VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners

Acknowledgements – the Virginia Department of Environmental Quality owes a debt of gratitude to the Environmental Protection Agency and to Tetra Tech, Inc. for their assistance in the formatting and drafting of this document. We also would like to express our appreciation to our sister agency the Virginia Department of Conservation and Recreation for their providing much of the information contained in the appendices, as well as their participation in the regulatory and guidance development processes.

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Introduction

In January 2005, the Commonwealth of Virginia issued the Chesapeake Bay (the Bay) Nutrient and Sediment Reduction Tributary Strategy. The strategy defines the reductions in nutrients and sediment necessary in Virginia's portion of the Bay to achieve and maintain the water quality necessary to support the Bay's aquatic living resources and to protect human health. Achieving these water quality goals requires point and nonpoint sources in Virginia to reduce phosphorus and nitrogen in Virginia's Bay watersheds or basins. Wastewater treatment plants and industrial facilities are point sources of nutrients, and nonpoint sources include runoff from agricultural and urban land uses.

Legislation passed in 2005 created the Chesapeake Bay Watershed Nutrient Credit Exchange Program and provides Virginia's point and nonpoint sources in the Bay watershed with the opportunity to meet required nutrient reductions through trading. The legislation also allows point sources to purchase nutrient reductions from nonpoint sources to offset new or increased nutrient discharges in excess of established load caps.

This guidance—written for landowners in Virginia's Bay watershed tributaries with an interest in nutrient trading—will help you navigate the process of generating and selling offsets to point sources. The guidance focuses on agricultural offsets generated through best management practice (BMP) enhancements. Load reductions from redeveloped lands and urban lands are not part of this guidance but will be discussed in separate guidance to be developed.

Regulatory Background

The 2005 Chesapeake Bay Watershed Nutrient Credit Exchange Program legislation authorized nutrient trading in Virginia's portion of the Bay. This legislation required, as of July 1, 2005, permitted facilities to offset new or increased nutrient discharges to the Bay and its tributaries. In addition, this legislation directed the Virginia Department of Environmental Quality (DEQ) to develop and issue a watershed general permit for significant point source discharges of nutrients to the Bay and its tributaries. The General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia (9 VAC 25-820-10 et seq.), approved in 2006, defines new and expanded nutrient discharges and specifies how permitted facilities can offset new or expanded nutrient discharges to the Bay. The watershed general permit and other regulations also require these facilities to install stringent, nutrient-removal equipment.

The watershed general permit requires owners or operators of new and expanded facilities (wastewater treatment plants with a design flow of 40,000 gallons per day or greater, or an industrial discharge of an equivalent mass of nutrients) to demonstrate to DEQ that they have offset any increase in delivered total nitrogen and delivered total phosphorus loads.

The watershed general permit specifies the basic *rules* for nutrient trading. These rules include the programmatic and technical requirements that offsets must meet

for a trade to comply with watershed permit requirements. According to these requirements, you and your potential trading partners must do the following:

- Determine offsets using a ratio of two pounds reduced by nonpoint BMP enhancements for each additional pound discharged;
- Generate and apply offsets to an offset obligation in the same calendar year in which the discharge occurs;
- Generate and apply offsets in the same tributary;
- Demonstrate that offsets achieve nutrient reductions beyond those already required by or funded under federal or state law or by the Virginia tributaries strategies plans;
- Calculate offsets using BMP efficiency rates and attenuation rates, as established by the latest science and relevant technical information, and approved by DEQ; and
- Base offsets on appropriate delivery factors, as established by the latest science and relevant technical information, and approved by DEQ.

In addition, the watershed general permit includes requirements for permitted facilities related to trading transactions, offset verification, and reporting. These requirements are as follows:

- Permitted facilities must acquire offsets through a public, or private entity acting on behalf of the landowner.
- Permitted facilities must report acquisition of offsets to DEQ no later than June 1 in the year before the calendar year in which the allocations are to be applied.
- Permitted facilities must authenticate (i.e., verify the generation of) offsets as required by the facility's individual VPDES permit, using procedures approved by DEQ, no later than February 1 immediately following the calendar year in which the allocations are applied.

Although these watershed general permit requirements directly apply to permitted facilities, they also affect your role in nutrient trading in Virginia.

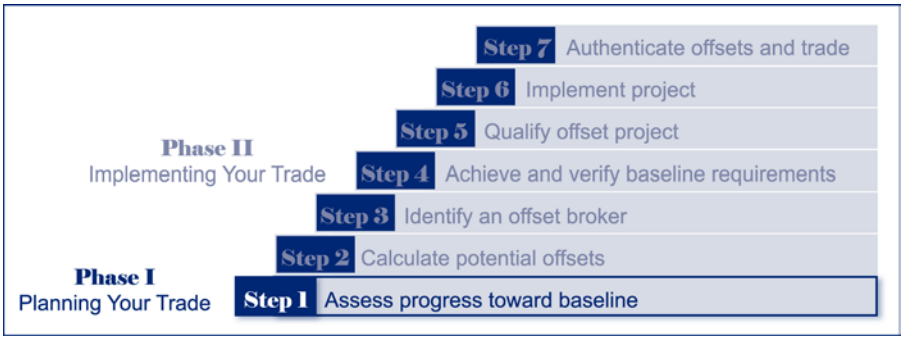
Generating and Selling Offsets

There are two phases in nutrient trading. The first phase focuses on planning activities that will help you assess whether you meet eligibility requirements, the number of offsets you have the potential to generate, how to determine the number of offsets your potential trading partners need, and how you will sell your offsets. The second phase focuses on implementing your trade, which includes installing, and maintaining the necessary BMP enhancements to generate offsets and taking the necessary legal steps to transfer your offsets to potential trading partners. A detailed description of the steps involved with each phase necessary to generate and sell offsets is provided below.

Note:
The law requires that point sources acquire offsets through a public, or private entity acting on behalf of a landowner. These *brokers* might be able to assist you in any of these steps.

Phase I – Planning Your Trade

Step 1: Assess your progress toward achieving the baseline



Virginia's Chesapeake Bay Watershed Nutrient Credit Exchange Program requires a certain level of BMP implementation called for in the nutrient tributary strategies to achieve nutrient reductions. You must achieve this level of nutrient reduction (known as *the baseline*) before you are allowed to generate and sell offsets to potential trading partners. Once you achieve this baseline level of nutrient reductions, additional reductions through approved BMP enhancements or land conversion (see Step 2) are eligible to generate offsets for trading. You *can* use cost share dollars to implement the BMPs that achieve your baseline. Unless otherwise approved on a case-by-case basis by DEQ or Department of Conservation and Recreation (DCR), you must implement baseline BMPs within an entire U.S. Department of Agriculture (USDA)-Farm Services Agency (FSA) tract before you can generate offsets from BMP enhancements.

Note:
The requirement for implementing baseline BMPs before you can generate offsets does not apply to land conversions.

You are presumed to meet the baseline level of nutrient reduction if you implement all the following BMPs that are applicable to your operation.

+ **Soil Conservation**. For a tract to be eligible, a soil conservation plan—developed to USDA, Natural Resource Conservation Service (NRCS) *Field Office Technical Guide* specifications to achieve a soil loss tolerance value of *T* or less on the basis of the revised universal soil loss equation, version 2 (RUSLE2)—for all cropland, hay, or pasture shall be implemented.

+ **Nutrient Management**. For a tract to be eligible, a nutrient management plan—written by a certified nutrient management planner and that meets the standards set in DCR's Nutrient Management Training and Certification Regulations, 4 VAC 5-15-10 et seq.—for all cropland, hay, or pasture shall be implemented. Demonstration of implementation must be provided on a Nutrient Application Field Record Sheet.
+ **Cover Cropping (cropland only)**. For a tract to be eligible, you must plant cereal cover crops to meet the standard planting date and other specifications for DCR cost-share practice SL-8B contained in the most current edition of the *Virginia Agricultural BMP Manual*. This requirement applies to all land where summer annual crops are grown (such as corn for grain or silage, vegetable crops, and such) if the summer annual crop received greater than a total of 50 pounds of nitrogen application from any nutrient source. Exception: If land is planted to winter cereal crops for harvest (barley, oats, rye, wheat) in the fall following the harvest of the summer annual crop, you do not need to plant cover crops on this land during that production year.
+ **Livestock Stream Exclusion (pasture only)**. For a tract to be eligible, you must use exclusionary fencing that restricts livestock access to perennial streams, rivers, lakes, ponds or other surface waters having perennial flow, with alternative watering sources provided, with a riparian buffer, having a minimum width of 35 feet established. Hardened, stream-limited access points for livestock watering or crossing are allowed. Ponds specifically built for the purpose of livestock watering that do not have perennial flow through an overflow pipe or spillway do not need livestock fencing. The exclusionary fencing must meet all requirements of the WP-2 practices contained in the most current edition of the *Virginia Agricultural BMP Manual*. This BMP is implemented once the fencing is in place and you have planted the riparian vegetation.
+ **Riparian Buffer Installation**. For a tract to be eligible, you must maintain a minimum width vegetative buffer of at least 35 feet, in accordance with NRCS standards 390 or 391 as contained in the USDA-NRCS *Field Office Technical Guide*. This BMP is implemented once you have planted the riparian vegetation.

Note:
The nutrient reduction values provided in Appendix A of this document represent the numerical difference in nutrient reductions between the proposed land use and the existing land use, assuming that the applicable baseline BMPs for the existing land use had been implemented. Therefore, in land conversion situations, to generate offsets, BMP baselines are not required prior to land conversion.

You must install and properly maintain all baseline BMPs according to applicable (state or NRCS) specifications. Appendix D provides these specifications. Keep in mind, if you decide to generate offsets to trade, documentation necessary to prove that baseline BMPs are implemented must be maintained and provided with the Nutrient Reduction Certificate referred to in Step 5.

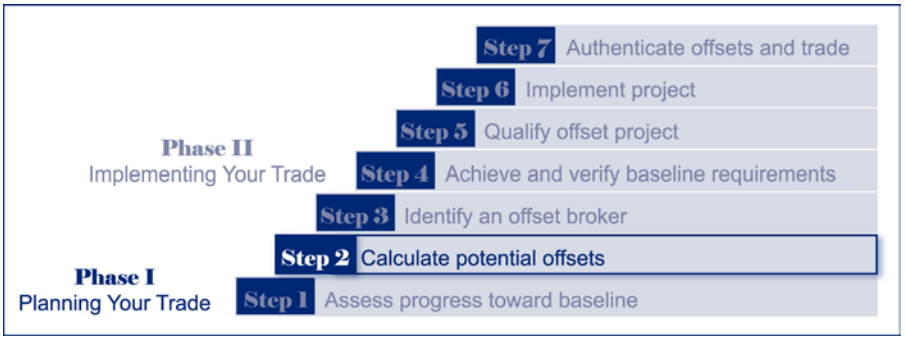
It is not necessary to implement baseline requirements before land conversion on agricultural lands; however, during the land conversion process, all applicable local, state, and federal storm water and erosion and sediment control laws and regulations must be followed and baseline practices for the new land uses must be

maintained. For example, if cropland was converted to hay, the baseline practices applicable to hay fields would have to be maintained after the land conversion took place. It would not be necessary to meet the baselines for cropland prior to the conversion.

Using these baseline requirements, determine what adjustments to your current activities are necessary to achieve the baseline on your land. You might have already implemented some of or all the baseline BMPs; however, it is likely that you will need to adjust your current activities to ensure that existing BMPs meet the guidelines for achieving the baseline. Depending on your operation, you might also determine that implementing one or more additional baseline BMPs is necessary.

After you have determined which adjustments to your existing operation are necessary to achieve baseline, you should assess the impacts of these requirements on your overall operation and *bottom line*. Remember, the money and time invested to meet the baseline is an up-front cost, and it is important to calculate these costs when determining whether trading is a financially viable option for you.

Step 2: Calculate the offsets you could generate on your land



After you determine what activities and associated costs are necessary to meet the baseline on your land, you should determine how many tradable offsets you can generate through (1) BMP enhancements, or (2) land conversion.

It is important to keep in mind that any BMP enhancement (e.g., early cover crop, continuous no-till) for which you received state or federal cost-share payments is not eligible to generate offsets; however, you can generate offsets from privately funded BMP enhancements that you previously implemented, as long as you currently maintain and manage these BMP enhancements according to applicable state or NRCS specifications. In addition, you might be able to generate offsets from BMP enhancements that are maintained after the expiration of the state or federal cost-share payment contract. You can also generate offsets if you implement a state or federally funded BMP in a manner in excess of the funding requirements. For example, if you received funding for livestock exclusion fencing and install the fencing 100 feet from a stream (instead of the baseline 35 feet from the stream) you can generate offsets from the additional 65 feet of protection.

You can generate offsets through the following BMP enhancements:

+ **Early Planted Cover Crops**. To establish vegetative cover on cropland to protect it from erosion and reduce nutrient losses to groundwater. For a tract to be eligible for offset generation the BMP enhancement must meet the early planting date and other specifications this practice as contained in Appendix D. Attribute reductions from early cover crops to the calendar year in which you kill the cover crop before spring planting.
+ **15 Percent Nitrogen Reduction on Corn**. To apply nitrogen at 85 percent or less of the rate recommended in a nutrient management plan on corn grain to reduce loss of nutrients to levels below those specified in the nutrient management plan. For a tract to be eligible for offset generation the BMP enhancement must meet the specifications for this practice as contained in Appendix D. This BMP enhancement is implemented for the calendar year during which you plant and harvest the corn.
+ **Continuous No-Till**. To implement a continuous, no-till system and nutrient management technologies resulting in reducing nonpoint source pollution to state waters from nutrients and sediments. For a tract to be eligible for offset generation, the continuous, no-till BMP enhancement must meet the specifications for this practice as contained in Appendix D. This BMP enhancement is implemented on January 1 of the calendar year following demonstration of the practice. You must maintain this BMP enhancement for at least 5 years.
+ **Land Conversion**. You can convert several types of agricultural land uses to a land use of a lesser nutrient load by converting large or small (i.e., riparian buffers) portions of land. The conversion of lands will begin to generate offsets on January 1 of the calendar year following planting. To be eligible for offset generation, the land conversion must occur on or after July 1, 2005. This date also serves as the reference point for the condition of the land prior to conversion from which you can claim nutrient reductions. For example, if a tract of land had been fallow (mixed open) as of July 1, 2005, and subsequently converted to cropland, a land owner could not decide at a later date to plant trees and claim nutrient reduction from a land conversion of cropland to forest. The land owner could, however, claim a land conversion from mixed open to forest. You can use an easement or other instrument to assure the land use for the duration of the contract; the land will generate offsets as long as it remains in the converted land use.

Note:
If a farmer was paid to put in a 35-foot buffer and instead, he put a 100-foot buffer, the area of the land converted would equal 65 feet times the perimeter of the field.

+ **A combination of the above practices**.

Each BMP enhancement will generate offsets on an annual basis.

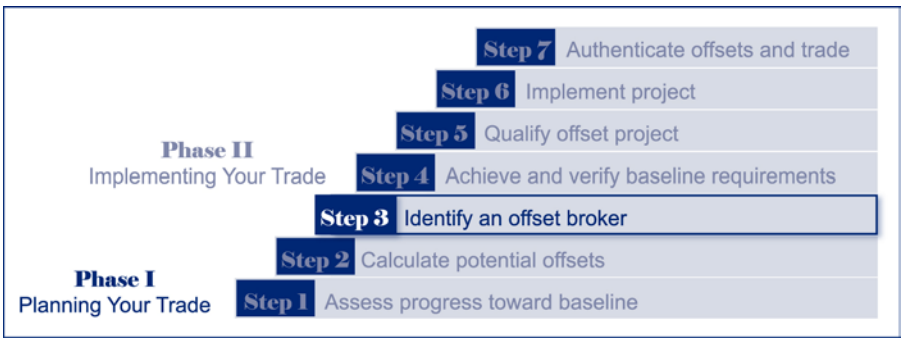
Appendix A provides you with a worksheet and technical information to calculate the amount of offsets you could generate with existing BMPs, BMP enhancements, or through land conversion. The number of offsets that you could generate will depend on (1) your location within a Bay tributary; (2) the type(s) of BMP enhancement and land conversion you want to implement; and (3) the number of acres you choose to treat.

As reflected in the worksheet, it is important to keep in mind that your potential trading partners must purchase two pounds of nutrient reduction from any nonpoint source to offset every one pound of nutrients they need to comply with their permit requirements. This 2:1 ratio, required by the watershed general permit, determines the number of offsets you generate through BMP enhancements and land conversions—i.e., two pounds of nutrient reductions from your land equates to one point source offset. The 2:1 ratio accounts for the difference in certainty when dealing with point sources, as opposed to nonpoint source nutrient reductions.

Once you have determined the number of offsets you could *theoretically* generate on your land, you should calculate the cost for implementing these options on your land. This information is necessary as you obtain information about potential trading partners and offset pricing (see Step 3).

DEQ and DCR anticipate that, as the nutrient reductions from other BMP enhancements are more accurately quantified, these enhancements could be added to the list of eligible practices. DEQ and DCR will develop a procedure for reviewing and approving proposed practices; these will most likely be first evaluated by the U.S. Environmental Protection Agency's (EPA's) Chesapeake Bay Program.

Step 3: Identify an offset broker



The watershed general permit requires a public or private entity to facilitate trading, acting as the offset broker on your behalf. A number of entities can serve as offset brokers, including private nutrient banks, land conservation trusts, agricultural cooperatives, or others. Offset brokers will determine the demand for offsets in your watershed, provide you with information about offset pricing in your watershed, and facilitate the trade transaction(s).

Note:
DEQ will make available a list of brokers who are offering their services. However, this list will not constitute an endorsement of these brokers or their practices.

Offset brokers must meet a set of qualifications established by DEQ and document them for review authorization. These qualifications include, at a minimum, the following credentials:

1. Possess a valid Virginia business license
2. Have a federal Tax ID Number
3. Demonstrate an ability to provide adequate financial assurances through bond, letter of credit or other legal mechanism on the basis of the

percentage of offset or set amount for facility (enrolled acreage or pounds offset)

4. Demonstrate an intent and ability to deliver offsets from one or more projects

An individual farmer, acting as the agent only for landowners whose land is rented by the individual farmer for agricultural production, need only meet requirements 2 and 4 above (if the farmer does not have a federal Tax ID Number, the farmer's Social Security Number is acceptable). A group of farmers acting as a cooperative or similar organization or an individual farmer acting as an agent for landowners from whom he does not rent must fulfill all the requirements.

Before connecting with an offset broker, you can determine the potential trading partners in your tributary by reviewing permitted facility registration lists available from DEQ. These lists will provide information about *offset demand* by watershed and will record offset acquisitions made by permittees. For the links for the permitted facilities' registration lists, see Appendix E.

Phase II – Implementing Your Trade

Once you have completed Steps 1–3, you will have the information necessary to decide whether nutrient trading is a fiscally attractive and viable option for you. If it is and you want to implement your trade, proceed to Step 4.

Step 4: Achieve and verify baseline requirements

You now need to complete the *on-the-ground* implementation of your baseline BMPs to begin generating offsets. For the criteria to determine when the implementation for each baseline BMP is complete, see Step 1. Remember that there are no baseline BMP requirements to implement before land conversion.

The offset broker will verify that your baseline obligations have been met by reviewing paper records and by conducting on-site evaluations.

Step 5: Qualify your offset generation project

If you have identified an offset broker who wants to acquire some of or all the offsets you propose to generate, you must complete a copy of the Chesapeake Bay Tributary Nutrient Reduction Certificate (referred to as the *Nutrient Reduction Certificate*, found in Appendix B). The General Permit requires that point sources report the acquisition of the offsets necessary to meet their nutrient allocations to DEQ by June 1st of the year before the calendar year in which you will generate your offsets (e.g., you plan to generate offsets during the 2010 calendar year, so your point source trading partner must report to DEQ the intent to acquire your offsets by June 1, 2009). For this reason, your offset broker will need to locate point source trading partner(s) for you within the watershed and help prepare the Nutrient Reduction Certificate for submittal by the point source(s) no later than June 1st of the year before the calendar year in which you will generate offsets.

The completion of the Nutrient Reduction Certificate is necessary to ensure that your BMP enhancements will meet the goals and requirements of the nutrient trading regulations and guidance, as well as your trading partner(s) permit obligations. Your project will include all the BMP enhancements or land conversion activities you commit to implementing on the USDA/FSA tract (or other land area approved by DEQ from which you seek to generate offsets). For a detailed list of project qualifications that your offset broker must confirm and provide to DEQ for each BMP enhancement you implement to generate offsets, see Appendix C.

Note:
Meeting these qualifications will likely involve inspections of your BMPs by a representative of the permittee, the offset provider, DEQ, or all the above. Be sure to maintain all paperwork records for at least 3 years; the watershed general permit requires point sources to maintain sampling records for this time period.

In addition to the information provided to DEQ, your offset broker might require an additional contractual obligation to ensure that you generate the offsets listed in the project qualification document. You might also desire this type of a contract to document factors specific to your transaction, such as offset pricing and payment schedules. Your point source trading partner(s) may also require contracts. The use and content of these types of contracts is at the discretion of the offset provider or permittee and falls outside the scope of state regulations and this guidance.

It is important to realize that when you agree to generate nutrient reduction offsets for a point source discharger, you are agreeing to provide an essential compliance service to the point source. According to the watershed general

permit, the point source facility owner/operator is liable under state and federal law to either maintain the discharged nutrient loads at or below their load limit or to obtain sufficient offsets to remain in compliance with the permit.

To facilitate this liability, the following language has been proposed for inclusion in the permits of point source facilities that choose to trade with nonpoint sources:

> The permittee has elected to offset any annual total nitrogen and/or total phosphorus loadings above and beyond those permitted prior to July 1, 2005, through (the acquisition of nonpoint source load reductions) or (through a proposal approved by the Department that involves (insert brief summary here[1])). Records of this acquisition shall be maintained on site (i.e., the point source facility) by the permittee and are subject to field verification by, or on behalf of, the Department. Should the reductions not be verifiable, or should they be demonstrated not to have been achieved, the permittee shall be required to obtain any additional wasteload or load reductions necessary to offset the wasteload discharged by the permittee in a given calendar year.

It is possible that your implemented BMP enhancement might not achieve the intended reductions because of a disaster such as a flood, fire, drought, and the like. Point source facilities are provided a limited amount of protection from such events affecting their operation or wastewater treatment; this protection would extend to physical damage to your BMP enhancement from natural disasters but would not cover voluntary actions undertaken to mitigate the economic effects of these events. For example, a flood would be considered a valid reason for the nonperformance of a BMP enhancement; disking a field (that was generating offsets through no-tilling) to recover from the flood would not be a valid reason.

Step 6: Implement your project

After your point source trading partner(s) has accepted the offsets that you propose to generate through your BMP enhancement project(s) and your offset broker has reported the offsets to DEQ, you are positioned to begin (if you have not already done so) implementing all obligated baseline enhancements (e.g., BMP enhancements or land conversions). It is understood that some individuals

[1] The statement "insert brief summary here" is verbatim from the permit guidance and is intended to prompt DEQ permit staff to include the specifics of another offset option that may (or may not) include activities addressed by this guidance.

could have one or more BMP enhancements in place before exploring the idea of trading nutrient reductions.

For information on when a BMP enhancement is defined as implemented and capable of generating offsets, see Step 2.

Your offsets will be calculated on a calendar year basis. Your point source trading partner(s) must use your offsets during the same calendar year in which they are generated.

DEQ, or an agent acting on DEQ's behalf, may inspect the land to check records and verify the implementation of BMP enhancements or land conversion activities. These visits are to ascertain the VPDES permittee's compliance, not yours.

Note:
You may contract to sell offsets to a point source for multiple years to meet the point source's needs.

Note:
Problems observed during the inspection may affect whether the offsets can be authenticated for that calendar year.

Step 7: Authenticate the offsets generated and trade

Actual trading of your offsets to your point source trading partner(s) occurs after you have generated your offsets for the calendar year. To certify the offsets reflected in the Nutrient Reduction Certificate, your point source trading partner(s) must provide a report to DEQ by February 1 of the year following the calendar year in which you generated your offsets. Your offset broker will assist your point source trading partner(s) in this certification process, which could include providing DEQ with copies of Nutrient Application Field Record Sheets, planting and killing dates for early cover crops, and photographic records of buffers and livestock exclusion.

Appendix A: BMP Enhancement and Land Conversion Offsets Calculation Worksheet

Nutrient Reduction Calculation for BMP Enhancements, Upon Achieving BMP Baselines

How many pounds of nutrients will your selected BMP enhancements reduce?

Step 1: Locate the BMP Enhancement and Land Conversion Nutrient Removal Rates tables at the end of this worksheet. Find the appropriate table on the basis of the basin in which the tract of land is located, the BMP enhancement(s) you intend to implement, and the land's location to the east or west of I-95.

Step 2: Copy the appropriate delivered pounds per year of nutrient(s) reduced to the applicable BMP rows for total nitrogen and total phosphorus in the calculation worksheet provided below.

Step 3: Indicate for each BMP enhancement the number of acres to be treated.

Step 4: Multiply the delivered pounds per year of nutrients reduced by the number of acres. Be sure to account for both total nitrogen (TN) and total phosphorus (TP) for the BMP enhancement, if applicable.

Step 5: Add the values in the Pounds Reduced column to calculate the total pounds of nutrients reduced (Value X).

BMP	TN[a]	TP[a]	Acres	Pounds reduced
Example – Early Planted Cover Crops (implemented east of I-95)[b]	2.01	--	10	20.10
Early Planted Cover Crops				
15% Nitrogen Reduction on Corn				
Continuous No-Till				
Early Planted Cover Crops & 15% Nitrogen Reduction on Corn				
Early Cover Crop & Continuous No-Till				
15% Nitrogen Reduction on Corn & Continuous No-Till				
Early Cover Crop & 15% Nitrogen Reduction on Corn & Continuous No-Till				
Total pounds of nutrients reduced (Value X)				

[a] pounds per year of nutrient(s) reduced
[b] This example used the *Eastern Shore Basin BMPs: Single BMP* table (the first table in the BMP Enhancement and Land Conversion Nutrient Removal Rates section later in this appendix).

Nutrient Reduction Calculation for Land Conversion

How many pounds of nutrients will the land conversion reduce?

Step 1: Locate the BMP Enhancement and Land Conversion Nutrient Removal Rates tables at the end of this worksheet. Find the appropriate table on the basis of the basin in which the tract of land is located, the current land use, the proposed converted land use, and the land's location to the east or west of I-95.

Step 2: Copy the appropriate delivered pounds per year of nutrient(s) reduced to the applicable land conversion type rows for total nitrogen and total phosphorus in the calculation worksheet provided below.

Step 3: Indicate for each type of land conversion the number of acres that you plan to convert. If you plan on converting land to create a riparian buffer greater than the required baseline width of 35 feet, use the following formula to determine buffer acreage:

$$\text{Acreage of buffer} = \frac{\text{Ave. width of buffer (feet)} \times \text{Ave. perimeter of buffer (feet)}}{\text{43,560 square feet/acre}}$$

Note: Be sure to calculate acreage of only the buffer in EXCESS of the required width of a baseline buffer (a minimum of 35 feet) and remember, for fields that you intend to implement buffer enhancements in addition to BMP enhancements, the acreage for the BMP enhancement must account for the acreage reduced by the area of the buffer enhancement.

Step 4: Multiply the delivered pounds per year of nutrients reduced by the number of acres.

Step 5: If areas to be converted to forest are composed of more than one of these land use categories, calculate the acreage of each type of conversion separately. Add the values in the Pounds Reduced column to calculate the total pounds of nutrients reduced (Value Y).

Land Conversion Type	**TN**	**TP**	**Acres**	**Pounds reduced**
Example – Cropland to Forest	20.70	1.96	20	453.2
Cropland to Forest				
Cropland to Hay				
Cropland to Mixed Open (fallow)				
Hay to Forest				
Hay to Mixed Open (fallow)				
Pasture to Forest				
Total pounds of nutrients reduced (Value Y)				

Total Offsets Calculation

The total pounds of nutrients reduced (i.e., Value X and Value Y) is the commodity that you have available to sell to facilities to offset new or expanded point source discharges. For each additional pound of nutrient discharged, the facility must purchase two pounds of reduction to offset the discharge. Therefore, if a facility plans to discharge an additional 18 pounds of TP annually, it must offset the discharge by purchasing a total of 36 pounds of TP annually from a nonpoint source.

BMP Enhancement and Land Conversion Nutrient Removal Rates

The values shown are derived from those used in the Chesapeake Bay Model v. 4.3; they account for loads delivered to the Chesapeake Bay.

Eastern Shore Basin BMPs: Single BMP

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops	NA	NA	2.01	0
15% Nitrogen Reduction on Corn	NA	NA	5.72	0
Continuous No-Till	NA	NA	2.40	0.39

Eastern Shore Basin BMPs: Combination of BMPs

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops & 15% Nitrogen Reduction on Corn	NA	NA	7.23	0
Early Cover Crop & Continuous No-Till	NA	NA	3.75	0.39
15% Nitrogen Reduction on Corn & Continuous No-Till	NA	NA	7.54	0.39
Early Cover Crop & 15% Nitrogen Reduction on Corn & Continuous No-Till	NA	NA	8.89	0.39

Eastern Shore Basin Land Conversion

Land Conversion Type	West of I-95		East of I-95	
	TN	TP	TN	TP
Cropland to Forest	NA	NA	20.70	1.96
Cropland to Hay	NA	NA	5.48	0.71
Cropland to Mixed Open (fallow)	NA	NA	14.87	0.23
Hay to Forest	NA	NA	10.52	2.18
Hay to Mixed Open (fallow)	NA	NA	4.69	0.46
Pasture to Forest	NA	NA	3.50	1.36

Shenandoah-Potomac Basin BMPs: Single BMP

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops	1.05	0	1.10	0
15% Nitrogen Reduction on Corn	2.60	0	4.21	NA
Continuous No-Till	1.79	0.40	1.32	0.15

Shenandoah-Potomac Basin BMPs: Combination BMPs

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops & 15% Nitrogen Reduction on Corn	3.43	0	4.94	0
Early Cover Crop & Continuous No-Till	2.49	0.31	1.98	0.15
15% Nitrogen Reduction on Corn & Continuous No-Till	4.01	0.31	5.10	0.15
Early Cover Crop & 15% Nitrogen Reduction on Corn & Continuous No-Till	4.71	0.31	5.76	0.15

Shenandoah-Potomac Basin Land Conversion

Land Conversion Type	West of I-95		East of I-95	
	TN	TP	TN	TP
Cropland to Forest	10.91	0.81	11.58	0.74
Cropland to Hay	5.77	0.58	6.40	0.26
Cropland to Mixed Open (fallow)	8.32	0.33	8.55	0.08
Hay to Forest	4.53	0.61	4.64	0.68
Hay to Mixed Open (fallow)	1.94	0.13	1.61	0.02
Pasture to Forest	0.91	0.32	2.85	0.85

Rappahannock Basin BMPs: Single BMP

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops	0.28	0	0.68	0
15% Nitrogen Reduction on Corn	2.07	0	2.70	0
Continuous No-Till	0.93	0.53	0.86	0.12

Rappahannock Basin BMPs: Combination BMPs

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops & 15% Nitrogen Reduction on Corn	2.34	0	3.14	0
Early Cover Crop & Continuous No-Till	1.16	0.53	1.26	0.12
15% Nitrogen Reduction on Corn & Continuous No-Till	2.69	0.53	3.28	0.12
Early Cover Crop & 15% Nitrogen Reduction on Corn & Continuous No-Till	2.92	0.53	3.68	0.12

Rappahannock Basin Land Conversion

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Cropland to Forest	4.24	1.35	6.51	0.062
Cropland to Hay	4.00	0.47	0.69	0.09
Cropland to Mixed Open (fallow)	3.01	0.73	3.86	0
Hay to Forest	3.85	0.98	5.83	1.04
Hay to Mixed Open (fallow)	2.63	0.36	3.17	0.38
Pasture to Forest	0.74	0.49	2.30	0.67

York Basin BMPs: Single BMP

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops	0.04	0	0.87	0
15% Nitrogen Reduction on Corn	1.11	0	4.12	0
Continuous No-Till	0.71	0.31	1.08	0.17

York Basin BMPs: Combination BMPs

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops & 15% Nitrogen Reduction on Corn	1.39	0	4.63	0
Early Cover Crop & Continuous No-Till	0.95	0.31	1.54	0.17
15% Nitrogen Reduction on Corn & Continuous No-Till	1.65	0.31	4.78	0.17
Early Cover Crop & 15% Nitrogen Reduction on Corn & Continuous No-Till	1.88	0.31	5.24	0.17

York Basin Land Conversion

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Cropland to Forest	3.71	0.76	8.75	0.84
Cropland to Hay	1.10	0.28	2.39	0.27
Cropland to Mixed Open (fallow)	2.48	0.37	4.48	0
Hay to Forest	2.20	0.49	5.60	1.06
Hay to Mixed Open (fallow)	0.98	0.10	1.33	0.11
Pasture to Forest	1.21	0.42	3.24	0.95

James Basin BMPs: Single BMP

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops	0.54	0	0.91	0
15% Nitrogen Reduction on Corn	1.75	0	3.70	0
Continuous No-Till	1.05	0.49	1.13	0.19

James Basin BMPs: Combination BMPs

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Early Planted Cover Crops & 15% Nitrogen Reduction on Corn	2.14	NA	4.29	0
Early Cover Crop & Continuous No-Till	1.38	0.49	1.66	0.19
15% Nitrogen Reduction on Corn & Continuous No-Till	2.53	0.49	4.46	0.19
Early Cover Crop & 15% Nitrogen Reduction on Corn & Continuous No-Till	2.86	0.49	4.99	0.19

James Basin Land Conversion

BMP	West of I-95		East of I-95	
	TN	TP	TN	TP
Cropland to Forest	5.48	1.22	9.34	0.93
Cropland to Hay	4.05	0.60	3.45	0.36
Cropland to Mixed Open (fallow)	3.44	0.33	3.08	0
Hay to Forest	3.28	0.98	13.35	2.16
Hay to Mixed Open (fallow)	1.24	0.09	7.09	0.47
Pasture to Forest	0.67	0.50	13.33	1.74

Appendix B: Nutrient Reduction Certificate

CHESAPEAKE BAY TRIBUTARY NUTRIENT REDUCTION CERTIFICATE, NUMBER xxxxx , CALENDAR YEAR 20xx

PART A – IDENTIFICATION OF BMP ENHANCEMENTS OR LAND CONVERSION AND CALCULATION OF NUTRIENT REDUCTIONS ACHIEVED

NAME AND PHONE NUMBER OF LAND OWNER:	TRIBUTARY

NAME AND PHONE NUMBER OF AUTHORIZED REPRESENTATIVE:

ADDRESS:

ARE ANY BMPS ON THESE FIELDS FUNDED BY STATE OR FEDERAL GRANTS? YES ☐ NO ☐ UNKNOWN ☐

CALCULATION OF MARKETABLE LOAD REDUCTIONS: ATTACH WORKSHEETS OR COMPUTER PRINTOUTS WITH CALCULATIONS DEMONSTRATING REDUCTIONS BEYOND THOSE ACHIEVED BY BASELINE IMPLEMENTATION, FEDERAL OR STATE FUNDING REQUIREMENTS AND IMPLEMENTATION PLANS, FOR TMDLS ATTRIBUTED TO NUTRIENTS.

FSA TRACT NUMBER	FIELD IDENTIFIER	No. OF ACRES	LATITUDE (UTM):	LONGITUDE (UTM):	BEST MANAGEMENT PRACTICE ENHANCEMENTS OR LAND CONVERSION IMPLEMENTED	TOTAL NITROGEN REDUCTIONS (DELIVERED LBS/YR)	TOTAL PHOSPHORUS REDUCTIONS (DELIVERED LBS/YR)
					TOTAL FROM ADDENDA SHEETS (AS NECESSARY)		
					TOTAL		

CERTIFICATION:
This form has been prepared for the purpose of submitting the information contained in it to the Virginia Department of Environmental Quality (DEQ). I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. On the basis of my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete and that no other certificate for nutrient reduction has been submitted for the above sites for the stated calendar year. I further certify that I am authorized to bind the party (on behalf of which I am signing) to the terms of this document. I further certify that the BMP, the monitoring, and the load reduction calculation described above satisfies the requirements for that type of BMP as set forth in the BMP list. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I hereby grant permission to access the BMP described above at reasonable times to DEQ or its representative for the exclusive purpose of verifying the information contained in this document and not for any other purpose whatsoever.

SIGNATURE OF LAND OWNER OR AUTHORIZED REPRESENTATIVE	DATE

PART B - ASSIGNMENT OF REDUCTIONS TO OFFSET BROKER

NAME AND PHONE NUMBER OF OFFSET BROKER:

ADDRESS:

CERTIFICATION:
I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and on the basis of my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I hereby grant permission to DEQ or its representative to access at reasonable times any records held by me that are associated with the BMP described above, or the VPDES permit holder described below.

SIGNATURE OF OFFSET BROKER OR AUTHORIZED REPRESENTATIVE	DATE

PART C - ASSIGNMENT OF REDUCTIONS TO VPDES PERMITTEE

NAME OF FACILITY:

PERMIT NUMBER OF FACILITY'S INDIVIDUAL VPDES PERMIT

NAME AND PHONE NUMBER OF AUTHORIZED REPRESENTATIVE:

CERTIFICATION:
I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and on the basis of my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. If the nutrient reductions represented on this certificate cannot be authenticated by February 1 of the year following the calendar year for which these nutrient reductions are to be accounted, I acknowledge that I remain responsible for acquiring the load allocations necessary to comply with my facility's individual VPDES permit in accordance with *§ 62.1-44.19:15 of the Code of Virginia*

SIGNATURE OF PERMITTEE OR AUTHORIZED REPRESENTATIVE	DATE

CHESAPEAKE BAY TRIBUTARY NUTRIENT REDUCTION CERTIFICATE, NUMBER xxxxx , CALENDAR YEAR 20xx

ADDENDUM TO PART A – IDENTIFICATION OF BMP ENHANCEMENTS OR LAND CONVERSION AND CALCULATION OF NUTRIENT REDUCTIONS ACHIEVED (SHEET x OF xx)

NAME AND PHONE NUMBER OF LAND OWNER: | TRIBUTARY

NAME AND PHONE NUMBER OF AUTHORIZED REPRESENTATIVE:

ADDRESS:

ARE ANY BMPS ON THESE FIELDS FUNDED BY STATE OR FEDERAL GRANTS? YES ☐ NO ☐ UNKNOWN ☐

CALCULATION OF MARKETABLE LOAD REDUCTIONS: ATTACH WORKSHEETS OR COMPUTER PRINTOUTS WITH CALCULATIONS DEMONSTRATING REDUCTIONS BEYOND THOSE ACHIEVED BY BASELINE IMPLEMENTATION, FEDERAL OR STATE FUNDING REQUIREMENTS AND TMDL IMPLEMENTATION PLANS, IF APPLICABLE.

FSA TRACT NUMBER	FIELD IDENTIFIER	No. OF ACRES	LATITUDE (UTM):	LONGITUDE (UTM):	BEST MANAGEMENT PRACTICE ENHANCEMENTS OR LAND CONVERSION IMPLEMENTED	TOTAL NITROGEN REDUCTIONS (DELIVERED LBS/YR)	TOTAL PHOSPHORUS REDUCTIONS (DELIVERED LBS/YR)
					TOTAL		

Appendix C: Required Attachment To Nutrient Reduction Certificate

In addition to ensuring that an offset broker is qualified, it is necessary to ensure that the proposed project meets the goals and requirements of the nutrient trading regulations and guidance. Your offset broker must confirm and provide project qualification data and documentation for review by DEQ or its representative for each BMP enhancement you implement to generate offsets. You and your offset broker should maintain project qualification data and documentation that should contain the following information, at a minimum:

1) Project Description/Background Information (for each USDA-FSA tract)
   a) Legal description of property/location information;
   b) Table summarizing the fields within a respective tract on which BMP enhancements or land use conversion are proposed, to include:
      i) Field identifier;
      ii) Acreage;
      iii) Baseline conditions and current land uses (include in an appendix to this document any relevant agricultural/land use records to support this);
      iv) Proposed land use alterations and/or conversions; and
      v) Annual total nitrogen and total phosphorus reductions projected for the field.
   c) Calculations for nutrient reductions for each field listed in the summary table;
   d) Include in an appendix to this document any information regarding participation in federal or state cost share or other landowner assistance program (including type and level of assistance, contract period, and any other relevant information);
   e) Include in a separate appendix to this document, tract maps/tax maps or aerial photographs/ground level photographs that would enable a person unfamiliar with the property to uniquely identify the respective fields listed on the summary table.
2) Operational
   a) Evidence of baseline practices on all tracts as evidenced by accurate documentation (landowner, NRCS, or SWCD records), for instance, site visit evaluation and documentation by a qualified entity, photo documentation, and the like;
   b) Copies of current soil conservation plans and nutrient management plans covering each USDA-FSA Tract where offsets will be generated;

c) BMP and/or land conversion installation and implementation details supplemented by tabular support data (i.e., dates of planting, fence installation)

d) Acquisition of necessary permits;

e) For land use conversion, evidence of restrictive covenant matching lifespan of offset generation—restrictive covenant should address the level of allowable development, timber management, access roads and trails, other commercial uses, and other relevant information needed to secure the availability of the offsets; and

f) Monitoring criteria—short-term and long-term to reflect term of offset generation.

Appendix D: BMP Fact Sheets

These represent the most current practices available for offset generation as of September 1, 2007. This appendix may be modified in the future. You should ensure that these are still the most current practices as of the time you consider whether generating and trading offsets are appropriate for your land.

Offset Practice: Early Planted Cover Crops

A. Description

Establish vegetative cover on cropland for protection from erosion and the reduction of nutrient losses to groundwater by planting cover crops in early fall within optimum planting times to maximize nutrient trapping capability.

B. Requirements and Specifications

1. Seed type and rates for all soils shall be:

Winter Rye	2.0 bu. per acre 3.0 bu. If aerial seeded
Winter wheat	2.0 bu. per acre
Winter Barley	2.0 bu. per acre
Triticale	2.0 bu. per acre
Winter Oats**	2.0 bu. per acre

****Eligible in coastal plain only**.
Higher seeding rates are required for aerial seeding

2. Seeding of all seed types must be planted by the dates listed below:

	Planting date
Cities of Chesapeake and VA Beach	**November 10**
Coastal Plain (east of I-95)	**October 25**
Piedmont (west of I-95)	**October 10**
Mountain and Valley (west of Blue Ridge)	**October 5**

3. This practice requires compliance with NRCS standard 340.
4. All seed must be free of prohibited noxious weed seed, have a minimum germination rate of 80% and have no more than 16 restricted noxious weed seeds per pound. If the grower elects to use home grown seed, it must be tested for purity, germination and noxious weeds prior to seeding by a recognized seed laboratory.
5. The offset is available for participants that are not receiving payment for early planted cover crops from another source on the same acreage. Cost-share funds may be received to meet the required baseline practice of the standard planting date for cover crops.
6. No nutrients from any sources may be applied before March 1 of each year, except that use of manure (with less than 40 lbs N. per ton tested value) is permitted if all of the following conditions are met:
   a. animals are raised as part of the applicants operation,
   b. inadequate manure storage is available for the winter,
   c. there are no other vegetated acres available to safely utilize the manure, and
   d. manure is applied in accordance with a nutrient management plan prepared by a certified nutrient management planner.

7. A good stand and good growth of winter cover must be obtained in sufficient time to protect the area in the fall and winter. (Ongoing research in Virginia's coastal plain indicates that a cereal grain crop with 30 plants per square foot of field planted with two tillers per plant (60 tillers per sq. ft.) by December 1, provides the optimum biomass for scavenging excess nitrogen while protecting the soil from erosion).
8. The cover crop must be killed using mechanical or chemical means or by grazing no earlier than **March 15** and no later than **May 15 for the coastal plain, piedmont, and mountain and valley**. The cover crop residue may be left on the field for conservation purposes; or the cover crop or its residue may be tilled under. The practice will be considered complete once the cover crop has served its purpose and been killed.
9. Harvesting for hay, haylage, silage, grain, or seed is not permitted. Pasturing consistent with sound agronomic management is permitted as long as a 60% cover is maintained through March 14. The local Soil and Water Conservation District Board upon a Gubernatorial drought disaster declaration may authorize harvesting for hay or silage in areas where it determines that a serious shortage of hay or silage exists because of adverse weather conditions and the growth harvested is needed for use on farms in the area.

Offset Practice: Continuous No-Till

A. Description

Implement Continuous No-till system and nutrient management technologies resulting in the reduction of non-point source pollution to state waters from nutrients and sediments.

B. Requirements and Specifications

1. This BMP enhancement practice must be maintained for at least 5 years.
2. Only double crop cash grain or cotton rotations that include at least two crops of small grain in five years are eligible. All required small grain crops may be harvested for grain only. Straw must remain on the field. Permanent grass or hay land is not considered cropland.
3. Producers must be fully implementing a current nutrient management plan prepared and signed by a certified nutrient management planner. The plan must include the entire USDA-FSA tract. A copy of the current nutrient management plan and a nutrient application record keeping form certified and signed as true and accurate by the seller of the offset shall be on file with the purchaser of the offset.
4. The continuous no-till system must be maintained for a minimum of five years without any tillage occurring within this period unless at least 60% residue cover remains on the entire field following the tillage.
5. All crops must be planted using no-till methods.
6. All eligible fields must have a cropping history two out of the past five years.
7. This practice must comply with NRCS Standards 329 Residue and Tillage Management No-Till/Strip Till/Direct Seed, 340 Cover Crop, 328 Conservation Crop Rotation, 590 Nutrient Management, and 595 Pest Management for at least 5 years, or the life of the practice, whichever is longer.
8. Biomass requirements for cash grain, oilseed, cotton and small grain rotations must maintain a minimum of 60% residue cover on the enrolled acres must be maintained for the lifespan of the practice.

Offset Practice: 15% Nitrogen Rate Reduction on Corn

A. Description

Use of nitrogen at 85% or less of the rate recommended in a nutrient management plan on corn grain to reduce loss of nutrients to levels below those specified in the nutrient management plan. Participants are encouraged to maximize application efficiency and use of nitrogen. Participants may benefit from income if the offset is purchased and fertilizer expenditures will be reduced, but there will be some reduction in crop yield potential.

B. Requirements and Specifications

1. Nutrient Management Plans must be prepared by planners who hold a current Nutrient Management Planner Certificate issued by the Virginia Department of Conservation and Recreation and must be written to comply with all regulations as set forth in the Nutrient Management Training and Certification Regulations, 4 VAC 5-15-10 et seq.
2. The determination of crop nutrient needs (prior to the 15% nitrogen rate reduction) shall be consistent with tables and procedures contained in Virginia Nutrient Management Standards and Criteria, revised October 2005 and shall be based on Virginia Tech soil test results or soil test results converted to Virginia Tech Mehlich 1 values, with test results being dated no more than three (3) years prior to the date of the nutrient management plan. Nitrogen and phosphorous application rates in nutrient management plans shall not exceed crop nutrient needs as established by the Nutrient Management Training and Certification Regulations. Nitrogen application rates must be developed from soil productivity ratings in Virginia Nutrient Management Standards and Criteria, revised October 2005, or verifiable yield records using an average of the 3 highest yields obtained for each field within the past 5 production years corn was grown in the field. No adjustments are allowed to the nitrogen application rates in NMPs except as allowed using the verifiable yield records described above.
3. All sources of nitrogen available to crops must be accounted for in the nutrient management plan, including legume credits, mineralization of past applications of manure or biosolids, fertilizer applications, etc. The total nitrogen available from all sources must be reduced by at least 15% of crop nutrient needs as identified in the nutrient management plan.
4. A copy of the nutrient management plan and the planner's Nutrient Management Planner certification number must be submitted to the purchaser of the offset.
5. The producer will maintain records of each nutrient application to each field. The records shall include:
   a. the pounds applied of each nutrient containing material and the analysis of each;
   b. the location (field number or name consistent with the NMP) where each nutrient application occurs;

c. the date the material was applied; and

d. the crop receiving the nutrient application.

Copies of the record sheets, certified and signed as true and accurate and complete records of the field's nutrient applications, will be sent by the farmer to the purchaser of the offset.

6. Receipts for all applied nutrients will be maintained by the seller of the offset for a period of one year following payment and are subject to spot-check and verification by DEQ or DCR.

NUTRIENT APPLICATION FIELD RECORD SHEET

Field Name: _____ FSA Farm #: _____ FSA Tract #: _____ FSA Field #(s): _____

Manure Type: (poultry, liquid dairy, swine, etc.)_____ Crop:_____ Acres:_____

Manure				Fertilizer/Lime			
Date	Incorporation[1] Time	Acres Applied	Actual Rate/acre	Date	Analysis	Rate/Acre	Method[2]

[1] Incorporation: Immediate, greater that two days, (>2 days), >4 days, or > 7 days [2] Starter=ST, Broadcast= BR, Top Dress=TD, Side Dress = SD

Field Name: _____ FSA Farm #: _____ FSA Tract #: _____ FSA Field #(s): _____

Manure Type: (poultry, liquid dairy, swine, etc.)_____ Crop:_____ Acres:_____

Manure				Fertilizer/Lime			
Date	Incorporation[2] Time	Acres Applied	Actual Rate/acre	Date	Analysis	Rate/Acre	Method[2]

[1] Incorporation: Immediate, greater that two days,(>2 days), >4 days, or > 7 days [2] Starter=ST, Broadcast= BR, Top Dress=TD, Side Dress = SD

I certify that the nutrient applications recorded above are true and accurate and do not exceed recommendations from my nutrient management plan.

_____ _____

Signature Date

EXAMPLE OF HOW TO COMPLETE NUTRIENT APPLICATION FIELD RECORD SHEET

Field Name: bottom FSA Farm #: 213 FSA Tract #: 5431 FSA Field #(s): 5

Manure Type: (poultry, liquid dairy, swine, etc.) liquid dairy Crop: Corn Acres: 10

Manure				Fertilizer/Lime			
Date	Incorporation[1] Time	Acres Applied	Actual Rate/acre	Date	Analysis	Rate/Acre	Method[2]
5/1/2006	>7 days	5 west end	7,200 gal.	5/13/2006	4-6-12	500 lbs/ac.	BR
5/2/2006	>7 days	5 east end	6,000 gal.	6/25/2006	46-0-0	195 lbs.	SD

[1] Incorporation: Immediate, greater that two days,(>2 days), >4 days, or > 7 days [2] Starter=ST, Broadcast= BR, Top Dress=TD, Side Dress = SD

Field Name: Front FSA Farm #: 213 FSA Tract #: 5431 FSA Field #(s): 6

Manure Type: (poultry, liquid dairy, swine, etc.) _____ Crop: Barley Acres: 40

Manure				Fertilizer/Lime			
Date	Incorporation[2] Time	Acres Applied	Actual Rate/acre	Date	Analysis	Rate/Acre	Method[2]
10/1/2006	> 2 days	10	6,000	9/22/2006	Dolomitic Limestone	2 Tons	BR
				2/21/2006	30% Solution N	30 lbs. N	SD

[1] Incorporation: Immediate, greater that two days,(>2 days), >4 days, or > 7 days [2] Starter=ST, Broadcast= BR, Top Dress=TD, Side Dress = SD

I certify that the nutrient applications recorded above are true and accurate and do not exceed recommendations from my nutrient management plan.

_____ _____

Signature Date

Appendix E: Glossary, Acronyms & Resources

Glossary

Baseline. The minimum pollutant control requirement that a credit seller must meet before entering the trading market.

Cropland. Land used for the production of grain, oilseeds, silage, or industrial crops not defined as hay or pasture.

Discharge limits. Under the Clean Water Act's NPDES permit program, EPA and its state partners impose discharge limits on point sources, such as wastewater treatment plants and industrial facilities. These limits are either technology-based discharge limits (TBELs), which are determined by the treatment technology available for particular point sources, or are water quality-based effluent limits (WQBELs), which are based on state water quality standards. Also called effluent limits or permit limits.

Forested. Land that has been established or has natural stands of hardwood and/or conifer trees.

Hay. Land used to grow a grass, legume, or other plants such as clover or alfalfa, which is cut and dried for feed, bedding, or mulch.

Impervious urban. Parking lots, streets, roads, sidewalks, and buildings.

Mixed open. Land such as parklands, school recreation areas, and other large tracts without active agricultural operations and having permanent herbaceous vegetative cover that is predominately non-forested but is not otherwise defined cropland, hay, pasture, urban pervious, or urban impervious.

National Pollutant Discharge Elimination System (NPDES). The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Clean Water Act (Title 40 of the *Code of Federal Regulations* [CFR] 122.2). NPDES permits regulate discharges of pollutants from point sources to waters of the United States. Such discharges are illegal unless authorized by an NPDES permit.

Nonpoint source. Nonpoint source pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from urban runoff and energy production; sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks; salt from irrigation practices and acid drainage from abandoned mines; and bacteria and nutrients from livestock, pet wastes, and faulty septic systems. Atmospheric deposition and hydromodification are also sources of nonpoint source pollution.

Offset (n). A nonpoint load reduction that is achieved on behalf of, and acquired by, facilities subject to the Watershed General Permit Regulation (9 VAC 25-820) for the express purpose of offsetting new or expanded point source discharges from these facilities.

Offset (v). To acquire an annual mass waste load allocation of total nitrogen or total phosphorus by a new or expanding [point source] facility to ensure that there is no net increase of nutrients into the affected tributary of the Chesapeake Bay.

Pasture. Land that supports the grazing of domesticated animals for forages.

Pervious urban. Lawns and landscaped areas surrounding dwellings, offices, or other buildings.

Point source. A facility with permitted wastewater discharges. EPA's regulations define a point source as any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff. (40 CFR 122.2)

Reconciliation period. The period of time during which the seller generates trading offset and a buyer may use those offsets to reduce its pollutant discharge load.

Revised Universal Soil Loss Equation (RUSLE). A quantitative procedure for estimating soil loss.

$$A = R * K * LS * C * P$$

Where

A = estimated average soil loss in tons per acre per year

R = rainfall-runoff erosivity factor

K = soil erodibility factor

L = slope length factor

S = slope steepness factor

C = cover-management factor

P = support practice factor

Soil loss tolerance (T). The maximum amount of soil loss in tons per acre per year that can be tolerated and still permit a high level of crop productivity to be sustained economically and indefinitely.

Trade ratio. Two pounds of nonpoint load reductions, of either total nitrogen or total phosphorus, to be acquired by a point source, to offset one pound to be discharged.

Watershed. A geographic area in which water, sediments, and dissolved materials drain to a common outlet such as a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. Watershed boundaries can transcend local, state, and national political boundaries.

Water quality trading. A tool that may enable some parties to more cost-effectively achieve equivalent or increased reductions of the pollutant than would otherwise be realized through traditional treatment approaches.

Acronyms and Abbreviations

BMP	best management practice
CBPA	Chesapeake Bay Preservation Act
DCR	Virginia Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
FSA	Farm Services Agency
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
RUSLE	Revised Universal Soil Loss Equation
SWCD	Soil and Water Conservation district
USDA	U.S. Department of Agriculture
VPDES	Virginia Pollutant Discharge Elimination System

Resources

Chesapeake Bay Preservation Act
http://www.dcr.virginia.gov/chesapeake_bay_local_assistance/theact.shtml

Chesapeake Bay Watershed Nutrient Credit Exchange Program legislation
http://leg1.state.va.us/cgi-bin/legp504.exe?051+ful+CHAP0710

Field Office Technical Guide (USDA-NRCS)
http://www.nrcs.usda.gov/technical/efotg/

General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia (9 VAC 25-820-10 et seq.)
http://www.deq.state.va.us/vpdes/pdf/9VAC25-820-NutrientDischargesGP-09-06-06.pdf

Nutrient and Sediment Reduction Tributary Strategy (January 2005)
http://www.naturalresources.virginia.gov/Initiatives/WaterQuality/FinalizedTribStrats/ts_statewide_All.pdf

Nutrient Management Training and Certification Regulations (4 VAC 5-15-10)
http://www.dcr.virginia.gov/documents/nmtraincertregs.pdf

Permitted Facility Registration Lists

Eastern Shore:
http://www.deq.state.va.us/vpdes/pdf/9VAC25-820-RegistrationList-EasternShore.pdf

James:
http://www.deq.state.va.us/vpdes/pdf/9VAC25-820-RegistrationList-James.pdf

Potomac:
http://www.deq.state.va.us/vpdes/pdf/9VAC25-820-RegistrationList-Potomac.pdf

Rappahannock:
http://www.deq.state.va.us/vpdes/pdf/9VAC25-820-RegistrationList-Rappahannock.pdf

York:
http://www.deq.state.va.us/vpdes/pdf/9VAC25-820-RegistrationList-York.pdf

Virginia Agricultural BMP Manual
http://192.206.31.46/agbmpman/toc.pdf

Virginia Association of Soil and Water Conservation Districts
http://www.vaswcd.org/map.htm