

**WV Potomac Nutrient Credit Bank  
and Trade Program**

**NRCS Conservation Innovation Grant  
NRCS 68-3A75-6-185**

**Biannual Progress Report:  
February-August, 2009**

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## **1.0 Executive Summary**

Both the draft statewide trading guidance and the Potomac basin specific nutrient trading guidance have been finalized by the Steering Committee and WVDEP intends to public notice the documents in late August. Discussions are underway between the WVDEP and WV Conservation Agency and conservation districts on respective agency responsibilities for implementing the trading program.

Most of the stakeholder efforts during this reporting period included several meetings and conference calls with WVDEP, core team and project partner WRI to discuss and refine the draft guidance documents. A NutrientNet demonstration and test was held at the WVU computer lab for WVDEP permit writers and WV Conservation Agency personal that will be calculating credits and incorporating them into NPDES permits.

The WV Legislature passed SB 715 requiring the WVDEP to develop and implement a nutrient trading program by June 2011. To meet the new Chesapeake Bay Program requirement that the states submit two year implementation milestones the WVDEP committed to implementing a trading program to achieve Potomac River basin nutrient reductions by 2011.

We continue to monitor the outcome of the City of Martinsburg's challenge to nutrient allocations imposed by WVDEP and a recent 9<sup>th</sup> Circuit Court of Appeals decision that prohibits new discharges to impaired waters without an existing compliance schedule (*Friends of Pinto Creek v/s USEPA*). The ultimate outcome of each of these cases could have adverse implications for not only the Potomac trading program but for trading nationwide.

We are also continuing to participate in the Bay Interstate Trading Forum to identify benefits and obstacles to inter-basin and inter-state trading and we continue to communicate with other trading program developers to identify lessons learned.

A one year no cost project extension was requested in January to support WVDEP and WV Conservation Agency implementation of the trading program.

## **2.0 Activities this reporting period**

### ***2.1 Steering committee meetings and Tasks 2 and 3- Target stakeholder group meetings.***

Stakeholder engagement continued this period with several phone conferences and meetings including WVDEP, WV Conservation Agency, WRI and the project steering committee. The Core Team met with WVDEP leadership to resolve outstanding issues with respect to trading program guidance.

***2.1.1 A Core Team meeting was held 3/23/09 with WVDEP in Charleston*** to discuss and resolve a number of outstanding issues including appropriate agricultural baseline, trading ratios, and other issues. After reviewing several performance-based agricultural baseline alternatives it

was agreed that the program will use the 2005 edge of segment (EOS), land use specific load from the Bay model averaged across watershed model segments (similar to the Maryland trading program). Additionally, it was agreed that due to the conservatism built into the Bay Program BMPs efficiencies as well as the application of the reserve ratio an uncertainty trading ratio was not necessary for Bay Program BMPs.

The meeting notes are appended as Attachment A.

**2.1.2 WRI NutrientNet demonstration 5/14/09 Moorefield, WV.** Twenty-two individuals representing The WVDEP, WV Conservation Agency, WV Department of Agriculture, NRCS, EPA, The Conservation Fund and WVU participated. Mindy Selman (WRI) led the group through the various components of NutrientNet (NN) as developed for WV including credit calculation, and the administrative, credit registry and marketplace functions. Several real farm scenarios as prepared by WV NRCS and WVU were evaluated to determine the credit generation potential of implementing various practices.

Based on the discussions and demonstration Bill Brannon, Deputy Director WVDEP Division of Water and Waste Management announced that he was comfortable with the credit calculation tool including the ag baseline and was ready to finalize the trading guidance.

**2.1.3 NutrientNet Demo and Test.** A demonstration and test of the Nutrient Net calculation tool was held July 23 in a WVU computer lab for personnel from the WVDEP NPDES permitting group and the WV Conservation Agency. Participants had the opportunity to run a number of real farm scenarios in an effort to become familiar with the credit calculation tool as well as detect bugs in the system. System testing is continuing through the following link:

<http://wv-stage.nutrientnet.org/>

**2.1.4 WVDEP Trading Guidance and Funding Meeting July 30, 2009 Moorefield, WV.**

The purpose of this final Steering Committee meeting was to solicit comments on the final draft trading guidance, discuss next steps for the trading program and to organize a stakeholder committee to evaluate options for funding public wastewater facility upgrades and implementing the trading program. The WVDEP announced that they are prepared to finalize the guidance and notice it for public comment by late August, 2009.

Meeting notes are included as Attachment B.

A power point presentation on the trading program background, process development, trading guidance and next steps for the program can be found on the project website at <http://wwri.nrcce.wvu.edu/programs/pwqb/index.cfm>

**2.1.5 Task 1a. Interstate coordination and collaboration on development of WV trading program:** The project team continues to participate in activities to ensure that the Potomac trading program design reflects lessons learned from other trading programs and that it does not preclude future interstate trading opportunities.

Project staff continues to participate in the EPA Interstate Water Quality Trading Conference Call series coordinated with Patricia Gleason from Region 3 EPA. The objective of these calls is

to inform Bay state participants of trading program developments in the respective states with the ultimate goal of developing a basin by basin and bay-wide trading program.

We continue to discuss the basis for various program elements with nutrient trading program representatives from Pennsylvania, Maryland and Ohio and to assess program status. Although there is ample credit supply the PA program is languishing due primarily to uncertainty with long-term availability and price of credits. There is discussion of forming a state run bank to facilitate and underwrite trades in order to reduce risk. Maryland has not yet issued what they refer to as the phase 2 program component which includes criteria for point to nonpoint source trades.

### **3.0 Results and Lessons Learned**

**3.1 Final Trading Program Guidance.** The Steering Committee has finalized the trading program guidance and WVDEP has agreed to public notice it for 30 day comment. The Statewide and Potomac specific guidance documents are included as attachments C and D.

**3.2 WV Senate Bill 715.** The Legislature passed and the Governor signed SB 715 in May mandating that WVDEP develop and implement a nutrient trading program in the Potomac basin by June, 2011. This new law provides renewed impetus for WVDEP to move forward with adoption of project trading guidance and implementation of the program with the WVCA.

**3.3 EPA Targeted Watershed Grant:** We have been awarded a grant from the EPA to conduct a feasibility assessment of the potential for nutrient trading in the Kanawha River basin, WV. The objectives are to evaluate the potential for expanding the Potomac trading program into the Ohio River drainage of WV and to inform the developing Ohio River basin nutrient trading program with WV specific policy, institutional and technical information and data. The support and involvement of WVDEP in this project indicates the agency's commitment to and recognition of the opportunity to achieve cost effective water quality goals with water quality trading.

#### **3.4 Task 2. Website Development**

<http://wvri.nrcce.wvu.edu/programs/pwqb/index.cfm>: The WV Potomac Trading Website is a continually evolving website designed to advance the project goals of transparency, public outreach, and keeping stakeholders as well as our steering committee members informed with the latest reports, organizational links, and materials related to the WV program process. New postings include: The final trading guidance documents, and the stakeholder briefing presentations.

#### **3.5 NutrientNet Development Progress Subtasks 1a-1d**

##### **Task 1. Develop Accurate Data and Information to Inform Process**

**Subtask 1a.** Utilize and build on existing trading programs (Great Miami, Conestoga, etc.), State trading policies and rules (Pennsylvania, Virginia, Michigan, etc.), and EPA policy and guidance to identify key program elements and "lessons learned" that are transferable to the Potomac Watershed.

**Status:** Complete

**Work to date:** WRI continued to provide feedback and expertise to the project members via phone calls and meetings.

**Planned Work:** None.

**Subtask 1b.** Evaluate and compare BMP efficiency rates, runoff coefficients, soil retention factors, equivalence factors, and other inputs and assumptions used by the CBWM with equivalent WV-specific water quality, soil, land use and other pertinent data and information to establish appropriate efficiency rates for practices.

**Status:** In progress (95% complete)

**Work to date:** Have gathered appropriate CBWM and agronomic factors from WVU, NRCS, and CBP. This data has been incorporated into spreadsheets.

**Planned Work:** Continue follow-up work as necessary. Specifically, decide with appropriate stakeholder input the appropriate efficiencies to use for BMP efficiencies pending approval from CBP.

**Deliverables:**

- CBWM delivery factors and baseline factors table. (final)
- BMP efficiency table (in progress).

**Subtask 1c.** Based on findings from Subtask 1b, develop WV specific BMP efficiency rates, soil nutrient retention factors, equivalence factors, and runoff coefficients that can be used to tailor NutrientNet.

**Status:** In progress (80% complete)

**Work to date:** Created Final spreadsheets for N and P calculations on crop and pasture.

**Planned Work:** Draft spreadsheets for animal operations. Determine with stakeholders the appropriate methodology for crediting manure export.

**Deliverables:**

- Draft N spreadsheet for crop/pasture (complete)
- Draft P spreadsheet for crop/pasture (complete)
- Final N spreadsheet for crop/pasture (complete)
- Final P spreadsheet for crop/pasture (complete)
- Proposed methodology for calculating reductions from animal operations and manure export.

**Subtask 1d.** Modify NutrientNet and develop various trading scenarios to estimate potential credit supply and demand, relative incremental credit costs and projected loading reductions.

**Status:** In progress (80% complete)

**Work to Date:** Developers have completed marketplace and administrative modules based on PA-NN site design, and have developed WV-specific calculation tools for nitrogen and phosphorus reductions from crop and pasture lands.

**Planned Work:** Developers will finalize the NutrientNet registry, marketplace, and calculation tools based on feedback from stakeholders testing the software.

**Deliverables:**

- Beta version of NN marketplace and administrative modules (complete)
- Final version of NN marketplace and administrative modules (in progress)
- Beta version of NN nonpoint and point source credit calculation tools (complete)
- Final version of NN nonpoint and point source credit calculation tools (in progress)

## **Task 2. Develop and Implement Stakeholder Process**

**Status:** ongoing

**Work to date:** WRI attended the following stakeholder meetings:

- May 14th (WRI presented the NutrientNet crop and pasture calculation tools to stakeholders.)
- July 22 (WRI presented NutrientNet calculation tools to a broader stakeholder audience).

**Planned Work:** WRI will continue to attend stakeholder meetings and conduct outreach as necessary.

## **Task 3. Develop Trading Rules and Infrastructure and Implement Program**

WRI will work with project team to develop a trading policy for West Virginia pilot project.

**Status:** In progress

**Work to date:** WRI has continued to provide comments and input on draft policy.

**Planned Work:** WRI will continue to provide input and feedback as needed as draft moves forward and becomes final.

## **4.0 One-Year No Cost Extension Request**

A request for a no cost extension of the project was submitted for the following reasons:

1. Although notification of the award was made in August 2006, NRCS did not authorize initiation of work until February, 2007 resulting in a six month delay.
2. The WV Department of Environmental Protection (WVDEP) is phasing in nutrient allocations into NPDES permits upon permit renewal rather than reissuing all watershed permits with nutrient permit limitations. The consequence is that only a portion of watershed NPDES permittees understand their compliance obligations and option for trading. Therefore a strong driver for nutrient trading has not yet developed in the watershed.
3. Although the draft stakeholder trading guidance was completed in September, 2008 we are still waiting for final WVDEP review and approval. A meeting with WVDEP is scheduled for January 15, 2009.
4. Phase 5.2 revision of the Chesapeake Bay model is to be issued in the spring of 2009. The revised model will contain smaller watershed segments and modified sector loadings. It is anticipated that once the revised model is issued significant modifications will need to be made to NutrietNet.
5. The city of Martinsburg, WV has filed an NPDES permit appeal of nutrient load limitations implemented by the WVDEP. Attorneys for Martinsburg argue that WVDEP

does not have authority under WV code to require nutrient reductions by point source dischargers. The outcome of this action has the potential to delay implementation of point source nutrient requirements and thereby delay implementation of the Potomac trading program.

## **5.0 Next six months (February 2009-August 2009)**

- **Task 3a.** Work with WVDEP and WVCA to develop trading program infrastructure.
- **Task 3d.** Work with WVCA to pilot several nutrient credit demonstration projects.
- **Task 1c.** Complete development of NNet-WV and transfer to WVDEP/WV Conservation Agency for implementation.
- **Tasks 3b/2c.** Work with WVDEP to respond to public comments on trading guidance and conduct additional stakeholder outreach.
- **Task 2.** Publication of another article on program status in *Pipelines*, the state Public Service Commission newsletter.
- **Task 2b.** Continue to develop/update WV Water Quality Trading informational website.
- **Task 3.** Continue coordination of CIG and Targeted Watershed trading grants – continue participating in riparian buffer/stormwater/wetland project development
- **Task 1a.** Continue to participate in Bay interstate-basin/state trading workgroup and communicate with other trading program leaders for lessons learned.

## **Attachments:**

### **Attachment A:**

WV-Potomac Water Quality Trading Guidance  
Meeting Notes 3-23-2009  
WVDEP office, Charleston

**Purpose:** Discuss key issues within final draft Potomac trading guidance.

**Participants:** WVDEP: Randy Sovic, Bill Brannon, Jennifer Pauer, Mike Warwick  
WVU: Rick Herd, Tom Brand, Julie Svetlik  
Others: Mindy Selman (World Resources Institute, via telephone), Isaac Wolford (WV NRCS), Joe Hankins (Freshwater Institute/Jefferson Co. PSD)

**Note:** A no-cost extension has been requested (scope: to “develop and implement” the nutrient trading program) through August 2010.

#### *ISSUE 1: SHOULD WE BUILD CREDITS FOR SEDIMENT REDUCTIONS?*

Currently, sediment trading is not viable because no sediment criteria have been defined. However, if sediment criteria materialize in the future, it would be helpful to have it already addressed in the trading guidance.

Mindy: sediment loadings and reductions can be built into NutrientNet as a simple reporting function for now (PA’s program utilizes this feature), and when a viable market for sediment credits arises, the delivery factors etc. can be calculated and included.

**Consensus:** insert “sediment” and related language into the relevant places in the guidance documents in order to keep the option open for sediment trading when the opportunity arises.

#### *ISSUE 2: WHAT NUMERICAL BASELINE SHOULD BE USED FOR AGRICULTURAL NPS?*

Options to use as baseline:

- Based on current (2007) performance levels as per CBWM.
- Based on Trib Strategy performance levels as per CBWM.
- Based on some other year (such as 2005), or some proportion of the difference between two years’ levels.

Mindy presented a short slideshow explaining the different baseline options, what other states are doing, why we chose a performance based standard, and a comparison of baselines based on edge of segment (EOS) levels vs. Trib Strategy levels. It was stressed that the EOS levels are averaged across segments, so theoretically half of the acreage in the watershed is already at or below these levels. After a thorough discussion, it was generally agreed on that until the TMDL is in place we should use the most current years’ levels as the baseline, with the understanding that baselines can and most likely will change when the TMDL is created. Implementation options at that time may include “grandfathering” existing credits/BMPs under the baseline that they were implemented under, applying the newer, more restrictive baseline to new credits only.

**Consensus:** Use 2005 EOS performance levels (“existing land use and practices”) as the starting baseline.

*ISSUE 3: CREDIT DISCOUNT FACTORS/RATIOS: ARE ALL OF THEM NECESSARY?*

Under the current version of the guidance, agricultural credits are severely diminished through the application of several discount factors or ratios; the salable credits produced by a farm are less than a tenth of the original load reductions achieved through BMPs. If farmers must expend effort for such little reward, they will be unlikely to participate in the program.

Mindy discussed trade ratios with a couple of slides--what the typical types of ratios are, and which states apply what ratios. In general, the states that use a reserve ratio do not use an uncertainty ratio, and vice versa, implying that both types of factors address uncertainty so only one is really needed (WV currently proposes both). Mindy also explained that the CBM accounts for uncertainty in its calculated BMP efficiency ratios, which are very conservative. Speaking from the perspective of point sources, Joe asserted that the PS are really only interested in the reserve ratio, and that the uncertainty factor is primarily important for regulators.

**Consensus:** Remove the uncertainty factor from the Potomac guidance document (however, we will insert a table/discussion of all discounting factors into the WV document to provide for trading programs in other basins in the future) and explain why an uncertainty factor is not included. To account for any remaining uncertainty, we will increase the reserve ratio from 10% to 20-25%. In the documents, include an explanation of the risk reserve ratio and how it is created and used.

*ISSUE 4: PRACTICES APPROVED FOR CREDIT GENERATION.*

The Potomac guidance states that to generate credits, the BMPs must come from the list of nutrient management practices approved by the CBP. This language is included to provide for the potential for interstate trading in the future, and should not apply to within-state trades (to encourage innovation and cost-effective approaches to nutrient mgmt).

**Consensus:** Non-Bay BMPs may be approved for WV's program on a case-by-case basis.

*ISSUE 5: STATUS OF NUTRIENTNET.*

Mindy informed us that developers are currently adding in calculations for enhanced BMPs. The interactive tool should be ready in 6 weeks, and the spreadsheet tool will be available sooner.

*NEW ISSUE: PS BUYING/SELLING "SELF-INSURANCE" CREDITS.*

Joe brought up some key questions related to PS' capability of buying a number of credits in excess of what it expects to need per year, to provide some insurance in cases where they may need credits at the end of the year (e.g., if credits are determined to be invalid, if the PS miscalculated its actual discharges or treatment capability, etc.). These credits allow the PS to insure itself against unforeseen circumstances and the uncertainty associated with the WVDEP's criteria under which reserve credits may be used. Joe suggested that we address this issue, as well as the potential for PS to sell any unused credits to other PS that may need them during the "true up" period.

**NEXT STEPS:**

- Conduct NutrientNet demo for steering committee with data from actual farms
  - Won't need to perform calcs on-site; we can use farm data (with farmers' permission, of course) housed at NRCS
  - Mindy will demo to WVU/NRCS personnel 1 week in advance to identify any issues

- Isaac/Tom will work to obtain permission from farmers to use data
- Tentative date: May 14, 2009 at NRCS

## Attachment B

Chesapeake Bay Trading Guidance and Funding Meeting  
July 30, 2009, 1-4 pm  
South Branch Inn - Moorefield, West Virginia

- **Purpose:** Discuss final draft Potomac trading guidance and explore options for organizing a funding stakeholder group.
  - **Participants:** Listed on last page.
  - **Action items & issues to be addressed appear in bold purple font.**
1. **SB 715 Discussion:** Bill Brannon, WVDEP
    - a. SB 715 charges the WVDEP to (1) establish a nutrient trading & offset program, (2) develop nutrient performance standards for WWTPs, and (3) establish a stakeholder process to evaluate options for funding the necessary capital improvements to meet nutrient requirements.
    - b. Milestones:
      - Oct. 2009 – Revised nutrient allocations expected from CBP
      - **June 1, 2010** – DEP must report to legislature on status of proposed nutrient performance standards for WWTPs; **and** recommend a capital funding program for municipal improvements needed to meet new standards.
      - Dec. 2010 – Bay-wide TMDL expected from EPA
      - **June 1, 2011** – WV Bay drainage nutrient trading/offset program must be established.
    - c. Q: Is WV adopting trading statute or guidance?  
A: Advice from other states that have developed trading programs is to adopt guidance over statute – more flexible.
  2. **Potomac Guidance Discussion:** Rick Herd, WV Water Research Institute
    - a. Key features of Potomac trading program:
      - based mainly on PA & MD programs
      - guidance rather than statute – for adaptability
      - primary driver initially will be offset requirements for new/expanding facilities
      - participants must meet baseline performance requirements before trading is allowed
        - Point source – at or below nutrient allocation
        - Nonpoint source – at or below 2005 land use-specific EOS loading rate
      - all credits are subject to a delivery factor (equates credits across segments)
      - **Program infrastructure and program funding are being discussed with Steering Committee, WVDEP and WVCA**
    - b. Q: How are baselines verified?  
A: Loadings are calculated by NutrientNet (NN) based on existing land use & practices and verified by on-farm visits (WVCA personnel). Q: Will the verification records and nutrient performance be available to the public?

A: Proposals for trading would be available; not sure about ag info (T. Brand: WVCA is tied to the same confidentiality requirements as NRCS, which means that farm-specific info such as BMPs installed cannot be made public)

--sticky issue that needs to be sorted out if WVCA is going to manage NPS credits

- c. Comment: suggest monitoring at the mouth of tribs to provide assurance that trading is effective.
- DEP: WVDA & WVDEP's ongoing monitoring efforts should serve this objective.
  - Comment: Bay TMDL will be broken into 90+ subwatersheds, and they will all have to be monitored under TMDL assessment anyway.
  - Q: Does this mean that every stream with BMPs will have to be monitored? If so, WVDA's monitoring program must be vastly expanded.
- d. Q: What about the lag time it takes before some BMPs are effective—shouldn't we delay credit generation until they become effective?  
A: BMP efficiencies are developed as averages across the lifespan of the BMP, so the lag time is taken into account.

#### Input/Questions from Point Sources:

- e. PS will want to know the **expected price of credits** so that they can compare it to the cost of upgrades.
- f. Q: What happens if the contract ends and the farmer decides not to renew?  
A: This is the advantage of having the credit bank/aggregator – the bank guarantees the credits, and the reserve insures them.
- g. Q: What about users of a facility that can't afford to buy the needed credits?  
A: The credit program will create a new cost line in the business plan that will need to be addressed through the financial planning process (i.e., construction, planning, permitting, etc.)
- h. Q: Why make the development community and PS responsible for 100% of nutrient reductions, but the bad ag actors can go unregulated/unpunished?  
A: Fair argument, but until the wrench tightens enough on the regulated PS community to force the political will to regulate ag, nothing can be done about it.  
-- No way the Bay can be cleaned up through PS reductions only.
- i. Q: Where will the reserve be housed, and how will it be managed?  
A: **Looking to WVCA for management of the reserve.**  
A: **Still needs discussion – DEP will have to assume some responsibility.**
- j. Q: Should PS “overbuy” credits to ensure that they comply with permit in case of disaster or credit loss on the NPS end? Especially if there are not enough credits in the reserve to cover all affected PS permits...  
A: Permit language already provides allowances for “Acts of God” situations, but in the case of NPS non-performance, then it's a contractual issue and PS will be liable along with DEP & WVCA.

- Comment: PS will have to budget in contract/legal costs
  - Q: Shouldn't the bank be liable for this, since the contract is between the PS and the bank?
  - A: yes, ultimately DEP will be liable
- k. B. Brannon: We're at a point in the process where the functioning of the program needs to be discussed (i.e., how it will work, who's in charge of what).
- **Suggestion: DEP will need PS input when designing program infrastructure.**
  - Q: **What does DEP need from PS in order to move forward?**
  - A: **Costs, recommendations from PS and other stakeholders**
- l. **Next steps for Guidance:**
- **Finalize guidance & put out for public notice**
  - **Go to public comment in mid-August for 30 days.**
3. **Rockymarsh Project:** Joe Hankins, The Conservation Fund
- Promotes voluntary investments in water quality in preparation for the trading program and TMDL.
  - Demonstrates/ advocates local benefits of water quality improvement practices, which also help WV meet Bay nutrient reduction goals.
  - Restoring brook trout habitat to Rockymarsh Run, as well as "greening up" new and existing residential developments
  - "Virtual developments" – platted/permitted on paper but not yet built – are a challenge: how do we incentivize developers to make them greener?
  - WVDEP will get Bay nutrient reduction credit for BMPs installed through this project.
4. **Funding Trading Program Implementation:** Bill Brannon, WVDEP
- cost of implementing Trib. Strategy in WV: \$1 Billion
  - Blue Ribbon panel has identified and recommended funding options
  - other states: MD (flush fee), VA (POTW upgrades thru state appropriations), DC (Blue Plains upgrades), PA (Growing Greener)
5. **Organization of Funding Stakeholder Group** – Bill Brannon 3:00 pm
- a. Report recommending capital funding program is due to the WV legislature (Joint Legislative Commission on State Water Resources) June 2010
- Will consist of a list of options for funding the trading program
- b. When we report to the legislature, we should propose this as a **statewide funding initiative** starting with Chesapeake Bay counties.
- Statewide nutrient criteria are under consideration, also criteria for Mississippi Basin
  - **Consider strategic statewide participants on stakeholder group to acquire the critical mass needed for legislative pull**
- c. Other suggestions on potential participants:
- Expand the current Steering Committee
  - Use sign-in sheets from past meetings as starting point for participants

- Regional Development Councils
- WV Infrastructure & Jobs Development Council
- **K. Hinkle: contact USDA Rural Development to explore interest in funding & participation**

**6. Next Steps**

- Final edits to Trading Guidance**
- Public notice Trading Guidance for 30-day comment in mid-August**
- Send funding infrastructure reading materials to Steering Committee for initial review**

**Attendees:**

Name	Organization
Julie Svetlik	WV Water Research Institute
Josh Frye	Frye Poultry
Susanne Lawton	Jefferson Co. PSD
Randy Sovic	WVDEP – DWWM
Scott Mandirola	WVDEP – DWWM
Jonathan Fowler	WV Public Service Commission
John Tuggle	Pentree, Inc.
Clifton Browning	Berkeley Co. PSSD
Curtis Keller	Berkeley Co. PSSD
Steve Knipe	City of Martinsburg
John Gangwer	Pilgrim’s Pride Corp.
Kevin S. Hinkle	USDA – Farm Service Agency
Tom Brand	WVU Extension
Sara Walker	World Resources Institute
Carla Hardy	WV Conservation Agency
Amanda Sullivan	WV Dept. of Agriculture
Margaret Janes	Appalachian Center
Matt Monroe	WV Dept. of Agriculture
Fred Blackmer	Eastern Panhandle Homebuilders Assn.
Jennifer Pauer	WVDEP – DWWM
Joe Hankins	The Conservation Fund
Bill Brannon	WVDEP – DWWM
Rick Herd	WV Water Research Institute

## **Attachment C**

# **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.

**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.

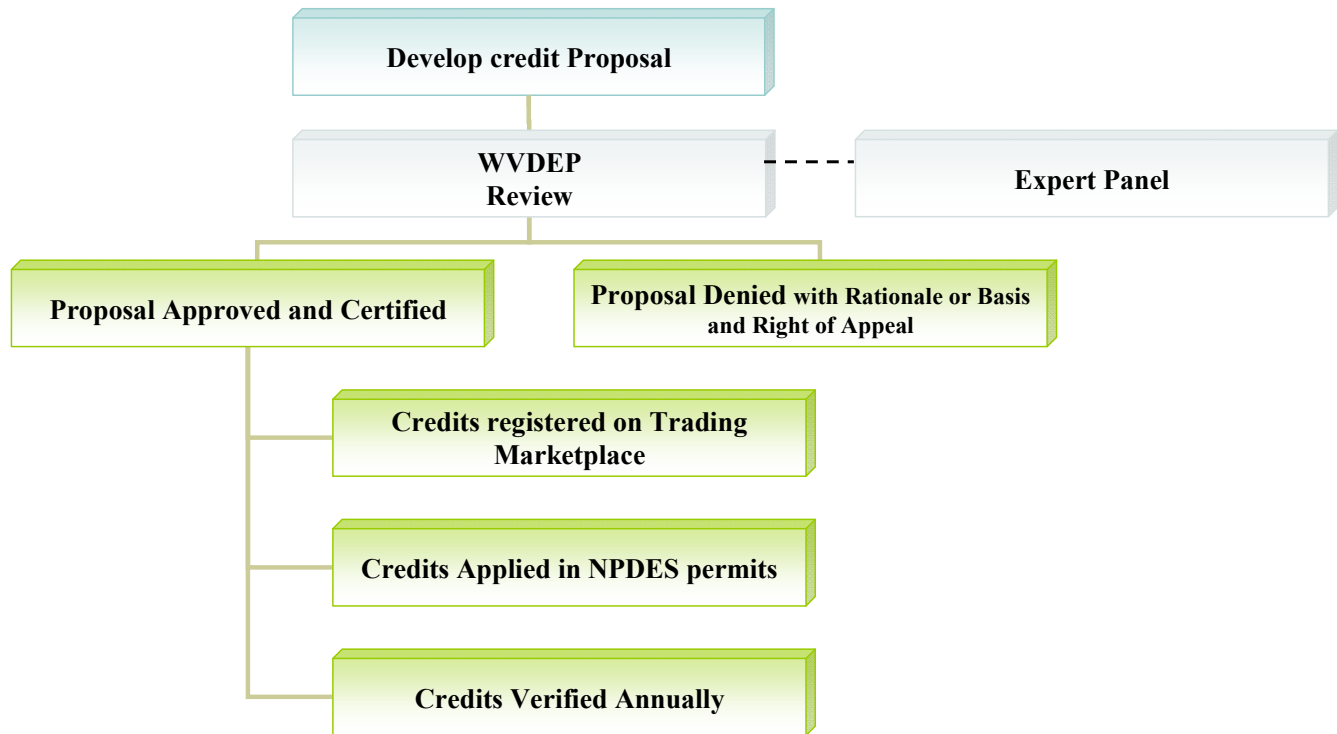
**e) Other.** The Department may allow qualified and approved third parties to perform verifications on behalf of the Department. For a third party to qualify to verify credits, the Department requires that the party:

- 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.

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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

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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.

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**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 D**

**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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## APPENDIX A: West Virginia Potomac Trading Program

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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.*

## APPENDIX A: West Virginia Potomac Trading Program

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### 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.*

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## 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.

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### *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

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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.

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**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>
<b>Hay</b>	7.7	0.7	0.2
<b>Cropland</b>	22.9	2.9	0.9
<b>Manure</b>	323	39	N/A
<b>Pasture</b>	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

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also be eligible for credit generation; proposals for these lands should also be developed on a case-by-case basis with the Department.

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### 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.

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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)*

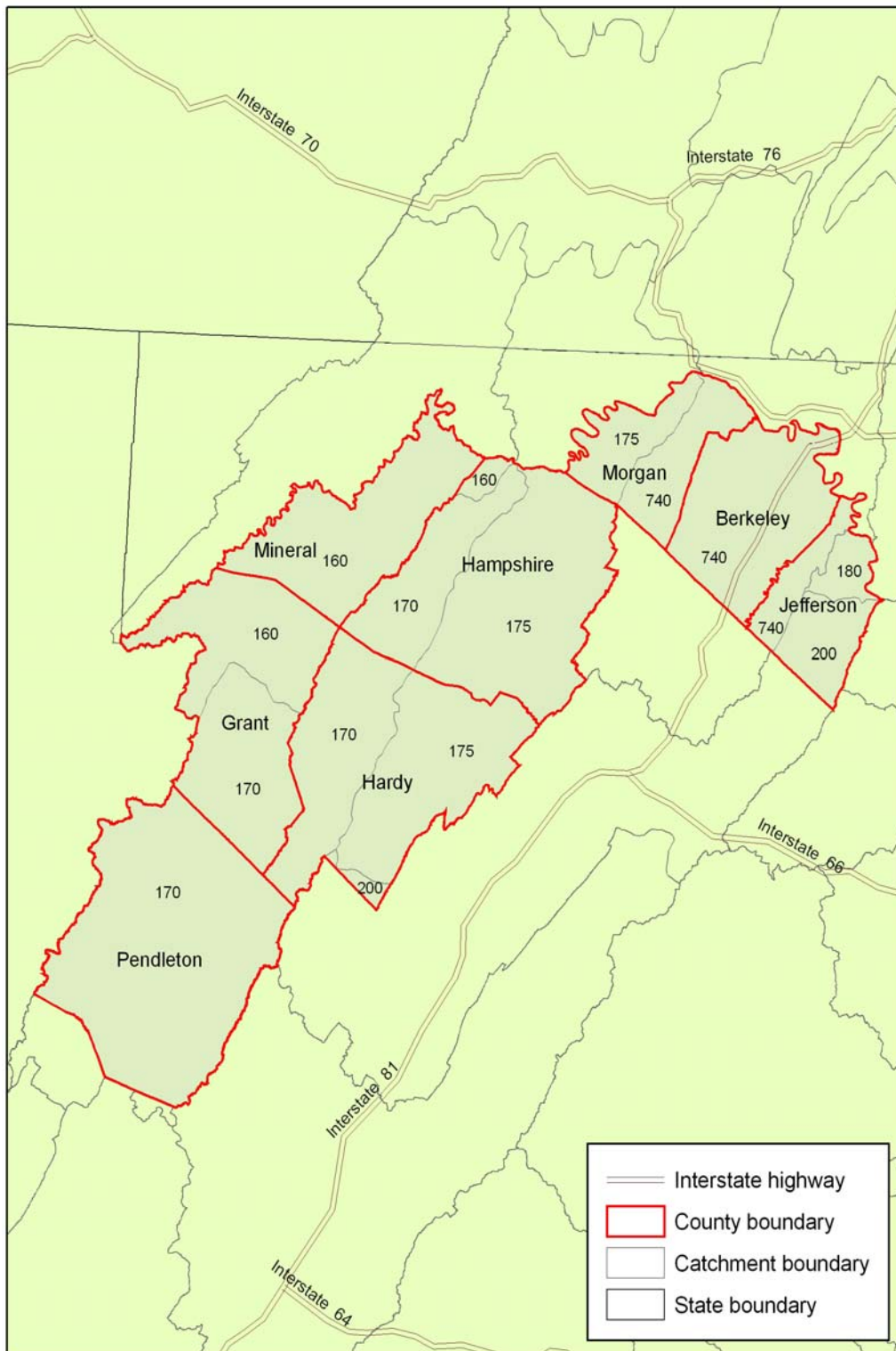
The **Delivery Factor** is a function of the distance from the edge of the watershed segment to the fall line of the Chesapeake Bay. It represents the effective delivery of the nutrient/sediment load to the Chesapeake Bay and the related estimated diminution of the effect of the nutrient reductions between 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

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## West Virginia Counties and Subwatershed Segments Within the Potomac Watershed



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### *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

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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.

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### 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.

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### *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.

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**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>
<b>Point Source</b>	<b>≥ 50,000 gpd</b>	Permitted load	N/A	Yes	N/A	0.1	1.1:1
	<b>&lt; 50,000 gpd</b>	Existing load	N/A	Yes	N/A	0.1	1.1:1
	<b>MS4</b>	Permit requirements	N/A	Yes	N/A	0.2	1.2:1
	<b>Nutrient assimilation projects</b> designed for nutrient removal (e.g. algal scrubbers, floating islands, etc.)	- 0 -	Project-by-project	Yes	Project-by-project	Project-by-project	Project-dependent
<b>Non-Point Source</b>	<b>NPS Agriculture</b>	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
	<b>NPS Urban/Mixed</b>	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
	<b>Septic</b>	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 × current N loading rate  
 $= 100 \text{ ac} \times 30 \text{ lbs/ac/yr} = 3,000 \text{ lbs/yr}$
- 2) BMP implementation reduction = BMP effectiveness × current N load  
 $= 0.45 \times 3,000 \text{ lbs/yr} = 1,350 \text{ lbs/yr}$
- 3) Delivered N loading reduction =  
 BMP implementation reduction × EOS × DF  
 $= 1,350 \text{ lbs/yr} \times 0.74 \times 0.21 = 210 \text{ lbs/year}$

Number of credits generated = 210 lbs/yr
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## 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:

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##### **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:

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##### **Source A**

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