Components of Credit Calculation

EPA Technical Memorandum

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CONTENTS

ABBREVIATIONS AND ACRONYMS

BMP .... Best management practice

CBP.. Chesapeake Bay Program

LA .... Load allocation

NPDES .... National Pollutant Discharge Elimination System

TMDL.. Total Maximum Daily Load

USDA... United States Department of Agriculture

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 Bay TMDL, including its allocations and assumptions and the common elements of Appendix S. Specifically, this technical memorandum identifies EPA's expectations for calculations that should be included in offset and trading programs for Chesapeake Bay jurisdictions. 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 the Chesapeake Bay jurisdictions' offset and trading programs.

EPA's expectations for minimum credit calculation components are summarized in Table 1. The Bay jurisdictions may include additional components as necessary if they are consistent with the common elements of Appendix S of the Bay TMDL and the minimum components as defined in Table 1. Separate technical memoranda on baseline and uncertainty related to offset and trading programs for Chesapeake Bay jurisdictions, as well as other topics relevant to Section 10 and Appendix S of the Bay TMDL, should help inform credit calculation.

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[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	This technical memorandum applies only to nitrogen, phosphorus, and sediment (TN, TP, and TSS), the three pollutants for which caps are set in the Bay TMDL.
Eligible parties and accountability	There are generally no restrictions on who can buy and sell credits. Credit transactions under any scenario can occur with or without an intermediary or broker. However, if a credit is to be used for NPDES compliance purposes or for offsets in NPDES permits, EPA expects that Bay jurisdictions 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 (accepted and defined) by the Chesapeake Bay Program (CBP) Partnership[5] for its annual progress review are acceptable to EPA.
Baseline	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 if reductions meet allowable loads under either the Bay TMDL or a local TMDL, whichever has the most stringent restrictions.[6]
Additionality	EPA expects Bay jurisdictions to ensure that there is additionality – i.e., assurance that a credit generating practice will result in pollutant load reductions beyond what would have occurred in the absence of a potential offset or trade.
Leakage	EPA expects the Bay jurisdictions to address potential leakage in their offset and trading accounting practices and to ensure that leakage is accounted for in offset and trading programs.
Accounting for uncertainty	EPA expects the Bay jurisdictions to address uncertainty by employing an uncertainty ratio to offsets and trades.[7]
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. See additional details in the *Location Adjustment for Offsets and Trading Partners and the Chesapeake Bay Segment* section below.

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[5] Formed in 1983, the CBP is a unique regional partnership that includes the District of Columbia, Maryland, Pennsylvania, and Virginia. The headwater states of Delaware, New York, and West Virginia participate as full partners on issues related to water quality. Additional partners include federal and state agencies, local governments, non-profit organizations and academic institutions. The CBP works across state boundaries to lead the protection, restoration and stewardship of the Chesapeake Bay. Bay Partnership leaders and experts work together to share information and set restoration and conservation goals to achieve a shared vision of a restored bay ecosystem. Each of the CBP partners agrees to use its own resources to implement projects and activities that advance Bay and watershed restoration.

[6] Baseline is expected to be addressed in a separate technical memorandum.

[7] Accounting for uncertainty and applicable uncertainty ratio is addressed in the technical memorandum entitled *Accounting for Uncertainty in Offset and Trading Programs*, published on February 12, 2014 available at http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/TradingTMs/Final_Uncertainty_TM_2-12-14.pdf.

Certification and verification of credit-generating projects or practices	In their offset and trading programs, EPA expects the Bay jurisdictions to use credits that have been generated using certified projects or practices. Generally, EPA expects that the life of a credit, once generated from a certified project or practice, will be valid for up to one year. EPA also expects the Bay jurisdictions to have a comprehensive verification system in place. See additional details in the *Certification and Verification of Credit-Generating Projects or Practices* section below.
Credit assurance	EPA expects the Bay jurisdictions to provide adequate assurance of the availability of credits for the duration of the transaction. See additional details in the *Credit Purchase Timeframe for Permitted Entities* section below.
Credit 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, including credits sold through third parties, should have a unique identifier that is traceable to the buyer and seller and, where applicable, used by NPDES permittees when reporting credits. See additional details in the *Credit Trading Registry* section below.
Reporting credits to the Chesapeake Bay Program	As part of the annual assessment toward milestone and Watershed Implementation Plan (WIP) commitments, Bay jurisdictions should report all CBP Partnership-approved BMPs, indicating those that were certified to generate credits and traded or sold as well as those that were not traded or sold. See additional details in the *Reporting Credits Traded as Part of Annual Progress Review and TMDL Reporting Requirements* section below.
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.[8] 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 affordably can sell credits to those sources for which the same reduction would be more expensive.

The following discussion identifies components of a credit calculation that the Bay jurisdictions should address in their offset and trading programs.

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

BACKGROUND

APPLICABLE POLLUTANTS

This technical memorandum applies only to nitrogen, phosphorus, and sediment (TN, TP, and TSS), the three pollutants for which caps are set in the Bay TMDL.

ELIGIBLE PARTIES AND ACCOUNTABILITY

There are generally no restrictions on who can buy and sell credits. Credit transactions under any scenario can occur with or without an intermediary or broker. Examples include, but are not limited to, an offset or trade between: (1) a farmer who has installed BMPs approved by the 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 Bay jurisdictions 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 for the life of the credit. Credit life of a certified and generated credit is defined as one year or less. In the context of permitted entities, credit life is defined as one year or no longer than the NPDES compliance period, whichever is shorter.

ELIGIBLE PRACTICES FOR CREDIT GENERATION

EPA expects the Bay jurisdictions to allow credits to be generated using only those practices that are approved (accepted and defined) by the CBP Partnership for its annual progress review. Over 130 BMPs have approved effectiveness values and can be evaluated using the CBP Partnership models. These practices have been reviewed by the CBP Partnership's Water Quality Goal Implementation Team and all Bay jurisdictions have agreed to the practices and their pollutant removal efficiencies.

CALCULATING CREDITS

BASELINE

While the baseline is expected to be covered in depth in a separate technical memorandum, a brief discussion is provided here.

The baseline is the amount of 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:

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

> For nonpoint sources generating credits, baseline options should be consistent with the TMDL LA for the appropriate sector and may be further defined in terms of load, geographic scale, minimum practices, schedule of implementation and/or time needed to facilitate improved environmental compliance with WQS.[9]

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 if reductions meet allowable loads under either the Bay TMDL or a local TMDL, whichever has the most stringent restrictions.**

EPA is committed to working with the Bay 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 Bay 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.

EPA expects Bay jurisdictions 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.

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[9] 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."

PERFORMANCE-BASED BASELINE

A performance-based baseline specifies the amount of load to be reduced, regardless of which practices are implemented to achieve that reduction, before credits can be generated. 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.

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. 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. If an existing operation's pre-Bay TMDL load is below the numerical baseline load, the existing pre-Bay TMDL load should serve as the baseline for credit calculation and not the numerical baseline load, taking into account the load associated with BMPs that were in place for a parcel of land.

ADDITIONALITY

In the context of offsets and trades in the Chesapeake Bay, EPA accepts that load reductions beyond the baseline meet the expectation that additionallity (assurance that a credit generating practice will result in pollutant load reductions beyond what would have occurred in the absence of a potential offset or trade) has been addressed. During the initial stage of a trading or offset regime, a credit generating practice is:

1) to have been implemented no earlier than January 1, 2006, which was the cutoff date for calibrating the CBP Partnership Watershed Model that was used in setting the Bay TMDL; and

2) in addition to pollutant reductions committed to in the generating sector's level of implementation contained in a Bay jurisdiction's final Phase II Watershed Implementation Plan.

LEAKAGE

EPA expects the Bay jurisdictions to address potential "leakage" in accounting practices and to ensure that leakage is accounted for in offset and trading programs. Leakage occurs when pollutant load reductions at one site indirectly increase pollutant loads from another activity outside the project boundary.

For example, leakage can occur when cropland is converted to forest to generate credits if the landowner clears forest elsewhere to make up for the loss of cropland. In another example, an agricultural operation could

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[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.

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 should be accounted for when calculating credits in these types of scenarios.

ACCOUNTING FOR UNCERTAINTY

While accounting for uncertainty is covered in depth in a separate technical memorandum,[11] because it relates to credit calculation, a brief discussion is provided here.

EPA expects the Bay jurisdictions to address uncertainty by employing an uncertainty ratio to offsets and trades. Safeguards are necessary to ensure that credits generated result in actual pollutant reductions. Occasions may arise in which practices do not reduce as much load as anticipated, such as when a particular year's weather hampers the full growth or coverage of a cover crop, but the modeled load assumes 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 addressed in a separate technical memorandum.

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

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. EPA understands that the CBP Partnership may agree to changes in the Watershed Model that could alter constant delivery factors. Bay jurisdictions may allow a credit certified under one version of the Watershed Model to remain available for sale until the certification period ends for that credit.[12]

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. Using a delivery factor normalizes the load reduced to the amount delivered to the Chesapeake Bay. The delivery factors generally approach 100% as the waterbody reaches tidal waters. Thus, a

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[11] The technical memorandum entitled *Accounting for Uncertainty in Offset and Trading Programs* was published on February 12, 2014 and is available at http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/TradingTMs/Final_Uncertainty_TM_2-12-14.pdf.

[12] 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.

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

CERTIFICATION AND VERIFICATION OF CREDIT-GENERATING PROJECTS OR PRACTICES

While certification and verification is expected to be covered in depth in a separate technical memorandum, because it relates to credit calculation, a brief discussion is provided here.

In their offset and trading programs, EPA expects the Bay jurisdictions to use credits that have been generated using certified projects or practices. Certification is the process through which state agencies that oversee offsets and trading ensure that credits are generated in compliance with all appropriate regulations and policies. The Bay jurisdictions may certify credit generating projects and practices at different times prior to the generation of a credit. Bay jurisdictions may have certified credit generating projects and practices for longer than one year. Credit generation from these certified projects or practices is expected to be calculated on an annual basis.

Generally, EPA expects that the life of a credit, once generated from a certified project or practice, will be valid for up to one year.[13]

EPA also expects the Bay jurisdictions to have a comprehensive verification system in place. Verification is performed to ensure that the credit-generating project or practice was installed and is performing and maintained as designed throughout the entire certification period, 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 (e.g., Bay jurisdiction or other accredited third party).

CREDIT ASSURANCE

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

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[13] Credit life is discussed in more depth on page 12 of this technical memorandum under the "Reporting Credits as Part of the Bay TMDL and Annual Progress Review" section. Additionally, credit life is anticipated to be addressed in a separate technical memorandum on Credit Permanence.

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.

Each Bay jurisdiction has discretion to decide how to assure credit availability in the future. Credit permanence is expected to be more fully addressed in a separate technical memorandum.

CREDIT 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, including credits sold through third parties, should have a unique identifier that is traceable to the buyer and seller and, where applicable, used by NPDES permittees when reporting credits.[14] The Bay jurisdictions may meet this expectation in many ways. For example, 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.

REPORTING CREDITS AS PART OF THE BAY TMDL AND ANNUAL PROGRESS REVIEW

Evaluation of each Bay jurisdiction's progress towards meeting the Bay TMDL is assessed on an annual basis. The Bay jurisdictions report all BMPs on an annual basis for this assessment. For purposes of this technical memorandum, a used credit is defined as an existing annual credit[16] that has been traded or sold after being certified and generated through a CBP Partnership-approved BMP. An unused credit is one that has *not* been traded or sold within its one-year life, despite a load reduction having taken place.

As part of the annual assessment toward milestone and Watershed Implementation Plan (WIP) commitments, Bay jurisdictions should report all BMPs, indicating those that generated credits that were used as well as those that were unused. A jurisdiction may need to add additional fields to the information submitted as part of the annual assessment to report the following: whether the BMP was used for a trade or offset or went unused, the sector to which the load reduction was applied, the location[17] at which the credit was generated, and the location at which the reduction should be credited (i.e., the locations of the buyer and the seller). Used credits can only be counted toward meeting WIP goals in the sector and location that purchased the credits, not the sector and location that created the credits. Unused credits may be counted toward meeting WIP goals *only* within the one year credit life of the unused credit, even if the certification period is greater than one year.

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[14] EPA expects to address the timing of public comment in a separate technical memorandum on credit certification and verification.

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

[16] Note: The terms "annual credit" and "credit life" are not to be confused with the terms "annual BMP" and "BMP life." An annual credit refers to a certified and generated credit that lasts for only one year. By contrast, in the context of annual progress reviews, BMPs (e.g., animal waste management systems) are defined as cumulative and summed with the amount reported in prior years. A BMP can generate credits over the course of several years. There is a finite amount of credits that any BMP can generate each year and is dependent as to how that BMP functions. Each year those credits resulting from a reduction due to the BMP are available to be used for compliance and/or offset.

[17] Location information should be consistent with what Bay jurisdictions require to be reported for annual assessment purposes.

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. The use of offsets and/or trades has the potential to positively impact the Chesapeake Bay. All aspects of the program should be publicly available, including but not limited to the credit generator, the location of credits, the type of credits, calculation, certification, and verification documentation. Where applicable, information about the credits should be included in NPDES permits, its administrative record and associated factsheet. The administrative record supporting the NPDES permit held by or to be held by the user of the credit(s) should contain all documents generated or relied on by the permitting agency that support or relate to the determination to allow the use of credits, including all numerical calculations, source data and assumptions including but not limited to the credit generator, the location of credits, the type of credits, calculation, certification, and verification documentation.

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.**

SUMMARY OF EXPECTATIONS

A summary of expectations related to the components of credit calculation is articulated in Table 1 at the beginning of this technical memorandum.