Department will operate a transparent system for review and approval of credits by providing notice to the public and for comment on the use of trading in permits as part of routine procedures followed with all NPDES permit actions and as required under the regulations governing NPDES permits.

The Department will make reference in the public notice of any trading proposal in the draft permit or in any required necessary major modification of the permit.

DMRs and/or other Department approved forms are records that can be accessed by the public. The information in these documents must include unique identifiers and the numbers of credits purchased. More detailed information about the credits can then be accessed from the Department’s Nutrient Trading website.

An inventory of credits developed, credits available and credits transacted is public information and will be published on the Department’s Nutrient Trading website and the on-line marketplace (NutrientNet).

Ensuring Program Integrity and Managing for Success

The Department 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 NutrientNet credit calculation methodologies (see Appendix A). 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 where/when 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.

Program Organization

Trading programs will be a joint effort between the Department and a Department-approved trading program management organization (e.g., Conservation District staff).

- a) **Credits** will be approved and certified by the Department through consultation between the Division of Water and Wastewater Management and additional experts as appropriate.
- b) **Verification** may be coordinated by the Department, the buyer, and or an aggregator/broker but in most cases will be conducted by the approved trading program management organization.
- c) **Registration** of credit generation approvals and trades will be managed by the NPDES Permitting Office, in coordination with the approved trading program management organization.
- d) **Registration and use of credits** in permits will be managed by the NPDES Permitting Office.
- e) **Public participation** during the permit process will be the responsibility of the NPDES Permitting Office.

Water Quality and TMDLs

Trading will be allowed only where water quality will be protected and maintained as required by applicable regulations.

- a) **TMDLs.** Once a TMDL is approved by EPA, any load allocations and individual waste load allocations established by the TMDL to meet local water quality standards apply. This may mean that adjusted “baseline” requirements must be implemented before credits can be generated. Trading will be consistent with the assumptions and requirements upon which the TMDL is based.
- b) **Antidegradation.** Trading will be consistent with the antidegradation requirements contained in Department regulations.

Attachment B:

**Appendix A – West Virginia Potomac River Basin Water
Quality Nutrient Trading Program
(West Virginia Potomac Trading Program)**

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

Purpose: The purpose of Appendix A is to provide program-specific guidance regarding water quality trading of nutrients in the West Virginia portion of the Potomac River Basin.

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Definitions

Cap Load Allocation – *The total allowable load of nutrients that can flow from a basin within the Chesapeake Bay watershed that is based on protection of downstream water quality.*

Chesapeake Bay Watershed – *The area of land defined by the aerial extent of surface water which drains to the Chesapeake Bay and its tributaries.*

Chesapeake Bay Watershed Model (CBM) – *The Hydrologic Simulation Program in FORTRAN (HSPF), used to simulate the surface water runoff, groundwater flow and the transport of nutrients and sediments within the Chesapeake Bay watershed.*

Delivery Factor (DF) – *A factor that is applied to determine the portion of the nutrient load that is expected to be delivered from the watershed segment to the fall line of the Chesapeake Bay.*

Edge of Segment Factor (EOS) – *A factor that represents the fraction of the nutrient load originating from a given land use type that is delivered from the field (via runoff, groundwater and atmospheric deposition) to the edge of the corresponding watershed segment. Segment soil types, topography, hydrological, and land use characteristics of each WV Chesapeake Bay Model watershed segment are considered.*

Edge of Segment Baseline – *The average 2005 Edge of Segment nutrient load calculated by the Chesapeake Bay Watershed Model. This is the performance level that must be achieved in each agricultural land use category before nutrient credits can be generated.*

Edge of Field Baseline – *The Edge of Field target load from the Chesapeake Bay Watershed Model calculated by dividing the EOS baseline by the Edge of Segment Factor.*

West Virginia Potomac Basin – *The area of land within West Virginia that drains to the Potomac River and its tributaries.*

West Virginia Potomac Tributary Strategy (“the Strategy”) – *The basin-specific framework developed by the West Virginia Tributary Strategy Stakeholders Working Group that seeks to reduce nutrient and sediment loads in the WV portion of the Potomac basin while minimizing economic and social burdens.*

West Virginia Potomac Tributary Strategy Implementation Plan (“the Plan”) – *The Plan written by the WV Department of Environmental Protection and stakeholders to help define and address nutrient and sediment loadings in the WV portion of the Potomac Basin.*

Background

The Chesapeake Bay and its tidal tributaries have been determined by Maryland and Virginia to be impaired under Section 303 (d) of the Clean Water Act (CWA). As nutrient sources in West Virginia contribute to this impairment, West Virginia (“the State”) became a partner in the Chesapeake Bay Water Quality Initiative (CBWQI) in 2002 by signing a document committing cooperation and efforts to protect and restore the Bay and its tributaries - joining a multi-jurisdictional effort to restore ecological functions within the Bay watershed which have been degraded by excess nutrients and sediment loads. In accordance with the 2002 CBWQI, each jurisdiction within the Chesapeake Bay watershed (WV, VA, PA, DE, Washington DC, MD, and NY) was to develop its own Tributary Strategy (“the Strategy”) and Implementation Plan (“the Plan”) (<http://www.wvnet.org/>) that would outline steps and goals for achieving agreed-upon cap load allocations (CLAs) for nutrient and sediment loads by 2010. This was done as an effort to avoid a mandated EPA TMDL for the Chesapeake Bay watershed.

Implementation of these strategies supports commitments associated with the CBWQI as well as compliance with Clean Water Act requirements, which mandate that states assure the attainment and maintenance of downstream water quality standards. Consequently, these requirements oblige WV to regulate permitted nutrient dischargers in the Potomac Drains in order to protect Maryland’s water quality standards, including those applicable to the Chesapeake Bay.

West Virginia voluntarily committed to reducing nitrogen, phosphorus and sediment loadings to the Potomac River by 33, 35, and 6 percent respectively over 1985 loading rates. The Strategy and Plan further include specific initiatives to address loading reductions from both point and non-point sources. Reductions are needed in the Potomac Basin in the regulated point source sector (e.g., sewage treatment plants, industrial dischargers, regulated MS4s) and in the non-point source sector (e.g., farms, forestry, and unregulated urban stormwater runoff) to achieve EPA-allocated levels.

The Strategy describes how the State can achieve its nutrient and sediment load allocation through a combination of actions, including changes to NPDES permits and other activities such as installation of best management practices.

In support of the State’s voluntary commitments and in anticipation of an impending Bay-wide TMDL, the West Virginia Department of Environmental Protection (WVDEP) or, “the Department”) is providing guidance for this water quality-related nutrient trading program. The trading program was one of the innovative measures outlined as a part of the CBWQI and recommended by WV’s Point Source Innovation Work Group, a group formed by the Department for initiating the permitting framework. This measure is just one part of a larger program to help sources in all sectors take preventative and proactive measures to achieve cost effective reductions in nutrient loadings that will improve and protect local water quality and help meet WV’s commitment to reduce nutrient loads to the Potomac Basin. *Most importantly, the water quality trading guidance outlined here is designed to ensure that WV’s local goals for economic development, environmental and public health protection, and soil conservation are advanced through efforts to also restore and protect the Bay.*

Fundamentals

General

The Environmental Protection Agency (EPA) advocates water quality trading as a cost effective approach to achieve water quality goals that will increase overall environmental and economic benefits. Among Bay states, watershed nutrient trading programs have been adopted by Pennsylvania and Virginia, and Maryland's program is currently being finalized. Although the specific criteria of these programs differ, all programs, including the WV program rely on trading to benefit the states in two principal ways. The first addresses the expected cost differential between upgrading treatment technology of point sources versus other approaches for reducing non-point source discharges. The second benefit arises from the flexibility of trading policy to allow for future economic development and growth to take place without sacrificing water quality.

Nutrients Traded

Trading may occur for nutrient (total phosphorous, total nitrogen, and sediment) credits. Credits are the units of compliance that correspond with a Department-recognized nutrient load reduction, instream nutrient load removal, and/or unused nutrient permit allocation which, when registered by the Department, may be used in a trade to offset a permittee's increase in a nutrient load beyond its permitted allocation.

Trading Guidelines

Credits must be expressed in units of measurement conforming to applicable permit compliance requirements. Nutrient credits will be expressed as delivered pounds per year, and will be valid for one year for trading in the context of the WV Potomac Basin. Credits must be measured, verified, and accounted for consistent with that time period.

Credits must be verified each year. If a credit-generating project has a longer life span than a year, then credits can be generated for the life of a project but they must be verified each year. Credits cannot be banked for future years but rather must be applied in the year that they are generated. For example, if an agricultural BMP generates an average of 10 credits per year and has a life span of five years, 50 credits cannot be applied in the fifth year. Projects with variable credit production capacity over time, however, can generate credits that reflect average performance over the life of the BMP (e.g. forested riparian buffer strips).

Credit trading may occur anywhere within the West Virginia portion of the Potomac Basin, but no trade may cause an impairment of any local water quality.

Trades must be of comparable parameters (e.g. nitrogen must be traded for nitrogen) and can occur amongst:

- Point sources;
- Non-point sources;
- Aggregators/Brokers;
- Any combination of the above.

Eligibility

Sector Trading Caps & Baselines

In the WV Potomac Tributary Strategy, a number of nutrient-contributing sectors are estimated to deliver respective nutrient loads to the Potomac Basin. Based on these initial estimated loads, the Strategy describes specific load reduction goals for each sector. The post-reduction loading levels are the nutrient loading caps that each sector/the State is responsible for obtaining and maintaining.

These load reduction goals are intended to be implemented across all sources. For point sources, regulatory efforts initially address point source sector permittees with design discharge flows of 50,000 gallons per day or greater. Other sector strategies are being implemented through different types of programs. For the purposes of the trading program, a party without permitted nutrient load restrictions that is interested in credit generation must demonstrate that it is also contributing to sector reductions and cap maintenance efforts as defined below. It is important to the integrity of the trading program that ***efforts intended to advance water quality goals not become credits that simply increase nutrient loadings elsewhere without resulting in a net load reduction.*** It is also important to the integrity of the trading program that efforts to reduce nutrient loads to achieve water quality goals not violate water criteria locally.

The point at which an entity can begin to generate credits is its ***baseline***. The baseline for all sectors is defined in the sections below.

Point Source Sector Baselines

- **Regulated facilities** in the municipal point source sector have or will receive annual nutrient allocations in their NPDES permits based on Department-selected effluent concentrations for the facility, multiplied by the facility's permitted design flow as of November 2005. New facilities or expansions permitted after November 2005 are required to ***offset all new nutrient loads.***

Targeted industrial and mining operations receive similar limits based on equivalent levels of nutrients as facility permits are reissued.

To be eligible to trade, a facility must have an NPDES permitted nutrient allocation for nitrogen and/or phosphorus, and must not cause or contribute to a localized water quality problem.

- **Facilities with design flow < 50,000 gal/day – Reserved**
- **Other Point Sources** - Where a permittee does not have a nutrient /sediment allocation, such as in the general MS4 permit, the permittee is obligated to meet the applicable monitoring, reporting, and management requirements to the maximum extent practicable. Dischargers must be in compliance with the expressed monitoring, reporting, and/or management requirements before the permittee is eligible to generate tradable credits from nutrient reductions.

Non-Point Source Sector Baselines

Non-point sources are not currently regulated by the Department and therefore do not have a regulatory nutrient allocation. The non-point source sector reductions set forth by the Tributary Strategy are to be achieved through the application of voluntary conservation practices by individual landowners, many of which can be funded by state or federal cost share or grant programs. The Department has decided, however, that a baseline performance must be achieved by these sectors before credits can be generated, certified, and registered by the Department for sale or exchange to help meet another entity's regulatory obligations. This requirement is intended to ensure the credit supplier's contribution toward meeting nutrient reduction goals in accordance with the Strategy.

The baselines below may change based on future requirements set forth in any applicable TMDL or state nutrient criteria.

Agricultural Sources Baseline Requirements - The baseline eligibility requirement for agricultural sources is the *more restrictive of*:

- any existing regulatory requirements or effluent limits related to nutrient management; or
- implementation of a whole-farm Nutrient Management Plan and an average per-acre nutrient load for the field or livestock production area where credits are being generated based on the 2005 average Edge of Segment (EOS) nutrient load for the specific agricultural land use (cropland, hay, pasture and manure).

Non-point sources entering the trading program who have implemented management practices that exceed the baseline are eligible to receive credits for their prior commitment to land stewardship. The per-acre nutrient load is calculated by NutrientNet based on-farm specific inputs such as current land use, fertilizer application rates and existing conservation practices, etc. that have been approved by the CBP and/or the WVDEP.

The table below specifies the nitrogen, phosphorous and sediment performance level (EOS baseline in lbs/ac) that must be achieved in the four agricultural land use categories (cropland, pasture, hay and manure) before credits can be generated. These numerical baselines are based on a weighted average of estimated Chesapeake Bay Model EOS nutrient and sediment loadings across all WV Potomac basin watershed segments representing existing land use and practices as of 2005.

Table 1. Agriculture Land Use Baselines

<i>Land Use</i>	<i>Total Nitrogen(lb/ac)</i>	<i>Total Phosphorus(lb/ac)</i>	<i>Sediment (ton/ac)</i>
Hay	7.7	0.7	0.2
Cropland	22.9	2.9	0.9
Manure	323	39	N/A
Pasture	7.0	0.8	0.2

Compliance with the baseline requirement may be determined and verified with the use of Department-approved calculation methodologies available via NutrientNet – an online tool – and through a site visit by Department staff or a Department-approved certified nutrient or conservation planning specialist.

Urban/Mixed Open- For this category the trading baseline is the *more restrictive of*:

- loadings associated with existing land uses as of 2005; or
- management practices needed to comply with applicable state or local regulations.

Farmland & Open Space Concerns

The Trading Program is not intended to accelerate industrial, commercial or residential development of productive farmland or open space. Therefore, credits cannot be generated for converting farmland into commercial, industrial or residential developments even though the conversion may result in a reduced nutrient load.

However, the Department may allow the generation of credits when sustainable development practices are applied to the same land use. For example, a municipality can generate credits for retrofitting an existing development with innovative stormwater practices that reduce nutrient loading. Similarly, a developer can generate credits by employing sustainable development practices (green infrastructure, low impact development, and smart growth practices above and beyond federal, state, county or local development requirements) that can be demonstrated to reduce nutrient runoff beyond what would occur under traditional development practices. Credit generation proposals for these types of activities should be developed on a case-by-case basis with the Department.

Additionally, if a portion of farm land is retired and/or converted through programs such as USDA's Farm Services Agency Conservation Reserve Program (CRP) and Conservation Reserve Enhanced Program (CREP) and the USDA's Natural Resources and Conservation Service's Environmental Quality Incentives Program (EQIP), those actions may be eligible for nutrient credit approval. Farmland retired under conservation easements obtained through other entities (e.g., state/local programs, land trusts, non-profit conservation groups, etc.) may also be eligible for credit generation; proposals for these lands should also be developed on a case-by-case basis with the Department.

Generating Tradable Credits

Eligible Activities for Generating Credits

Nutrient reduction activities beyond those meeting baseline requirements are eligible for credit generation.

Point Sources

Regulated Point Sources - For a permitted source with a nutrient allocation to generate nutrient credits, it must discharge at levels below the nutrient allocation stated in its NPDES permit. Credits are based on the difference between the

permitted limit and the discharge level (reported in the Discharge Monitoring Reports or DMRs) deemed by WVDEP to be representative of average discharge loads, and adjusted with relevant factors in section [IV.B.] below.

Existing nutrient related facilities *with design flow less than 50,000 gallons per day* – These facilities represent a nutrient load which may be used for offset and/or trading purposes. On a case-by-case basis, these facilities will be assigned an average annual nutrient load which would provide opportunities for new and expanded non-significant and/or significant facilities to use as offsets for increased nutrient loads.

Note: Once the Chesapeake Bay Total Maximum Daily Load (TMDL) is developed, all facilities including those with design flows less than 50,000 GPD may be assigned nutrient loading limits commensurate with the TMDL and may be required to obtain offsets.

For MS4s, the six Minimum Control Measures in the MS4 general permit must be attained before other activities are eligible to generate credits (e.g. increasing nutrient assimilative capacity or using wetland treatment at outfalls, investing in nutrient removal efforts on public lands, etc.). Such activities must be proposed and will be reviewed on a case-by-case basis by the Department.

Non-point Sources

For non-point sources, nutrient reduction proposals must contain Department-recognized methods for demonstrating nutrient reductions occurring from activities that reduce nutrient application, increase nutrient uptake and retention, or result in net export of nutrients/sediments from the watershed. Currently, all approved Chesapeake Bay Program BMPs are eligible to generate credits. A current list of approved activities in West Virginia is available on the Department's trading program website.

Where Department-recognized methods for a nutrient reduction activity do not exist, methods may be proposed for Department review and approval.

BMPs or other credit-generating activities occurring after November 1, 2005 may be submitted for review to determine credit eligibility. Non-structural BMPs (e.g. no-till, cover crops, litter transport, etc) that were implemented prior to November 2005 and continue to be utilized and maintained on an annual basis are eligible to earn nutrient reduction credits.

Credits must be generated and verified on an annual basis for the duration of the contractual agreement between the credit supplier and buyer.

Calculation of Delivered Load

To calculate the number of credits that can be derived from nutrient reduction activities, the factors below are used. These factors serve to translate how various activities on a parcel of land result in a delivered load reduction and are automatically calculated in the Nutrient Net online

forms (nutrient reduction activities not included in the Nutrient Net program may be approved subsequent to Departmental review).

Edge of Segment Factor (EOS)

The **Edge of Segment Factor** is a factor that represents the fraction of the nutrient or sediment load originating from a given land use type that is delivered (via runoff, groundwater and atmospheric deposition) to the edge of the corresponding watershed segment. This factor also accounts for average soil types, topography, hydrology, land use, and other factors within the segment. The EOS is derived from the Chesapeake Bay Watershed Model and included in the NutrientNet calculation tools. The WV Potomac River watershed segments used in the Chesapeake Bay Model are depicted in the map on the following page.

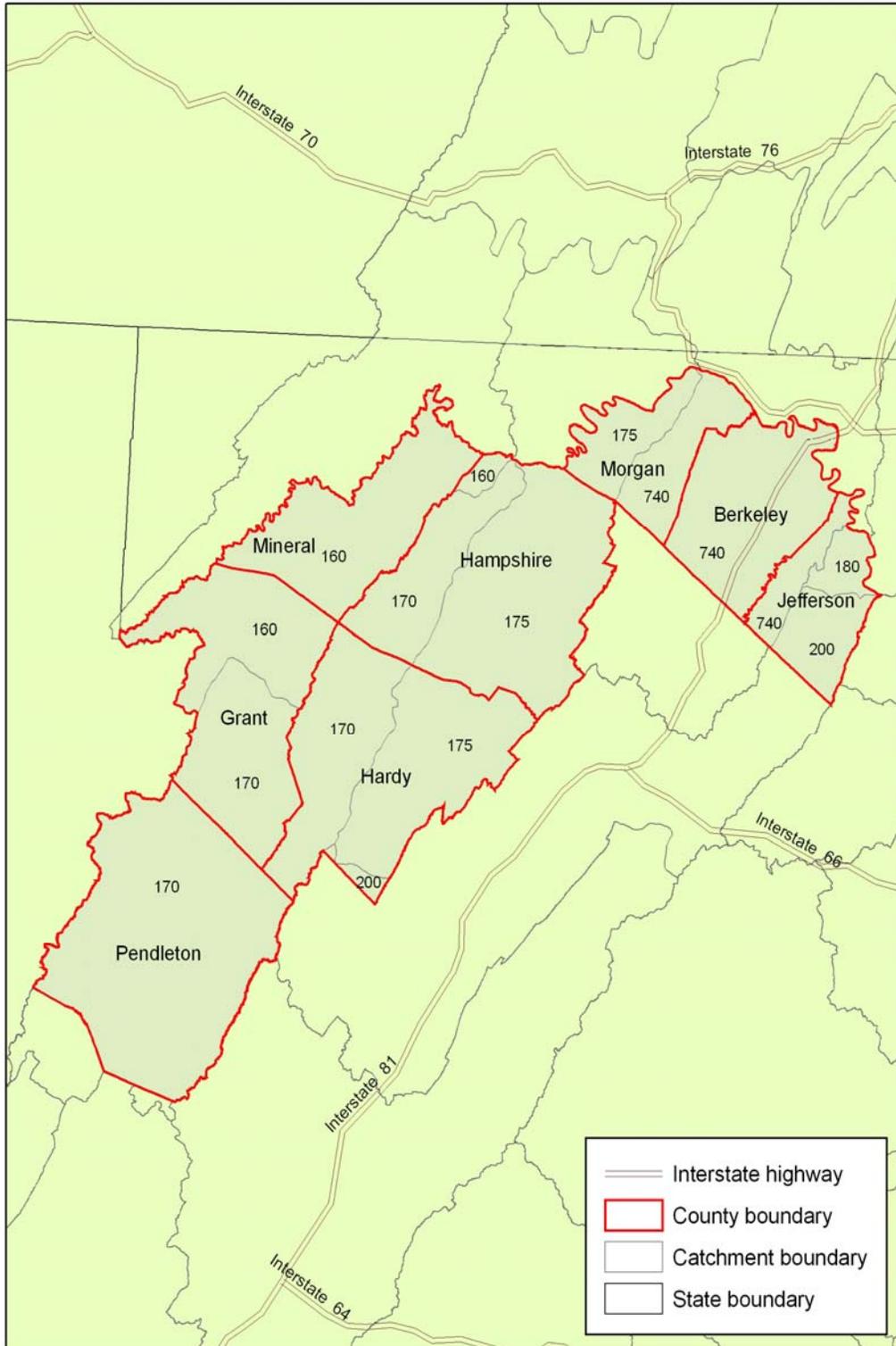
Delivery Factor (DF)

The **Delivery Factor** is a function of the distance from the edge of the watershed segment to the fall line of the Chesapeake Bay. It represents the effective delivery of the nutrient/sediment load to the Chesapeake Bay and the related estimated diminution of the effect of the nutrient reductions between upstream and downstream points. The delivery factor is derived from the Chesapeake Bay Watershed Model and included in the NutrientNet calculation tools. The delivery factors for the watershed segments within the WV Potomac River basin are shown below:

Table 2. Delivery factors for Potomac River Basin watershed segments.

<i>Watershed Segment</i>	<i>Delivery Factors</i>		
	<i>N</i>	<i>P</i>	<i>Sediment</i>
160	0.59	0.77	1
170	0.56	0.77	1
175	0.70	0.77	1
180	0.83	0.77	1
200	0.66	0.77	1
740	0.74	0.77	1

West Virginia Counties and Subwatershed Segments Within the Potomac Watershed



Calculation of Credits from Eligible Activities

Point Source

Nutrient limited point sources - For a point source to generate credits, it must discharge at levels below its nutrient allocation stated in the NPDES permit. Credits generated are based on the difference between the permitted allocation and discharge level monitored and reported in the DMR. Therefore, the number of credits that are either needed for purchase or available for sale is obtained by calculating the difference between the permit limit (lbs) and the discharge level (lbs). Point sources with available credits for sale will provide the quantity of their available credits to the Department, who will verify and list them on NutrientNet.

Point Sources without nutrient limitations - A point source without nutrient limits that voluntarily installs nutrient reduction treatment can also generate credits. Credits for such facilities can be calculated by the difference between the existing discharge level and the level achieved by upgrading treatment. Also, a nutrient limited point source may generate credits by absorbing a point source without nutrient limitations.

MS4's can generate credits by performing nutrient reduction activities beyond those required for compliance with the State's general MS4 permit.

All point sources generating credits must apply the delivery factor to nutrient reductions in order to equate reductions across segments.

Non-point Source

Agriculture – Agricultural sources can generate nutrient reduction credits by implementing activities on their fields or animal concentration areas that reduce nutrient loads to ground and surface water. In order to generate credits, these activities must result in an average per-acre load below the stipulated baseline. The Department's on-line automated calculation methodology, NutrientNet, will be available for use to calculate the initial nutrient loading rate for the acreage and apply the relevant segment factor, delivery factor and BMP effectiveness to establish credits resulting from proposed or on-going practice(s).

The following steps are used within NutrientNet to calculate agricultural credits:

Step 1: The farmer enters site-specific information about the farm (e.g. crop type, amount and type of manure/fertilizer applied, manure application method, current best management practices).

Step 2: NutrientNet automatically calculates a nutrient loading rate for the field depending on the information the farmer has entered in step 1. The nutrient loading rate subtracts the nitrogen and phosphorus outputs of the cropping system (i.e. crop uptake) from the nutrient inputs to the cropping

system (i.e. amount of fertilizer applied) and adjusts for current best management practices.

Step 3. The farmer selects one or more Best Management Practices (BMP's) that are to be implemented on the farm. NutrientNet calculates the estimated nutrient/sediment reductions using the Chesapeake Bay Model effectiveness estimates.

Step 4. The estimated nutrient reductions are multiplied by the Chesapeake Bay Model's Edge of Segment (EOS) factor to adjust for the amount of nutrients that are transported to the stream. The EOS factor is a ratio that estimates the amount of nutrients that travels from the edge of the farm field to the edge of the watershed segment.

Step 5. The EOS nutrient reductions calculated in step 4 are multiplied by a Chesapeake Bay Model Delivery Factor to adjust for the nutrient/sediment load delivered from the watershed segment to the Bay.

The Department may consider other calculation approaches for practices not included in the NutrientNet program.

Urban/Mixed Open (U/MO) – Reductions of nutrients from the land in this category can generate credits using calculations based on the Chesapeake Bay Model and applying relevant Segment and Delivery factors. Persons interested in developing U/MO credits must work with the Department on a case-by-case basis.

Other - Credit generation by other non-point sources and other innovative nutrient reduction projects to increase nutrient uptake/increase nutrient assimilation and retention (such as algal scrubbers and floating islands) will be evaluated on a case-by-case basis. If the Chesapeake Bay Program has already determined effectiveness estimates or methodologies for the practices in question, alternatives will only be considered with justification and upon approval of the Department. Relevant calculation factors will be determined on a case-by-case basis.

Use of Credits in NPDES Permits and Trading Ratios

Department-approved and registered credits may be used by NPDES permittees to comply with permit requirements. For a nutrient regulated point source to apply available credits as offsets to plant loads in excess of permitted nutrient allocations, the facility must apply the appropriate ratios as described in this section.

Trading Ratios

Reserve Ratios set aside a percent of load reductions to be held in a "Credit Reserve." Similar to risk or crop insurance, this Reserve covers permittees' obligations in the event of natural or the otherwise uncontrollably-caused failure of credit generating activities. The reserve ratio applies to all credits generated. This ratio may be adjusted by the Department to ensure program integrity.

Uncertainty Ratios are an allowance for the relative uncertainty in the relationship between credit generation efforts and actual resulting nutrient and sediment reductions in local waters and ultimately the Bay – this accounts for uncertainties related to the absence of monitoring data and the challenge of estimating how individual actions affect stream loads over time and space. For example, there is uncertainty in estimation of initial loadings, the load reduction effectiveness of various BMPs, the delivery of the nutrients to the nearest stream and across watersheds.

Uncertainty ratios *will not* be applied when:

1. The performance of BMPs are directly monitored to quantify resulting nutrient reductions; or
2. Chesapeake Bay Program-approved BMPs with well established and conservative nutrient reduction efficiencies are implemented. These practices have been rigorously peer reviewed by the Bay Program and have uncertainty incorporated into their reduction effectiveness.

Uncertainty ratios *will* be applied on a case-by-case basis by the Department to agricultural and urban and mixed open stormwater BMPs that have not been approved by the Chesapeake Bay Program and are not in widespread use and do not have accepted scientific peer reviewed reduction efficiencies. The Department reserves the right to conduct a technical review of these practices and apply an appropriate uncertainty ratio.

Special Concerns Ratio – Additional incentives or ratios may be applied to credits generated in watersheds which the Department deems to be of special water quality concern such as those located on impaired or high quality streams and/or their tributaries.

Application of Ratios

1. Credits generated by non-point sources that either measure reductions or implement Chesapeake Bay Program peer-reviewed practices will be used by NPDES permittees at a ratio of 1.2:1 – that is, for each pound of nutrient discharged above permit levels, the permittee must purchase 1.2 credits of non-point source reductions. This accounts for the risk reserve factor (0.2). An additional uncertainty factor may be applied on a case-by-case basis to non-point nutrient reduction practices that are not measured or have not been peer reviewed and approved by the Chesapeake Bay Program.
2. Credits generated by *nutrient-limited point sources* must be purchased or secured by other NPDES point sources at a ratio of 1.1:1 – for each pound of nutrient discharged above permit levels, the permittee will be required to purchase 1.1 credit pounds of point source reductions. This accounts for the risk reserve (0.1).

3. Credits available from regulated point sources without nutrient limitations can be secured by other NPDES point sources at a ratio of 1.1:1 – for each pound of nutrient discharged above permit levels, the permittee is required to purchase 1.1 credits of point source reductions to account for risk (0.1 risk reserve factor).

An example of the latter is that a nutrient limited point source may take measures to reduce or eliminate discharge from an unregulated wastewater point source in order to increase its own nutrient allocation. A PSD may choose to control the discharge from an existing package treatment plant or on-lot sewage disposal system. The PSD could claim credits from absorbing an unregulated point source or on-lot system at a ratio of 1 pound credit to every 1.1 pound load eliminated.

Table 3. Credit calculation factors and ratios applied to point and non-point sources.

Source		Credit calculation factors			Trading ratios		
		<i>Baseline</i>	<i>Edge-of-Segment Factor (calculated by CBM)</i>	<i>Delivery Factor(calculated by CBM)</i>	<i>Uncertainty</i>	<i>Reserve</i>	<i>Total</i>
Point Source	≥ 50,000 gpd	Permitted load	N/A	Yes	N/A	0.1	1.1:1
	< 50,000 gpd	Existing load	N/A	Yes	N/A	0.1	1.1:1
	MS4	Permit requirements	N/A	Yes	N/A	0.2	1.2:1
	Nutrient assimilation projects designed for nutrient removal (e.g. algal scrubbers, floating islands, etc.)	- 0 -	Project-by-project	Yes	Project-by-project	Project-by-project	Project-dependent
Non-Point Source	NPS Agriculture	Farm-wide Nut. Mgt Plan & attainment of average field or practice area load in accordance with EOS Baseline.	Yes	Yes	N/A for measured reductions or CBP approved practices: case-by-case for others.	0.2	1.2:1
	NPS Urban/Mixed	Legal compliance with any federal, state, and/or local codes and an average per acre load.	Yes	Yes	N/A for measured reductions or CBP approved practices: case-by-case for others.	0.2	1.2:1
	Septic	9.5 lbs/N/capita/yr for failed systems; 5.7 lbs N/capita/yr for functioning systems minus the discharge level of the receiving system, i.e. actual N reduced.	Yes	Yes	N/A	0.2	1.2:1

Monitoring and Evaluation / Risk Allocation and Reduction

The Department (and approved aggregators/brokers) will ensure the effectiveness, validity and availability of the credits used in NPDES permits by using: (1) scientifically proven methodologies to calculate credits before approval; (2) credit certification, verification and registration processes, and (3) a credit reserve.

Permittees voluntarily participating in the trading program are obligated to ensure: (1) credits satisfy their permit conditions; (2) the credits they obtain and apply to their permits for compliance purposes are certified and registered by the Department; and (3) that the terms of their credit purchase agreements are met, when needed, to ensure compliance with their permit.

In the event that nutrient reduction activities fail due to uncontrollable or unforeseeable circumstances such as extreme weather conditions or credit supplier default, timely notice must be provided to the Department and Reserve Credits may be applied for the purposes of permit compliance. The purpose of the credit reserve is to reduce permittee risk in participating in the trading program by providing access to a credit pool that can be applied, if necessary and warranted, to meet permit obligations. The Department plans to exercise enforcement discretion with respect to permittees for the year in which credits are determined to be invalid, as long as (1) the credit failure is not due to negligence or willfulness on the part of the permittee or credit supplier, and (2) the permittee replaces the credits for future compliance periods.

Additionally the Department provides permittees a “true up” period at the end of each accounting year to generate or purchase credits needed to meet their compliance obligation due to credit failures not related to natural disaster or risk or due to unexpectedly higher discharge annual average discharge volumes or effluent levels. Application timeframe for this period extends for two months from the end of the credit accounting year.

Furthermore, nothing in this guidance prohibits permittees from purchasing additional credits above and beyond their compliance requirements in order to ensure an adequate credit supply. In the event these excess credits are not needed by the purchaser they can be sold or transferred to another entity to be used in the year in which they are generated.

Documenting Credits and Trades

The Department, using approved methodologies, must approve all credit calculations, credit and trade registries, and credit tracking activities. This information is public and current information will be available on the Department’s Nutrient Trading website and the on-line marketplace (NutrientNet). All credits must be registered before they can be used to meet permit limits.

The marketplace tool may also be used by buyers and sellers to verify that their trades have been approved by the Department.

The Department may provide guidelines for acceptable contract terms and a model trading contract, purchase agreement or a list of certain essential elements of a trading contract in the future if deemed necessary.

Ensuring Program Integrity and Managing for Success

The Department recognizes that there is some level of uncertainty in the ultimate success of nutrient and sediment reductions that serve as the basis for tradable credits.

The Department will evaluate the program at least every five years or more frequently if deemed appropriate. Based on these reviews, the Department may determine program enhancements are needed and the appropriate changes will be made. These will be shown on the Department’s Nutrient Trading website. Stakeholder input will be obtained prior to the changes, as appropriate.

Examples of Credit Calculation and Trades

The following examples are based on hypothetical situations and are intended to demonstrate how credits are calculated and trades are carried out in the marketplace. Information required for the calculations is either predetermined through established models and policies, or calculated by NutrientNet based on site-specific input provided by non-point sources. The following table lists required information and sources.

Table 4. Information required to calculate credits for this trading program.

<u>Input</u>	<u>Source of Information</u>
Current TN and TP loading (point source)	Monitoring data from point source
Permitted TN and TP loading (point source)	Discharge permit
Land area	Non-point source – i.e., farmer
Current nitrogen (N) and phosphorus (P) loading rate	NutrientNet, based on non-point source data
BMP effectiveness	Chesapeake Bay Program
Edge-of-Segment Factor (EOS)	Chesapeake Bay Watershed Model
Delivery Factor (DF)	Chesapeake Bay Watershed Model
Risk Reserve Factor	WV Potomac Water Quality Trading Program

Example 1: Non-point Source Credit Calculation

A farmer located in Chesapeake Bay Watershed Model Segment 740 currently plants 100 acres of corn using conventional till (high-till). (S)He decides to implement a cover crop on this field to generate nutrient credits. How many credits can (s)he generate with this BMP?

Given:

Land area:	100 acres
Current Nitrogen (N) Loading Rate:	30 lbs/acre/yr
Cover Crop Nutrient Reduction Effectiveness:	45%
Edge-of-Segment Factor (EOS):	0.21
Delivery Factor (DF):	0.74

Nitrogen Credit Calculation:

-
- 1) Current N load = land area \times current N loading rate
 $= 100 \text{ ac} \times 30 \text{ lbs/ac/yr} = 3,000 \text{ lbs/yr}$
 - 2) BMP implementation reduction = BMP effectiveness \times current N load
 $= 0.45 \times 3,000 \text{ lbs/yr} = 1,350 \text{ lbs/yr}$
 - 3) Delivered N loading reduction =
BMP implementation reduction \times EOS \times DF
 $= 1,350 \text{ lbs/yr} \times 0.74 \times 0.21 = 210 \text{ lbs/year}$

Number of credits generated = 210 lbs/yr
--

Example 2: Point Source-to-Point Source Trade

Two point sources in the Potomac basin would like to benefit by participating in the trading program. Point source A is currently exceeding its nutrient allocation; Point source B is discharging below its nutrient allocation either because it has installed nutrient removal technology, modified its treatment process to enhance efficiency, or because it is discharging below its design flow. How many credits are needed by Source A to achieve compliance; and how many credits can Source B provide?

Given:

Source A

Bay Watershed Model Segment Location:	740
Delivery Factor (DF):	0.74
Current TN Loading:	50,000 lbs/yr
Permitted Loading (5mg/l @ design flow):	25,000 lbs/yr

Source B

Bay Watershed Model Segment Location:	180
Delivery Factor (DF):	0.83
Current TN Loading:	100,000 lb/yr
Permitted Loading (5mg/l @ design Flow):	150,000 lbs/yr
Risk Reserve Factor:	10%

Nitrogen Credit Calculation:

Source A

- 1) Excess N loading = Current TN loading – permitted loading
 $= 50,000 \text{ lbs/yr} - 25,000 \text{ lbs/yr} = 25,000 \text{ lbs/yr}$
- 2) Delivered N loading reduction needed = Excess N load \times DF
 $= 25,000 \text{ lbs/yr} \times 0.74 = 18,500 \text{ lbs/yr}$
- 3) Number of credits needed = Delivered N loading reduction needed + (Delivered N loading reduction needed \times risk reserve factor)
 $= 18,500 \text{ lbs/yr} + (18,500 \text{ lbs/yr} \times 0.1) = 20,350 \text{ lbs/yr}$

Number of credits needed = 20,350 lbs/yr
--

Source B

- 1) Unused N allocation = Permitted loading – current TN loading
 $= 150,000 \text{ lbs/yr} - 100,000 \text{ lbs/yr} = 50,000 \text{ lbs/yr}$
- 2) Delivered N loading reduction = Unused N allocation \times DF
 $= 50,000 \text{ lbs/yr} \times 0.83 = 41,500 \text{ lbs/yr}$

Number of credits available = 41,500 lbs/yr

Sources A and B would work out a trade agreement and then register the trade on the Department's website.

Example 3: Point Source-to-Non-point Source Trade

Point source B in watershed segment 740 is exceeding its nutrient allocation and would like to purchase credits from local farms to achieve compliance in lieu of installing technology. Farmers located in segment 740 choose to form Co-op A and plant cover crops on 1000 acres of fields currently under conventional tillage, in the hopes of generating income from the sale of nutrient reduction credits. How many credits can Co-op A generate; and how many credits are needed by Source B to achieve compliance?

Given:

Source A: Farm co-op

Land area:	1000 acres
Edge-of-Segment Factor (EOS):	0.21
Delivery Factor (DF):	0.74
Current N Loading Rate:	30 lbs/ac/yr
Cover Crop Nutrient Reduction Effectiveness:	45%

Source B - Point source

Delivery Factor (DF):	0.74
Current N Loading:	10,000 lb/yr
Permitted Loading:	5,000 lb/yr
Risk Reserve Factor:	20%

Nitrogen Credit Calculation:

Source A

- 1) Current N load = land area × current N loading rate
 $= 1000 \text{ ac} \times 30 \text{ lb/ac/yr} = 30,000 \text{ lb/yr}$
- 2) BMP implementation reduction = BMP effectiveness × current N load
 $= 0.45 \times 30,000 \text{ lbs/yr} = 13,500 \text{ lbs/yr}$
- 3) Delivered N loading reduction =
 BMP implementation reduction × $\frac{\text{EOS}}{\text{DF}}$
 $= 13,500 \text{ lbs/yr} \times 0.74 \times 0.21 = 2,098 \text{ lbs/year}$

Number of credits generated = 2,098 lbs/yr
--

Source B

- 1) Excess N loading = Current TN loading – permitted loading
 $= 10,000 \text{ lbs/yr} - 5,000 \text{ lbs/yr} = 5,000 \text{ lbs/yr}$
- 2) Delivered N loading reduction needed = Excess N loading × DF
 $= 5,000 \text{ lbs/yr} \times 0.74 = 3,700 \text{ lbs/yr}$
- 3) Number of credits needed = Delivered N loading reduction needed + (Delivered N reduction needed × risk reserve factor)
 $= 3,700 \text{ lbs/yr} + (3,700 \text{ lbs/yr} \times 0.2) = 4,440 \text{ lbs/yr}$

Number of credits needed = 4,440 lbs/yr

Point source B would work on a trade agreement either directly with Co-op A or with a third party aggregator, and then register the trade on the Department’s website. Point source B must acquire the remainder of its needed credits from an additional source.

Attachment C:
NutrientNet Hosting Memo

Memo

To: Teresa Coon, West Virginia Department of Environmental Protection; Richard Herd; West Virginia University

From: Mindy Selman, World Resources Institute

Regarding: NutrientNet-West Virginia Hosting

Background

West Virginia University received a Conservation Innovation grant in 2007 to develop a nutrient trading program for West Virginia's upper Potomac watershed. The World Resources Institute has worked with WVU and its partners to design and develop a version of NutrientNet that will serve as the online calculation tool, marketplace and registry for the program. The project will be completed on August 15, 2010 at which time the WVDEP will be responsible for the continued implementation of the trading program and the hosting and maintenance of the NutrientNet tool. Meanwhile, WRI, in partnership with the state agencies, has submitted and received funding for a Conservation Innovation grant that will fund the development of an interstate nutrient trading platform. This platform will marry elements from the PA, WV, MD and VA state trading applications, but merge them into a single platform.

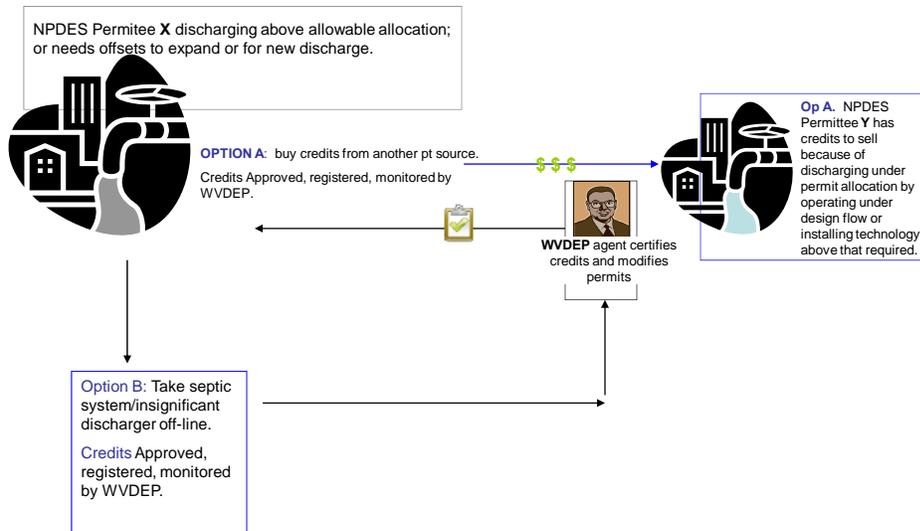
NutrientNet-West Virginia Hosting

The purpose of this memo is to document the hosting decision for NutrientNet-West Virginia after the close-out of the West Virginia University CIG grant which financed the development of NutrientNet-West Virginia.

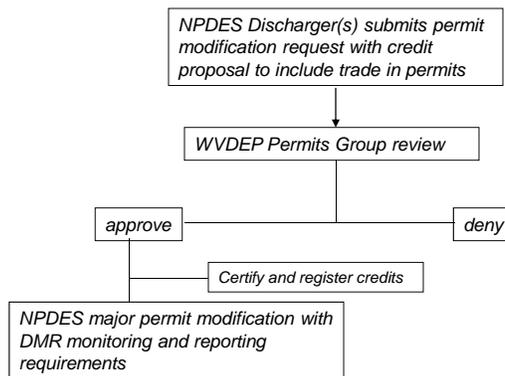
The World Resources Institute (WRI) has agreed to allow West Virginia DEP to leave the West Virginia NutrientNet application on the WRI servers until such a time as an interstate trading platform has been developed and is available to West Virginia users. While residing on the WRI servers, WRI will be under no obligation to perform updates or modifications to the NutrientNet-West Virginia site unless such work is agreed upon by both parties. Once the interstate trading platform is live, the NutrientNet-West Virginia site will be decommissioned by WRI. WRI agrees to give adequate notice to WVDEP so that it can make alternate hosting arrangements if desired, and/or transfer data from the site as needed. It is assumed that hosting of the interstate trading platform will be centrally located (perhaps with the Chesapeake Bay Program), privately hosted, or hosted by a state that has capacity to dedicate a server.

Attachment D:
Trading Program Infrastructure

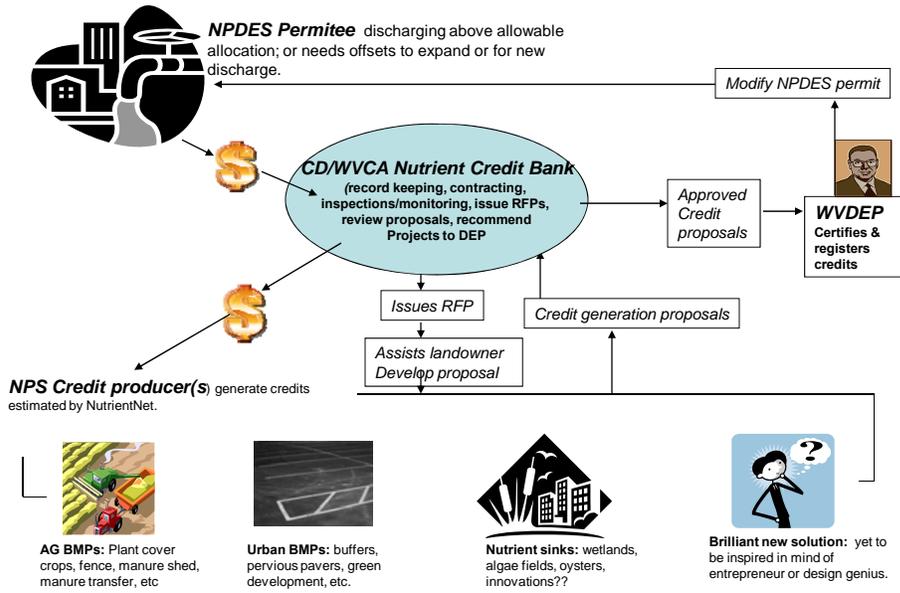
NPDES Permitted Point to Point Credit Trading



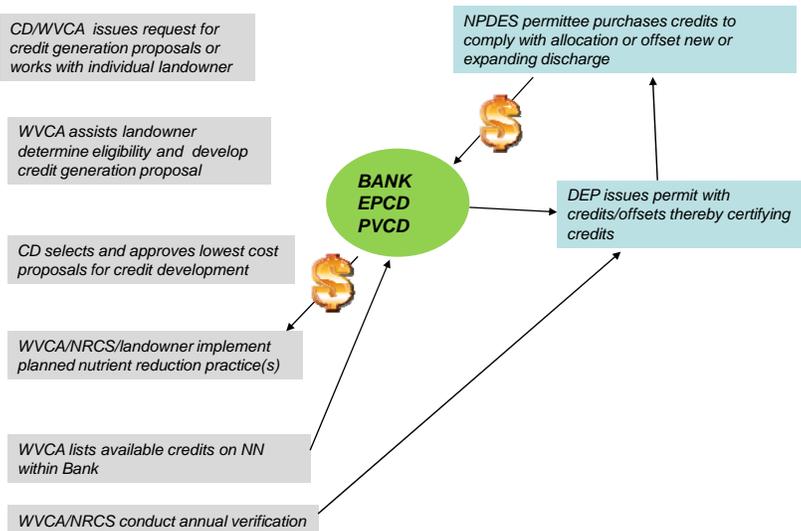
Point Source to Point Source Trade Process



NPDES Permitted facility to Non-Point Source Trade



NonPoint Source Nutrient Credit Generation and Purchase Process



Attachment E:

WV Potomac Nutrient Trading Program Outreach Fact Sheet



west virginia department of environmental protection

Nutrient Credit Trading in West Virginia's Potomac River Watershed

Protecting and Restoring Our Potomac River and Chesapeake Bay Watershed While Providing for Economic Development

The West Virginia Potomac Nutrient Trading Program was initiated to help the state more cost-effectively comply with new nutrient reduction requirements while providing for economic development and other environmental benefits. It is a legal, fair and effective *voluntary* tool for advancing water quality improvement and regulatory compliance. A market-based approach, it allows emitters with high pollution reduction costs to purchase credits from sources with lower reduction costs.

Background

Excess nutrients entering the Potomac River are creating significant downstream water quality problems. Under the Clean Water Act (CWA), West Virginia is required to address the downstream problems in the Potomac River Watershed – a tributary of the Chesapeake Bay. West Virginia has committed to reducing the amount of phosphorus entering the Potomac River by 33% and nitrogen by 35%. Programs such as nutrient trading are being implemented to help meet the nutrient reduction requirements that EPA will impose by December, 2010.

Water Quality Trading

Water Quality Trading is an innovative approach to efficiently achieve water quality goals. Trading is based on the fact that various nutrient sources in a watershed can face very different costs to control the same pollutant.

Trading programs allow facilities facing high pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from other sources with lower pollution reduction costs, thus achieving water quality improvement at a lower overall cost.

Why Become Part of the Nutrient Trading Program?

— Because it Makes Economic Cents! —

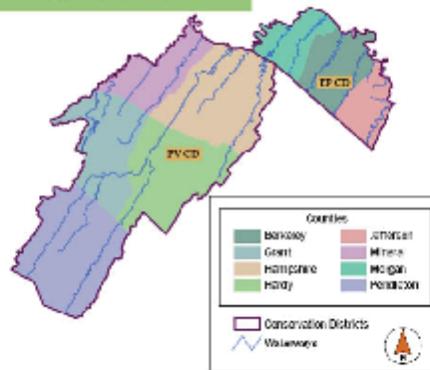
Water quality trading incentivizes farmers and landowners to generate nutrient reduction credits by implementing conservation practices on their lands. These credits, based

on the reduction achieved, can then be sold to facilities like wastewater treatment plants.

Water quality trading is not a governmentally mandated program or regulatory requirement. It is a market-based tool that enables some industrial and municipal facilities to meet regulatory requirements more cost-effectively. Through trading, producers and other landowners receive monetary incentives to implement conservation practices.

By a combination of agronomic management options and/or Best Management Practices (BMPs), farmers can reduce the amount of nutrients that runoff to local streams. The pounds of nitrogen and phosphorus runoff that are reduced can then be sold as credits to those wastewater treatment plants needing additional nutrient reductions to meet regulatory requirements or offset their increased load. By selling these credits, nutrient trading can be a source of additional revenue for farmers.

Counties and Conservation Districts
WV Potomac Basin



Map showing West Virginia Counties in the Potomac Watershed and indicating the Potomac Valley and Eastern Panhandle Conservation Districts.

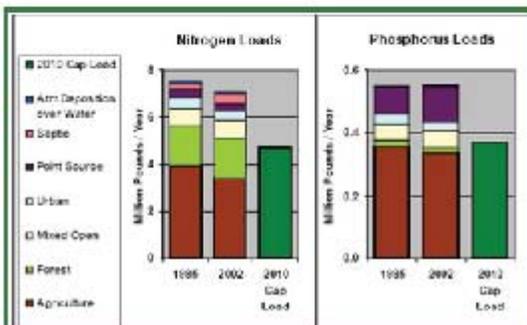


Nutrient Credit Trading in West Virginia's Potomac River Watershed

Where do excess nutrients come from?

Virtually all people in the Potomac watershed contribute nutrients to the Potomac River which end up in the Chesapeake Bay. Excess nutrients reach these waterways from three major sources:

- 1.) specific, identifiable entry pipes, called "point sources," principally waste water treatment plants.
- 2.) runoff from urban, suburban and rural land, called "non-point sources," which include fertilizers, septic systems, and farm animal manure.
- 3.) air pollution, from vehicles, industries etc.



This chart compares delivered loads of nitrogen and phosphorus in 1985 and 2002 for each of the seven major land use categories in West Virginia's Potomac River watershed. The 2010 Cap Load Allocation is included for comparison purposes. Source: CBP, Sweeney, 2002 model run

How are excess nutrients a stressor on our Potomac River and the Chesapeake Bay?

Excess nutrients fuel the growth of dense algae blooms that block sunlight and rob the water of dissolved oxygen which aquatic species need to survive. The current levels of nutrients and sediment entering the River and Bay ecosystem are causing millions of dollars of damage and lost revenue annually.

Simplified example of a trade.

A waste water treatment plant (wwtp) is required to reduce its phosphorus (P) discharge at a unit cost of \$10/lb. whereas a farmer can remove the same unit of P for \$3/lb. In a trading scenario between these two sources, the wwtp could contract with the farmer to remove the unit of P for a payment of \$5 thereby saving the ratepayers \$5.

How the Program Works

A methodology has been developed for calculating potential nutrient reduction credits resulting from various agricultural practices applied in West Virginia. These calculations have been integrated into West Virginia's online water quality trading platform called NutrientNet.

NutrientNet uses six steps to calculate Nitrogen and Phosphorus Credits involving Ratios, Factors and Baselines. This Credit Calculation program helps suppliers and buyers of nutrient credits define the product more clearly. It ensures that real and verifiable pollution load reductions are established.

Step 1: The user enters site specific information about their farm. This includes crop type, amount and type of manure applied and application method as well as current conservation practices.

Step 2: NutrientNet automatically generates a "Nutrient Balance" on the field based on the information entered about the farm. It subtracts nutrient uptakes by the crops from the nutrient inputs to the cropping system and adjusts for current BMPs.

Step 3: The user then selects the BMPs or management practices that are to be implemented on the farm and NutrientNet calculates the resulting nutrient reductions.

Step 4: The Edge of Segment (EOS) Factor then adjusts for the amount of nutrients which travel from the field to the stream.

Step 5: The EOS nutrient reductions calculated in Step 4 are then adjusted for the nutrient load that reaches the Chesapeake Bay.

Step 6: Risk Reserve and Uncertainty Ratios are applied to account for uncertainty in BMP efficiencies and risk of BMP failure.

How Can I Get More Information?

Guidance Documents can be accessed at:
<http://wvri.nrce.wvu.edu/programs/pwqb/index.cfm>

WV Potomac Water Quality Bank and Trade Program

Richard Herd, Project Director
 WV Water Research Institute
 PO Box 6064
 Morgantown, WV 26506
 304 293 2867 x 5442
Richard.Herd@mail.wvu.edu



West Virginia
 Department of
 Environmental Protection
<http://www.dep.state.wv.us>



Attachment F:
**Recommended Poultry Litter Export Program for
Generating Nutrient Credits**

Guidance for Development of Nutrient Credits by Poultry Litter Transfer

This guidance applies to the transfer of poultry litter from the Potomac River basin, WV to another river basin outside of the Chesapeake Bay drainage for the purpose of developing nutrient trading credits and improving water quality. Poultry litter is a valuable nutrient resource but when improperly applied can result in excess nutrient runoff that may impair local and downstream water quality. Producers participating in the program will be provided nutrient trading credits based on the pounds of nitrogen and phosphorus contained in the litter. The credits will be listed on the WV Department of Environmental Protection (WVDEP) Nutrient Trading registry for sale to entities that need to offset new or expanded discharges or choose to use the credits for regulatory compliance. The WV Conservation Agency will manage the litter transfer program including coordination with sellers and buyers, calculation of credit generation, listing of credits and the transfer of funds between buyers and sellers.

General Program Requirements:

Land Eligibility

- Pastureland, hayland, cropland and AML outside of the Potomac River basin, WV.
- Land that is fifty feet from a river, stream, pond, sinkhole or property boundary.
- Land that is one hundred feet from a well or spring.

Litter Use and Storage

- Litter must be obtained from within the Potomac River basin, WV
- Litter is to be properly applied only to cropland, hayland, pasture or AML in accordance with a current nutrient management plan, prepared by a WVDA Certified Nutrient Management Consultant.
- Litter will be transported from the producer's site directly to the location of intended use.
- Litter is not to be resold or fed to livestock.
- Litter will be stored at an approved site as described in the Nutrient Management Plan.
- If not applied to land within three days of delivery, stored litter must be covered to protect it from precipitation.
- Litter will not be applied to frozen, snow covered or saturated soils.
- Litter application will be timed as closely as practical to active crop growth.
- Litter will not be applied within fifty feet of a stream, drainage way, pond, sinkhole or property boundary.
- Litter will not be applied within one hundred feet of a well or spring.
- Litter will be applied at the agronomic rate provided in the Nutrient Management Plan.
- Litter will be applied as uniformly as spreader will allow.

Responsibilities of Landowner/Operator Receiving Litter

- The owner/operator of the land on which the litter is to be applied will have a current Nutrient Management Plan developed by a certified Nutrient Management Consultant.
- The owner/operator of the land on which the litter is to be applied will provide cropping history and soil test information to the WVDA Certified Nutrient Management Consultant to include in the Nutrient Management Plan.
- The landowner/operator will through with the WVCA to contact and negotiate with a litter supplier and transport agent.
- Follow the Nutrient Management Plan in litter application.
- Follow bio-security procedures established by WVDA.

Responsibilities of Producer Supplying Litter

- Supply an average of five litter analyses made within the past year to the WVCA.
- Supply a certificate of litter weight that will be transferred to WVCA. If a certified scale is not available the weight of the litter may be estimated based on truck volume and percent solids.
- Follow bio-security procedures established by WVDA.

Responsibilities of the WVCA

- Conduct outreach and education with litter producers of the benefits of litter transfer.
- Establish a list of litter suppliers within the WV Potomac River basin and potential users outside of the Chesapeake Bay drainage.
- Serve as the central resource to facilitate contact between litter suppliers, users and transporters.
- Ensure litter supplier and user comply with the requirements of the litter transfer program.
- Assist litter suppliers calculate the nutrient credit value of transferred litter.
- List nutrient credits for sale on the WVDEP's nutrient credit registry.
- Record source and disposition of litter and maintain records for three years.
- Facilitate the transfer of funds for credit sales to litter producers.