Components of Credit Calculation

EPA Technical Memorandum

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For EPA TOWG and stakeholder review

Prepared by EPA Region III

CONTENTS

ABBREVIATIONS AND ACRONYMS

BMP	Best management practice
CBP	Chesapeake Bay Program
CAFO	Concentrated Animal Feeding Operation
CWA	Clean Water Act
HUC	Hydrologic unit code
LA	Load allocation
MS4	Municipal separate storm sewer system
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTT	Nutrient Tracking Tool
PennVEST	Pennsylvania Infrastructure and Investment Authority
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WIP	Watershed Implementation Plan
WLA	Wasteload allocation

SCOPE

This technical memorandum addresses EPA's expectations for information the Chesapeake Bay jurisdictions[1] should incorporate when calculating credits for offsets and trading.

This technical memorandum is not official agency guidance and does not replace the EPA 2003 Trading Policy. Its purpose is to elaborate on EPA's expectations, set out in Appendix S and Section 10 of the Chesapeake Bay Total Maximum Daily Load (Bay TMDL), for the Bay jurisdictions' offset and trading programs. As stated in the Bay TMDL, the Bay jurisdictions' offset and trading programs are expected to be consistent with and supportive of the water quality goals of the Chesapeake the Bay TMDL, including its allocations and assumptions and the common elements of Appendix S. Specifically, this technical memorandum identifies EPA's expectations for [insert TM-specific purpose]. This technical memorandum is only applicable in the Chesapeake Bay watershed and may be revised in the future.

EXECUTIVE SUMMARY

The Bay TMDL expects the Bay jurisdictions to offset all new or increased loads and identifies trading as a tool that may be used to implement the Bay TMDL. Offset and trading programs should be consistent with the Bay TMDL, the Clean Water Act[2] and its implementing regulations, EPA's 2003 Water Quality Trading Policy,[3] and EPA's 2007 Water Quality Trading Toolkit for NPDES Permit Writers.[4]

This technical memorandum addresses the components of credit calculations that should be included in offset and trading programs for Chesapeake Bay jurisdictions.

EPA's expectations for minimum credit calculation components are summarized in

Table 1. The Bay jurisdictions may include additional components as necessary. Separate Technical Memoranda on baseline and uncertainty, as well as other topics relevant to Section 10 and Appendix S of the Bay TMDL, will help inform credit calculation.

[1] The Bay jurisdictions are: Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia.
[2] Clean Water Act, 33 U.S.C. §§ 1251 et seq.
[3] United States Environmental Protection Agency, "Water Quality Trading Policy, January 13, 2003." Available online at http://www.epa.gov/owow/watershed/trading/finalpolicy2003.pdf
[4] United States Environmental Protection Agency, "Water Quality Trading Toolkit for Permit Writers," Updated June 2009. Available online at http://water.epa.gov/type/watersheds/trading/WQTToolkit.cfm

Table 1: Summary of EPA's expectations for the primary components of credit calculations.

Credit Calculation Component	EPA Expectation
Applicable pollutants	Applicable pollutants are those addressed by the Bay TMDL —total nitrogen, total phosphorus, and total suspended solids.
Eligible parties	There are no restrictions on who can buy and sell credits. If a credit is to be used for NPDES compliance purposes or for offsets in NPDES permits, however, EPA expects that a jurisdiction will have a system in place to establish accountability for permittees trying to meet permit or offset obligations.
Eligible practices for credit generation	Credits generated using only those practices that are approved by the Chesapeake Bay Program (CBP) partnership for its annual progress review are acceptable to EPA.
Baseline requirements	Both practice-based and performance-based methods for defining baselines and calculating credits that approximate and are consistent with the Bay TMDL are acceptable to EPA as long as reductions meet allowable loads under either the Bay TMDL or a local TMDL, whichever has the most stringent restrictions.
Additionality	EPA expects a Bay jurisdiction to ensure that there is additionality – i.e., that a potential credit generating practice will result in pollutant load reductions beyond what would have occurred in the absence of a potential offset or trade.
Leakage	Leakage is defined by the CBP Partnership's Scientific and Technical Advisory Committee as occurring when a trade results in unexpected and unaccounted for net increases in loads. EPA expects a jurisdiction to address potential leakage in its offset and trading accounting practices.
Uncertainty	The Bay jurisdictions should address factors leading to uncertainty to ensure that total loads will not increase when a load reduction practice fails to generate the expected reductions.[5]
Location adjustment	EPA expects the Bay jurisdictions to use the constant delivery factors from the CBP Partnership's Watershed Model to adjust the load between the buyer and the seller based on the relative position of each in the major river basin.
Certifying and verifying credits	The Bay jurisdictions should have a program in place to certify credits used in offset and trading programs, as well as a comprehensive system in place for credit verification whereby BMPs are routinely evaluated to ensure that they are installed, performing and maintained as designed.
Credit timeframe for buyers	EPA expects the Bay jurisdictions to provide adequate assurance of the availability of credits for the duration of the transaction.
Credit trading registry	Once credits are calculated, EPA expects each Bay jurisdiction to provide a publicly

[5] A separate technical memorandum is expected to be developed regarding uncertainty.

	accessible registry that records and tracks credits available and the credits sold. All credits sold should have a unique ID that is traceable to the buyer and seller.
Reporting credits to the Chesapeake Bay Program	As part of the annual assessment toward the two-year milestone and Watershed Implementation Plan (WIP) commitments, Bay jurisdictions should report all BMPs and indicate which were certified to generate credits and those that were not sold.
Public accountability	EPA expects information on offsets or trades to be clearly articulated and available to the public at the time the credit is proposed to be certified and at the time the credit is sold, including the methods for generating, calculating, and purchasing credits.

INTRODUCTION

The establishment of the 2010 Chesapeake Bay Total Maximum Daily Load (Bay TMDL) created limits (caps) on total nitrogen, phosphorus and sediment loads into the Bay.[6] After 2010, any new or increased load above those limits is expected to be offset by an equal reduction of that pollutant by an existing source or sources.

The Bay TMDL also contemplates the use of trading to meet TMDL allocations. Such activities can offer a more cost-effective way of meeting allocations, as those sources that can reduce their loads more cheaply can sell credits to those sources for which the same reduction would be more expensive.

Following are components of a credit calculation that the Bay jurisdictions should address in their offset and trading programs. For purposes of illustration, a discussion of the Chesapeake Bay jurisdictions' current offset or trading program credit calculations, as of the publication date of this technical memorandum is included in the sections below.

BACKGROUND

APPLICABLE POLLUTANTS

This technical memorandum applies only to total nitrogen, total phosphorus, and total suspended solids, the three pollutants for which caps are set in the Bay TMDL.

The offset and trading programs currently established in Maryland and Pennsylvania allow for the trading of nitrogen and phosphorus. Virginia has established both trading and offset programs for all three pollutants.[7]

[6] Full text of the 2010 Chesapeake Bay TMDL is available at: http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html

[7] Note: Where a current trading or offset program characteristic is referenced in this document specific to a particular Bay jurisdiction, the reference is accurate as of the date of release of this document.

ELIGIBLE PARTIES

With limited exceptions there are no restrictions on who can buy and sell credits. Trading under any scenario can occur with or without an intermediary or broker to facilitate the trades. Examples include, but are not limited to, an offset or trade between: (1) a farmer who has installed best management practices approved by the Chesapeake Bay Program (CBP) partnership and a wastewater treatment plant permit holder or a developer seeking to offset new loads, (2) a credit seller and a local watershed group seeking to set aside a portion of credits to increase the potential of water quality improvements, or (3) a developer who installs a stormwater treatment system that exceeds offset requirements for post-development loads and a buyer seeking to offset new loads. **However, if a credit is to be used for NPDES compliance purposes or for offsets in NPDES permits, EPA expects that a jurisdiction will have a system in place to establish accountability for permittees trying to meet permit or offset obligations.** Jurisdictions, at their discretion, may apply restrictions on buyers and sellers. In addition, jurisdictions should ensure that eligible parties are in compliance with applicable state laws, rules and regulations.

ELIGIBLE PRACTICES FOR CREATING NUTRIENT AND SEDIMENT CREDITS

The EPA expects the Bay jurisdictions to allow credits to be generated using only those practices that are accepted by the Chesapeake Bay Program (CBP) Partnership for its annual progress review. Over 130 BMPs have approved methods for calculating effectiveness and can be evaluated using the CBP Partnership models. If the BMP is not approved by the CBP Partnership, then the BMP load reduction cannot be calculated using the CBP Partnership models.

CALCULATING CREDITS

BASELINE DESCRIPTION

The baseline is the amount of nutrient and sediment load reduction, expressed in pounds, that must be achieved to be eligible to generate credits. For a baseline to assure environmental improvement, it should meet the Clean Water Act requirements and associated regulations, as well as any caps established by local TMDLs or the Bay TMDL. The Bay TMDL defines baseline as follows:

> *2(a) For point sources generating credits, the TMDL assumes that the offsets baseline is the WQBEL* (Water quality-based effluent limit) *included in that discharger's permit consistent with the applicable WLA in the TMDL. For some point sources that will be a numeric limitation; for others, it will be a suite of BMPs determined to be protective of WQS.*

2(b) For nonpoint sources generating credits, baseline options should be appropriately defined in terms of ***load, geographic scale, minimum practices, schedule of implementation and/or time needed to facilitate improved environmental compliance with WQS.[8] [Emphasis added.]***

The Bay jurisdictions' offset and trading programs may use either practice-based or performance-based methods for defining baselines and calculating credits generated. **Both options are consistent with the Bay TMDL and are acceptable to EPA as long as reductions meet allowable loads under either the Bay TMDL or a local TMDL, whichever has the most stringent restrictions.** Pennsylvania and Virginia, for example, use a practice-based baseline – before a source can generate credits, a particular set of practices should be in place.[9] Maryland, in contrast, uses a performance-based baseline – a source must make a load reduction of a certain amount before it can generate credits.

EPA is committed to working with the jurisdictions to ensure that both practice-based and performance-based methods for defining baselines and calculating credits produce results that approximate and are consistent with the TMDL.

PRACTICE-BASED BASELINE

A practice-based baseline specifies practices that are required to be implemented before credits can be generated. The selected set of practices should consistently demonstrate over multiple scenarios that a load meets the TMDL allocation. This set of practices should be as similar as possible throughout the jurisdiction's entire portion of the Bay watershed, but may vary based on hydrogeomorphic regions and other landscape characteristics.

EPA expects a Bay jurisdiction to demonstrate that the practices used to generate credits produce results that approximate and are consistent with the TMDL allocations for the land uses and major river basin. EPA also expects the demonstration to use the same data and assumptions as were used in developing the Bay TMDL, e.g., source data, BMP effectiveness values, land uses, etc.

PERFORMANCE-BASED BASELINE

The performance-based baseline is defined as the difference between the pre-BMP and post-BMP per acre load based on pollutant inputs and geographical information entered into a model. The baseline should be calculated at a scale applicable to the credit generating practice, i.e., agricultural or other source.

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[8] Bay TMDL at p. S-3. The Bay TMDL is available at: http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html. The *Water Quality Trading Toolkit for Permit Writers,* August 2007, defines 'baseline' as "The pollutant control requirements that apply to buyers and sellers in the absence of trading."

[9] It should be noted that as of the date of this memorandum, Virginia is in the midst of a rulemaking that will define credit calculation procedures. Therefore, this approach may be altered in the future.

For each sector, EPA expects that the model a jurisdiction uses to calculate the performance of credits produces results that approximate and are consistent with the loads generated by the CBP Partnership models for the jurisdiction and major river basin. EPA also expects the model to use the same data and assumptions that were used in developing the Bay TMDL, e.g., source data, BMP effectiveness values, land uses, etc. The numerical baseline, at a minimum, should be the 2010 Bay TMDL load allocations (LA) and wasteload allocations (WLA) by jurisdiction and by major river basin[10] or a local TMDL, whichever is most stringent. Where an existing operation's pre-Bay TMDL load is below the numerical baseline, the existing pre-Bay TMDL load should serve as the baseline for credit calculation and not the numerical baseline, taking into account the load associated with BMPs that were in place for a parcel of land.

ADDITIONALITY

For trading and offsets, EPA expects a Bay jurisdiction to ensure that there is additionality – i.e., that a potential credit generating practice will result in pollutant load reductions beyond what would have occurred in the absence of a potential offset or trade. For example, a farmer might plant a riparian buffer along fields to prevent excess nutrients from flowing into a river in exchange for payment. If planting the buffer strip would have occurred to meet that farmer's baseline, then the practice is not additional. Any credit generating practice implemented after baseline has been met, motivated by factors other than meeting baseline, whether market, altruistic, or otherwise, would be considered additional.

LEAKAGE

EPA expects a Bay jurisdiction to address potential "leakage" in accounting practices and to ensure that "leakage" is prevented. Leakage is defined by the CBP Partnership's Scientific and Technical Advisory Committee as occurring "when a trade [credit transaction] results in unexpected and unaccounted for net increases in loads."[11]

The following examples illustrate how leakage can affect potential load reduction practices proposed for credit generation purposes.

In one example, a leakage situation could exist when manure transport is proposed as a load reduction measure. If manure is transported off of a farm and applied elsewhere within the watershed, the total nutrient load does not diminish. Indeed, the total load may increase depending on the delivery factor of the new location, or if replacement nutrients for the originating farm are not considered.

[10] Bay TMDL at Table 8-5, p. 8-33. The Bay TMDL is available at http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html

[11] Evaluation Framework for Water Quality Trading Programs in the Chesapeake Bay Watershed. 2009. Chesapeake Bay Program Scientific and Technical Advisory Committee and the Mid-Atlantic Water Program. p. 5. http://www.chesapeake.org/stac/Pubs/nutrient%20trading%20evaluation.pdf. Last accessed 2/1/2013.

In another example, an agricultural operation could take some land out of production and plant a buffer, which would reduce loads. If the agricultural operation replaces the lost production area by putting acres of another separate land area under production, however, a load is generated from those new production acres. Leakage could occur if loading from the additional acres under production is not taken into account.

ACCOUNTING FOR UNCERTAINTY

EPA expects that each Bay jurisdiction will address factors leading to uncertainty to ensure that total loads will not increase when a load reduction practice fails to generate the expected reductions. Safeguards are necessary to ensure that credits generated result in actual pollutant reductions. Occasions may arise in which practices did not reduce as much load as anticipated, such as when a particular year's weather hampered the full growth or coverage of a cover crop, but the modeled load assumed average hydrology. There also may be occasions in which a practice could not be implemented. For example, a grass swale could be washed out by a storm event and no longer function as designed. This type of uncertainty is expected to be addressed in a separate technical memorandum.[12]

Some Bay jurisdictions set aside a percentage of credits for improving water quality (e.g., retirement credits). While these do not address uncertainty, they are encouraged for general water quality improvement.

LOCATION ADJUSTMENT FOR OFFSETS AND TRADING PARTNERS AND THE CHESAPEAKE BAY SEGMENT

EPA expects the Bay jurisdictions to use the constant delivery factors from the CBP Partnership's Watershed Model to adjust the load between the buyer and the seller based on the relative position of each in the major river basin. EPA understands that the CBP Partnership may agree to changes in the model that could alter constant delivery factors. Jurisdictions may allow a credit certified under one version of the Model to remain available for sale until the certification period ends for that credit.[13]

The purpose of a location adjustment is to account for the distance between each of the offset or trading partners and the Chesapeake Bay. Landscape features and in-stream processes vary throughout the Chesapeake Bay Watershed, and the CBP Partnership's Watershed Model provides factors that make adjustments to loads based on these factors.

Currently, all Bay jurisdictions are calculating credits in terms of the delivered load to Bay tidal waters using constant delivery factors generated by the CBP Partnership's Watershed Model. Using a delivery factor

[12] A separate technical memorandum is expected to be developed regarding uncertainty.

[13] Recognizing that change is inevitable over a 15-year period in a dynamic environment like the Bay, the constant delivery factors may be subject to change as part of the Bay TMDL 2017 midpoint assessment.

normalizes the load reduced to the amount delivered to the Chesapeake Bay. The delivery factors generally approach 100% as the waterbody reaches the Chesapeake Bay. Thus, a decrease in load upstream of 150 pounds of nitrogen with a delivery factor of 20% will generate 30 credits (150 X 0.2). A decrease in load at the mouth of a river of 150 pounds of nitrogen with a delivery factor of 100% will generate 150 credits (150 X 1.0). This means that the amount of reduction near the headwaters of a river will likely need to be greater than the amount of reduction required near the mouth of a river to generate the same number of credits.

ADDITIONAL CONSIDERATIONS

CERTIFYING AND VERIFYING CREDITS

EPA expects the Bay jurisdictions to certify credits used in offset and trading programs. Certification is the process through which state agencies that oversee offsets and trading ensure that proposed credits have been or will be generated in compliance with all appropriate regulations and policies. The Bay jurisdictions may certify credits at different times, e.g., credits can be certified when the practice is submitted for approval or at the time of sale as long as the practice has been verified before the seller and buyer enter into a contractual agreement (see below).

EPA expects that for most practices, a credit, once certified, will be valid for one year or no longer than the NPDES compliance period, whichever is shorter. However, jurisdictions may certify credits for longer period if the practice results in a change to the landscape that reduces a pollutant load and is permanently protected by an easement or other legal instrument that conveys with the land.[14] A jurisdiction must have a verification system in place to ensure that the practice continues to function throughout the entire period.

EPA also expects the Bay jurisdictions to have a comprehensive system in place for credit verification whereby BMPs are routinely evaluated to ensure that they are installed, performing and maintained as designed. Verification is performed to ensure that the credit was and continues to be generated, via monitoring, inspection, reporting, or some other mechanism. The system should articulate the frequency of on-site or other monitoring and an entity able to conduct monitoring or inspections (i.e., EPA or Bay jurisdiction, or other accredited third party). Credit certification and verification are expected to be more fully addressed in a separate technical memorandum on verification.

CREDIT PURCHASE TIMEFRAME FOR PERMITTED ENTITIES

EPA expects the Bay jurisdictions to provide adequate assurance of the availability of credits for the duration of the transaction. Permits require certainty that loads will be met, and availability of verified credits is part of the certainty expected in a permit. Because permits are not necessarily reviewed annually, sufficient credits are expected to be available for the life of the permit.

[14] EPA is aware that the District of Columbia's stormwater regulations certify Stormwater Retention Credits for a period of three years and has an inspection schedule in place to verify BMPs.

The lifespan of BMPs is not yet specified by the CBP Partnership. Those BMPs funded by USDA that meet the CBP Partnership BMP definitions may use the practice lifespan if inspection shows that the practice still functions as designed and the BMPs have been accepted by the Chesapeake Bay Program for the annual progress review.

Each Bay jurisdiction has discretion to decide how to assure credit availability in the future. Currently, the Bay jurisdictions have different requirements for the minimum amount of time for which a point source should secure credits to offset an increased load. In Maryland, point sources secure credits for ten years with a plan for another ten. In Pennsylvania, point sources secure credits for five years. In Virginia, point sources secure credits for ten years.

Credit permanence is expected to be more fully addressed in a separate technical memorandum.

CREDIT TRADING REGISTRY

Once credits are calculated, EPA expects each Bay jurisdiction to provide a publicly accessible registry that records and tracks credits available and the credits sold. All credits sold should have a unique ID that is traceable to the buyer and seller. There are many ways for the Bay jurisdictions to meet this expectation. Currently, all Chesapeake Bay jurisdictions are participating in a USDA-funded project for a multi-jurisdictional platform for water quality trading called NutrientNet.[15] NutrientNet includes a credit registry. In Pennsylvania, PennVEST hosts auctions and serves as a clearinghouse for credits. Information on the PennVEST credits also is available on NutrientNet.

REPORTING CREDITS TRADED AS PART OF ANNUAL PROGRESS REVIEW AND TMDL REPORTING REQUIREMENTS

Evaluation of each Bay jurisdiction's progress towards meeting the Bay TMDL is assessed on an annual basis as part of a progress review. The Bay jurisdictions report CBP Partnership-approved BMPs on an annual basis for this progress review.

As part of the annual assessment toward the two-year milestone and Watershed Implementation Plan (WIP) commitments, Bay jurisdictions should report all BMPs and indicate which were certified to generate credits and those that were not sold. A jurisdiction may need to add additional fields to the information submitted as part of the annual progress review to tag if that BMP was used for a trade or offset or went unused, the sector to which the load reduction was applied, and the location at which the reduction should be credited (i.e., the location of the buyer and the seller). A BMP that is used for generating credits cannot be credited toward meeting the sector-specific BMP targets in a jurisdiction's WIP.

[15] See http://nutrientnet.mdnutrienttrading.com/ for Maryland's version of NutrientNet.

PUBLIC ACCOUNTABILITY

EPA expects information on offsets or trades to be available to the public at the time the credit is proposed to be certified and at the time the credit is sold. The use of offsets and/or trades has the potential to positively impact the Chesapeake Bay, a common access resource. All aspects of the program should be publicly available, including the credit generator, location of credits and type of credits. Where applicable, information about the credits should be included in NPDES permits.

Likewise, credit sellers and buyers should have a clear access point to Bay jurisdictions' offsets and trading programs. **EPA expects the methods for generating, calculating, and purchasing credits to be clearly articulated and available to the public.**