BEST PRACTICES FOR WATER QUALITY TRADING
JOINT REGIONAL STATEMENT

Draft Best Practice, November 12th, 2013

Note: this page provides context for the draft document distributed for agency review on November 12, 2013. It is not intended to be part of the final Joint Regional Statement document. In the final version, the context, genesis, intent, and status of the document will be covered in the Introduction section alone. Both sections have been retained at this stage, leading to some redundancy between them. This was done to ensure that the body of the document represents our most current and complete thinking on how the final version may appear, while still providing the appropriate caveats and context up front.

This Draft Best Practice document is based on discussions held at a series of interagency workshops held between March 2013 and early 2014. The participants at these workshops included the Idaho, Oregon and Washington water quality agencies, US EPA Region 10, Willamette Partnership, and The Freshwater Trust. This document is intended to represent apparent points of consensus among the attendees as to how each component of trading should operate. A number of the "draft best practices" reflect points from the 2003 U.S. EPA Trading Policy, and so where there is overlap, reference has been made to the policy, with supplementary explanation where needed. The remaining draft best practices and accompanying explanations highlight additional elements recommended by the project participants. There are areas where the language provided herein extends beyond the workshop discussions, these additions are offered as suggestions to move the conversation forward and will be refined or removed through future review and comments. As additional research, experimentation, and discussion progresses, these practices are likely to change and potentially expand. When acceptable to all parties, the Draft Best Practice document will be posted on the Willamette Partnership's website. These draft best practices only represent recommendations. Inclusion of these practices in this joint regional statement will not result in any changes to any existing state program. Participating states may choose to incorporate some or all of these draft best practices into their own trading program rules or guidance in the future, and will follow all appropriate public notice and review provisions if and when they choose to do so.

Each section includes 1) a descriptive name of the best practice component and its definition (where applicable), 2) proposed language for the draft best practice, and 3) commentary describing important considerations associated with the best practice, derived from agency comments and workshop discussions.

Please direct feedback, questions, and comments to:

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Joint Statement on Water Quality Trading: Guiding Principles and Best Practice Guidelines

In March 2013, water quality agency staff from Washington, Oregon, Idaho, the U.S. Environmental Protection Agency (EPA) Region 10 office, Willamette Partnership, and The Freshwater Trust convened a Joint Regional Statement working group for the first of a series of four interagency workshops on water quality trading in the Pacific Northwest. Facilitated by Willamette Partnership, those who assembled over the subsequent eight months discussed and evaluated water quality trading policies, practices, and programs across the country against the backdrop of EPA's January 13, 2003, Water Quality Trading Policy,[1] and its 2007 Permit Writers' Toolkit.[2] Out of these conversations came a deeper understanding of water quality trading policy objectives and the guiding principles that may be considered in the development of future, in-state programs. Where these discussions led to the recognition of preferable practices, those components have been documented as best practices to be considered in future trading development where practicable.

Beginning in 2014, states have committed to testing these ideas, methods, and guidelines through pilot projects and in selected watersheds. Under the USDA Conservation Innovation Grant Award, the Joint Regional Statement working group will reconvene in 2015 to exchange experiences and, if needed, refine such principles. This statement and best practices do not create agency guidance, policy, rule, or regulation. Any update to an individual state's trading program will be made according to all applicable procedures for public participation and input. However, this document may serve as a common reference point in each agency's toolbox as they endeavor to improve their Clean Water Act programs.

Washington Department of Ecology: By: _____

Date: _____

Idaho Department of Environmental Quality: By: _____

Date: _____

Oregon Department of Environmental Quality: By: _____

Date: _____

[1] EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1612 (Jan. 13, 2003), *available at* http://water.epa.gov/type/watersheds/trading/finalpolicy2003.cfm.

[2] *See* EPA, EPA 833-R-07-004, *Water Quality Trading Toolkit for Permit Writers,* 30-31 (August 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit_fundamentals.pdf.

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I. Introduction

In 2003, U.S. EPA released its national policy framework for water quality trading. Since that time, only twelve states have developed a state-level framework around how trading should occur.[3] Three of those states– Idaho, Washington, and Oregon– are located in the Pacific Northwest region, and so have generated considerable interest in their trading programs.

In November of 2012, Idaho, Oregon, and Washington water quality agencies, and U.S. EPA Region 10 began working together to define what they consider the best practices to implement water quality trading. The goal of this effort is to help ensure that water quality trading programs have the quality, credibility, and transparency necessary to be consistent with the Clean Water Act and make certain all trades achieve water quality improvements. By identifying recommended approaches to critical components of water quality trading programs, this effort may also serve to increase the confidence of participants and observers that trades produce their intended water quality benefits and comply with applicable Clean Water Act regulations.

This *Draft Best Practice* document is based on discussions held at a series of interagency workshops held between March 2013 and early 2014. This document is intended to represent apparent points of consensus among the attendees as to how each component of trading should operate. A number of the "draft best practices" reflect points from the 2003 U.S. EPA Trading Policy, and so where there is overlap, reference has been made to the policy, with supplementary explanation where needed. The remaining draft best practices and accompanying explanations highlight additional elements recommended by the project participants.

Each section includes a draft best practice, and where appropriate, commentary describing important considerations derived from agency comments and workshop discussions. The "draft best practices" in this document only represent recommendations. Inclusion of these practices does not result in immediate changes to any existing state program. Participating states may choose to incorporate these draft best practices into their own trading program rules or guidance in the future.

Beginning in 2014, states anticipate testing some of the ideas from the draft framework by implementing pilot projects in selected watersheds. The framework will then be revised to incorporate lessons learned through the end of the project in September 2015. The states may choose to update their own trading program's rules or guidance to incorporate the best practices. If states choose to do so, they would follow their state's applicable procedures for public participation and input.

[3] This includes states with legislation, policy, guidance, or draft guidance on water quality trading at the state level as of November 2013 (i.e. Colorado, Connecticut, Maryland, Michigan, Ohio, Oregon, Florida, Idaho, Pennsylvania, Virginia, Washington, and Wisconsin). This does not include states with individual authorized trading programs or pilot programs.

II. Guiding Principles for Water Quality Trading

Water links us in ways that underpin healthy communities, economies, and ecosystems. When Congress passed the Clean Water Act[4] (CWA) in 1972, it aimed to protect those links in ways that would restore the nation's waters to levels that would support fishing, swimming, and the other beneficial uses we rely on. Water quality trading is just one tool of many to help achieve the goals of the CWA and other public objectives.[5] Trading is not appropriate for many water quality challenges, and its efficacy must be evaluated before assuming it can be useful in every watershed. When designed well and combined with other tools, however, trading programs can help achieve water quality goals in a way that is beneficial for landowners, communities, and the environment.

One of the primary goals of trading, as identified in United States Environmental Protection Agency's (EPA) 2003 Water Quality Trading Policy (2003 EPA Trading Policy), is to encourage "voluntary trading programs that facilitate implementation of [total maximum daily loads (TMDLs)], reduce the costs of compliance with CWA regulations, establish incentives for voluntary reductions and promote watershed-based initiatives."[6] The 2003 EPA Trading Policy describes how water quality trading can comply with different requirements of the CWA and its implementing regulations. Recognizing that the CWA and its implementing regulations do not directly address water quality trading, the design of water quality trading programs should focus on how they can best support achievement of particular CWA goals.[7] Implementing TMDLs with greater efficiency and timeliness, while at the same time recognizing that flexibility is the key to innovative solutions, is where water quality trading shows its greatest potential.

Individual trading programs will inevitably face many unique situations and issues. These guiding principles are meant to anchor state agencies and other stakeholders with a cohesive approach to thinking through the tough design issues that should be contemplated when establishing a water quality trading program where best practices are not clearly defined or there is a need for a case-by-case decision.

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[4] Federal Water Pollution Control Act, 33 U.S.C. § 1251, et. seq. (2006).

[5] EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1609 (Jan. 13, 2003), *available at* http://waterepa.gov/type/watersheds/trading/tradingpolicy.cfm ("Water quality trading is an approach" to "[f]inding solutions to [] complex water quality problems.").

[6] *Id.*

[7] *Id.* at 1610 ("*CWA Requirements*. Water quality trading and other market-based programs must be consistent with the CWA.").

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Water quality trading is generally supported when it is consistent with the 2003 EPA Trading Policy and where it:

I. Allows sources to comply with their allocations and permit effluent limits in a way that

a. Is linked directly to meeting applicable water quality standards, including the beneficial uses that the TMDL and permits are designed to protect,[8]
b. Addresses causes of pollutant of concern, while not negatively affecting other parts of the environment;
c. Achieves more pollution reduction than would have occurred without trading over a comparable period of time;
d. Achieves water quality and environmental benefits greater than would otherwise be achieved under more traditional regulatory approaches;[9]
e. Achieves ancillary environmental benefits beyond the required reductions in specific pollutant loads, such as the creation and restoration of wetlands, floodplains and wildlife, fish and/or waterfowl habitat, reduction of multiple pollutants, etc.;[10] and
f. Provides for the long-term stewardship and management of practices that produce water quality benefits.

II. Is based on sound science, in that it

a. Bases program goals, credit quantification methods and adaptive management systems on sound science;
b. Uses monitoring and evaluation to regularly improve and report on the progress toward water quality goals;[11] and
c. Does not rely on economic justifications instead of water quality goals as the basis for undertaking trading.

III. Provides sufficient accountability that promised water quality improvements are delivered

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[8] Trading cannot cause an impairment of existing or designated uses. *Id.* at 1611.

[9] *Id.* at 1609.

[10] *Id.* at 1610.

[11] *Id.* at 1612 ("*Program Evaluations.* Periodic assessments of environmental and economic effectiveness should be conducted and program revisions made as needed.").

a. Fosters transparent information on program rules and processes, location and volume of transactions, and effectiveness of the program over time;
b. Fosters accountability by clearly articulating who is responsible for producing which water quality improvements, providing a mechanism for identifying and correcting problems, and allowing for clear dispute resolution;
c. Engages public participation at the earliest stages and throughout the development of programs, strengthens program effectiveness and credibility;[12] and
d. Provides sufficient information for regulatory agencies and the public to regularly determine that certified trades and individual credits comply with a permittee's waste load allocation and effluent limitations.

IV. Does not produce localized water quality problems, such as

a. Thermal barriers to salmonid migration, thermal shock/lethality for salmonids, or impairment of known salmonid spawning habitat;
b. Algal blooms and areas of low dissolved oxygen caused by nutrient hotspots; or
c. Exceedance of an acute aquatic life criteria within a mixing zone or a chronic aquatic life or human health criteria at the edge of a mixing zone using design flows specified in the water quality standards.[13]

V. Is consistent with the CWA regulatory framework, such that it does not

a. Circumvent the installation of minimum treatment technology required by federal and/or state regulations at the site of a point source;
b. Conflict with the relevant provisions of a TMDL, as described in the 2003 Policy;
c. Adversely affect water quality at an intake for drinking water supply;[14] or
d. Delay implementation of a TMDL approved or established by EPA or cause the combined point source and nonpoint source loadings to exceed the cap established by a TMDL.[15]

VI. Achieves environmental goals with predictable and reasonable transaction costs

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[12] *Id.*

[13] *Id.*

[14] *Id.* at 1611.

[15] *Id.* at 1610.

III. Draft Best Practices

1. Eligibility for Water Quality Trading

Trading is not appropriate for every watershed or in every situation. U.S. EPA's 2003 Trading Policy identifies some specific conditions under which trading may occur. This section describes the project partners' proposed eligibility criteria for individuals and entities seeking to participate in trading and the generation of credits. This includes those criteria already identified in U.S. EPA's 2003 Trading Policy.[16] Recommendations below are based on the states' experiences with water quality trading to date, lessons from other areas of the country, and a pragmatic view of how trading should proceed in the Pacific Northwest.

1.1 Eligible regulatory trading environments

Draft Best Practice – Eligible environments: *The 2003 U.S. EPA Trading Policy notes that trading may be used under the Clean Water Act (CWA) to maintain high quality waters, in pre-TMDL impaired waters, pursuant to TMDLs, in pretreatment situations, and intra-plant. 68 Fed. Reg. 1608, 1610-1611 (Jan. 13, 2003). Trades in the Northwest will be considered primarily pursuant to individual NPDES permit reissuance in basins covered by an approved total maximum daily load (TMDL), or similar watershed analyses. Subject to agency discretion and conformance with the CWA and its implementing regulations, trading may also occur outside of a TMDL and under other types of permits or regulatory tools, including but not limited to, CWA section 401 certifications, overlay watershed trading permits, variances, or other watershed-wide plans.*

Commentary:

Proposals for trading outside of or prior to the development of a TMDL may be evaluated on a case-by-case basis provided that a TMDL-comparable analysis is undertaken. This context is challenging for many state agencies, as the associated analysis would require large amounts of staff time and capacity, and may strain already limited staff resources. In order for agencies to consider trading prior to or outside of a TMDL in water quality limited water bodies, the following issues and information should be available for analysis:

1. Identification of pollutants, pollutant forms and sources, and the relative contribution of pollution by each source. This analysis needs to be performed by the agency, permittee, or a qualified third party;

[16] EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1612 (Jan. 13, 2003) (hereafter "2003 Trading Policy").

2. Agencies, permittees, or a qualified third party have assessed alternatives available for pollution reduction, including available control technologies (and the costs associated with reducing such pollutants via technology);
3. Agencies have access to review any analysis completed by a permittee or external third-party;
4. Important areas for water quality have been identified within the watershed to avoid localized impacts and maximize targeted water quality improvements;
5. The state agency or EPA has considered how an outside-of-TMDL trading environment would interact with that state's 303(d) list;
6. Parties understand that trading provisions are subject to change if a TMDL is promulgated, and so trading participants must understand the long-term implications if and when a TMDL is approved.

In basins where point sources have been given a wasteload allocation (in a TMDL or another cumulative watershed analysis), agencies may wish to allow entities to initiate trading in advance of permit reissuance with agreements that allow for those actions to count toward future permit obligations.

Draft Best Practice - Compliance with anti-degradation policy: *Water quality trades and trading programs must comply with the federal anti-degradation policies and state implementing rules, as stated in the 2003 U.S. EPA Trading Policy*

Commentary: U.S. EPA's 2003 Trading Policy states: "Trading should be consistent with applicable water quality standards, including a state's and tribe's antidegradation policy established to maintain and protect existing instream water uses and the level of water quality necessary to support them, as well as high quality waters and outstanding national resource waters (40 CFR 131.12). U.S. EPA recommends that state or tribal antidegradation policies include provisions for trading to occur without requiring antidegradation review for high quality waters. U.S. EPA does not believe that trades and trading programs will result in 'lower water quality' as that term is used in 40 CFR 131.12(a)(2), or that antidegradation review would be required under U.S. EPA's regulations when the trades or trading programs achieve a no net increase of the pollutant traded and do not result in any impairment of designated uses." 68 Fed. Reg. at 1611.

Additional anti-degradation requirements may apply when trading bio-accumulative pollutants.[17] States should also be aware that proposed federal regulations may create further anti-degradation implementation requirements [18]

[17] Trading of bio-accumulant pollutants may face extra scrutiny from EPA in light of its July 23, 2013 letter to Idaho notifying the state that even "de minimis" discharges impacting high quality waters are not exempt from Tier 2 public review. Letter from Daniel Opalski, Director, Office of Water and Watersheds, to Barry Burnell, Water

Draft Best Practice – Compliance with anti-backsliding policy: *As stated in the 2003 U.S. EPA Trading Policy, except where allowed under the CWA, NPDES permits, TMDLs, and water quality standards cannot be renewed, reissued, modified, or revised as a result of water quality trading to include less stringent effluent limitations, wasteload allocations, or water quality standards than those previously achieved. States should provide guidance as to how anti-backsliding applies to situations where a TMDL is either promulgated or withdrawn/revoked, and as a result, point sources receive less stringent limits than in previous permits.*

Commentary: U.S. EPA's 2003 Trading Policy states: "EPA believes that the antibacksliding provisions of Section 303(d)(4) of the CWA [33 U.S.C. § 1313] will generally be satisfied where a point source increases its discharge through the use of credits in accordance with alternate or variable water quality based effluent limitations contained in an NPDES permit, in a manner consistent with provisions for trading under a TMDL, or consistent with the provisions for pre-TMDL trading included in a watershed plan. These antibacksliding provisions will also generally be satisfied where a point source generates pollution reduction credits by reducing its discharge below a water quality based effluent limitation (WQBEL) that implements a TMDL or is otherwise established to meet water quality standards and it later decides to discontinue generating credits, provided that the total pollutant load to the receiving water is not increased, or is otherwise consistent with state or tribal antidegradation policy." 68 Fed. Reg. at 1611. Entities engaged in trading must also abide by the anti-backsliding provision in section 402(o) of the CWA (33 U.S.C. § 1342(o)), where applicable.

If a TMDL does not yet exist for a watershed, but later comes into existence, resulting in less stringent limits for permittees, anti-backsliding could be deemed an issue. Anti-backsliding could also be an issue if a TMDL is withdrawn, disapproved, or revoked, resulting in less stringent limits for permittees. States should contemplate these situations in terms of providing anti-backsliding guidance.

1.2 Regulatory instruments to support trading

1.2.1 NPDES Permits

Quality Div. Adm'r, Idaho Dep't of Envtl. Quality (Jul. 23, 2013), *available at* http://www.epa.gov/region10/pdf/water/wqs/id_de_minimis_disapproval_072313.pdf.

[18] *See* Water Quality Standards Regulatory Clarifications, 78. Fed. Reg. 54,518, 54,525 – 54,531 (Sept. 4, 2013). These changes would ensure that states and tribes only make a finding that lowering water quality is necessary, as required in 40 C.F.R. § 131.12(a)(2), after conducting an alternatives analysis that evaluates a range of non-degrading and minimally degrading practicable alternatives that have the potential to prevent or minimize the degradation associated with the proposed activity. This proposal also provides that if a state or tribe identifies any practicable alternatives, the state or tribe must choose one of those alternatives to implement when authorizing a lowering of high water quality. Assuming these regulations are adopted, states would need to consider how trading would fit within a practicable alternatives analysis.

The NPDES permit (CWA section 402) is the primary regulatory tool for controlling wastewater discharges of pollutants to waters of the United States and the respective states (i.e., jurisdictional waters). The federal and delegated state regulations describe in detail what needs to be in a permit and both federal and state guidance exists to describe, step-by-step, what a permit writer needs to consider in developing a permit. A NPDES permit provides the permittee with permission to discharge pollutants into jurisdictional waters, contingent upon required treatment within established pollutant loads and effluent concentration limits. A NPDES permit describes detailed monitoring and reporting requirements tailored to explicitly demonstrate compliance with established effluent limits that are meant to achieve water quality standards. If the permittee cannot meet established effluent limits at the time the permit is issued, the permit will contain a compliance schedule identifying when the permittee will be in compliance with the permit. Depending on the length of time needed to come into compliance, the compliance schedule may need to identify interim milestones and interim effluent limits that a permittee must achieve.

In addition to establishing effluent limits, a NPDES permit may require a permittee to develop and implement other supporting programs required under federal or delegated state agency rules, including, but not exclusively, a pretreatment program, a reuse program, or a biosolids program. The development and implementation of a trading program in a permit is similar in nature to these programs as it describes specific processes and actions the permittee must undertake and maintain to come into compliance with the effluent limits established in the permit.

In the case of a water quality trading program, the permittee would develop a trading program as described in the conditions of the permit, which when implemented, would allow the permittee to achieve compliance with its established effluent limits. As such, the permit should contain sufficient detail regarding the trading program to allow the permittee to proceed with confidence. The permit writer has the discretion to determine what level of detail is necessary for different permittees and what components of the trade program should be included in a NPDES permit and where those components will appear within the permit. Although EPA and the various delegated states may have slightly different outlines for their individual NPDES permits, all permits should contain the information required in 40 C.F.R. pt. 122. The following permit sections contain recommendations as to where specific language and detail related to water quality trading should be included in a permit.

a. Waste Discharge Limits Not to be Exceeded

The most critical section in the NPDES permit is that containing the specific effluent limits (either technology-based or water quality-based), which must be achieved by the permittee to achieve water quality standards at the end of the discharge pipe, at the downstream boundary of the zone of immediate dilution (ZID), or at the downstream boundary of the regulatory mixing zone (RMZ). For waterbodies covered by a total maximum daily load (TMDL), a

permittee's effluent limits must be consistent with the assumptions and requirements underlying TMDL wasteload allocations (WLA) for specific parameters.[19]

a(1). Identification of trading parameters, units, and quantity needed to offset effluent limits.

Draft Best Practice – Identification of trading parameters, units, and quantity needed to offset effluent limits: *Identification of trading parameters, trading units, and quantity of credits needed to offset effluent limits established in the NPDES permit. The effluent limits section of the NPDES permit should identify the parameter of concern, its units, and the number of units that would be needed to offset the specific loads of the parameter, whether or not the permittee uses trading or some other mechanism to comply. In order to do this, the permit should explicitly outline the methodology that a facility must use to calculate its excess load (including any seasonal variations), and summarize the amount of load that a facility needs to address—via trading or otherwise—at all points during the year. This section of the permit should not include a detailed description of the specific credit-generating projects, their type and location, etc.*

This section of the permit should also include any requirements for obtaining credits to meet changing flow and pollutant load characteristics of the discharge when it may fluctuate over the month or seasons. In other words, if the discharge exceeds the effluent limits in the summer period but not the winter period, the permit should be clear as to how many credits are needed at those discrete times of the year. If the discharge is projected to exceed the effluent limits at a future point within the five-year cycle of the permit (but an exceedance is not currently projected), the permit should indicate when the permittee will need to obtain credits to offset its potential future effluent limit exceedances.

Commentary: Different states may choose to put more or less detail on trading into the effluent limits section of a permit. This choice must balance detail desired for trading with the need for flexibility in the technology/processes that a permittee might use to meet its effluent limits. Generally, permits do not establish the treatment processes that are needed to meet limits.

The introduction of trading into the permit to meet established effluent limits requires a clear description of the parameter that could be traded in standardized units that are consistent with those in the TMDL or other watershed-wide plan. Moreover, this section of the permit should identify the number of those units needed to address a facility's discharge exceeding its effluent limits. While this type of specificity is needed on these fronts, if the permit describes the specific number, type and location of credit-generating projects needed to address a

[19] 40 C.F.R. § 122.44(d)(1)(vii)(B).

permittee's excess load issue, the permit will constrain a permittee's ability to meet its effluent limits.

a(2). Describing the trading program in the effluent limits section of the permit

Draft Best Practice – Describing the trading program in the effluent limits section of the permit: *Trading Program description in the effluent limit section of the permit: Much like a biosolids, reuse water, or other required programs that are often attached to NDPES permits, a trading program is a supporting implementation program for the NPDES permit. These programs detail a permittee's efforts to operate and maintain a particular needed water pollution control program.*

The needed content of a trading program should be outlined in the special conditions of the permit, and similar to other required programs, the trading program should be attached to the permit and publicly noticed. Only appropriate and necessary elements of the trading program should be integrated into the body of the permit.

If a permittee has not fully developed its trading program attachment at the time the permit is publicly noticed, the permit would condition the development of the trading program in the compliance schedule section of the permit and require that the later-developed trading program attachment be publicly noticed when completed.

Commentary: Only the appropriate and necessary elements of a trading program should be included in the permit. Other required programs are not described in whole in the various sections of the permit but are usually attached to the permit with only specific program elements identified in appropriate sections within the body of the permit. Having the entire trading program described in the effluent limits section of the permit can lead to unintended consequences, such as having each aspect of the trading program subject to compliance and enforcement actions similar to those imposed for effluent limit violations. For example, effluent limit exceedances are usually considered significant violations of the NPDES permit because they often result in water quality standard violations. Consequently, requirements in the effluent section of the permit usually receive the highest violation class designation. The various intermediate steps of various supporting programs, while important, usually do not lead to water quality standards violations and consequently receive a lower violation class level. Therefore, placing the entire trading program in the effluent section of the permit would potentially result in higher violation classes than may be warranted.

a(3). Relationship of the permit compliance point to the trade compliance point

The NPDES permit has a specific compliance point for the effluent limits established in the permit. In some cases, the permittee must be in compliance with the effluent limits at the end of its discharge pipe. In other cases, a permittee must achieve compliance at the downstream boundary of the zone of initial dilution (ZID) for acute toxicity levels, or at the downstream

boundary of the regulatory mixing zone (RMZ) for other parameters. In each of these cases, however, the permittee must demonstrate that established effluent limits will be achieved at the designated compliance point for that parameter. In a trading program, credits will likely be generated within a broader geographic area, but the permittee will use those credits to address an effluent limit with a specific compliance point defined in the permit. Consequently, the compliance point defined in the permit remains the same in water quality trading for permit administrative purposes.

Draft Best Practice – Compliance Point: *The compliance point established in the permit for the effluent parameter being offset remains the same under a trading program. However, actual trades may take place in areas of the watershed defined in the TMDL and applied as an offset to the effluent limit in the permit.*

Commentary: In watersheds with a TMDL, the TMDL identifies areas where water quality is most impacted by discharges. The TMDL will further describe the area of a watershed where point and nonpoint sources need to reduce pollutant loads so that the water quality standard is achieved. In contrast, the permit identifies where a permittee's effluent must achieve the established effluent limits (i.e., at the end-of-pipe or at the end of a mixing zone). Therefore there are different points of compliance for permit compliance and for TMDLs. If a permittee wants to offset its excess load (above its effluent limits) through use of a trading program, the point of compliance established in the permit remains the same because the trade offsets the parameter in the permit. If a permittee utilized trading, it will not meet its effluent limit or the specific water quality standard for the effluent limit parameter at the permit compliance point, but it will still address its excess load in the watershed through trading, and thus be in compliance.

In watersheds with an approved TMDL, pollutant load reductions must take place within that area of the watershed defined in the TMDL. Under the trading program, the trade must take place within the impact area defined in the TMDL program for the trade to offset the effluent limit established in the permit.

b. Monitoring

A NPDES permit also identifies the actual physical effluent monitoring that must be conducted by the permittee. The purpose of this section of a permit is to determine compliance with the effluent limits established in the permit. The monitoring section details the specific parameters to be monitored, monitoring frequency (i.e., daily/monthly/annually), the type of sample required (i.e., grab/ composite/continuous), the actual physical form of the report (Discharge Monitoring Report, or DMR), and the timing for reporting to the regulatory agency. If the permittee is also implementing other required programs such as pretreatment, biosolids, etc., this section will also describe the specific monitoring required by these programs (including identification of the parameter, the frequency of monitoring, and the type of sampling needed).

A water quality trading program may include a number of different monitoring elements, and so it is important to identify which aspects of monitoring must be described in this section of the permit. At a minimum, a permittee should be required to report credit quantities (as defined in the section of the permit that details effluent limits, units, and exceedances).

Draft Best Practice – Discharge Monitoring Reports: *Permit monitoring should focus on the effluent discharged and reported in the DMR. In the comment section of the DMR, the permittee should report the quantities of credits that it holds and certify/attest that it has secured those credits and that those credits are available during the period(s) for which they are needed. The permit would establish the timing for reporting the amount of credits bought (monthly, seasonally, or annually).*

The Special Conditions section of the permit and/or the trading program attachment will address how a permittee demonstrates that the credit-generating BMPs it relies on for compliance are in fact performing as anticipated. This information would not be included in a permittee's discharge monitoring report (DMR).

Commentary: A viable trading program may require several forms of monitoring to successfully track permittee compliance and project performance. However, for NPDES permit purposes, a much narrower monitoring requirement in the monitoring section of the NPDES permit is appropriate. In a water quality trading context, the permittee should be responsible for documenting the quantity of credits generated for permit compliance. In addition to reporting credits, permittees must attest that its credits exist and are performing as promised. Without this formal attestation in a compliance document (for which misrepresentation may have enforcement consequences), the permittee cannot fulfill its reporting responsibility.

Discussion and draft best practice for reporting obligations beyond DMR submission are included in Section 1.2.1 d(3). (Reporting obligations beyond DMR submission) and Section 7.4 (Frequency and content of ongoing verification).

c. Compliance Schedules

The NPDES permit should contain any compliance schedules needed to identify the time necessary for a permittee to come into compliance with permit requirements, particularly effluent limits. For example, if a permit established a WQBEL for a parameter that the permittee does not have treatment processes to achieve it, a compliance schedule would identify the specific time period by which the treatment process would need to be designed, built, and operational in order to meet the effluent limits. Compliance with effluent limits must be achieved "as soon as possible."[20] The time period for completing each step in that process would be established in the permit. The permittee is held accountable for meeting the

[20] 40 C.F.R. § 122.47(a)(1).

schedule. Compliance schedules recognize that even though the permittee is not yet achieving the final effluent limit established in the permit, as long as the permittee is in compliance with the schedule to design, build, and operate the needed treatment, it is considered in compliance with its permit.

In some cases, when the time needed to design, build and operate the treatment solution is lengthy, the permit writer may establish interim effluent limits that the permittee must achieve while building the needed treatment capacity. [21] Consequently, the permittee may be required to evaluate treatment options, and then select, design and build the selected option under a compliance schedule described in the permit. In this case, little may be known about the option the permittee would ultimately select at the time the permit is issued. Therefore, the permit would need to be modified at a later date to contain specific compliance milestones. In other situations, the permittee may have evaluated the various treatment options prior to submitting its permit renewal application. Here, the permittee may have selected a trading program as the means for meeting its new WQBEL. There is any number of situations between these two end-posts and so each permit would include different levels of detail based on the information available at the time of permit issuance.

Permit writers routinely consider whether and how to establish compliance schedules when writing permits. However, in each situation, a critical review of the specific permit is needed to develop a reasonable compliance schedule. Many states have specific guidance on how to establish a permit compliance schedule. The State of Oregon, for example, has an Internal Management Directive (IMD) devoted to establishing compliance schedules in NPDES Permits.[22]

c(1). Establishing compliance schedule where a permittee needs longer than 5-years to design, implement, and operate its treatment solution.

Draft Best Practice – Compliance Schedules beyond 5-years: *If the time needed to come into compliance with a new WQBEL will extend beyond the 5-year cycle of an NPDES permit,23 the permit should contain the entire compliance schedule necessary for the facility to achieve the new WQBEL, even though the schedule will extend beyond the current permit's expiration date. This approach establishes the long-term compliance commitments in the first permit cycle and would require the permittee to meet the schedule even if the permit is administratively extended after the end of the first 5-year cycle.*

[21] If longer than one year in duration, the compliance schedule must contain a set of interim milestones and effluent limits. 40 C.F.R. § 122.47(a)(3).
[22] Oregon DEQ, Compliance Schedules in NPDES Permits IMD (2010), *available at* http://www.deq.state.or.us/wq/pubs/imds/ComplianceSchedule.pdf.
[23] 40 C.F.R. § 122.46(a).

Commentary: U.S. EPA guidance is clear that compliance schedules are only available to address water quality standards established after 1977, and for aiding in the achievement of WQBELs by permittees.[24] Compliance schedules need to fit the particulars of an individual permit. Although there are guidelines for how long compliance schedules should be at the extreme, it is difficult to standardize interim limits, specific schedule lengths, etc. Other options that may allow for longer-term compliance are generally not preferred. For example, administrative schedule orders may not protect against third party litigants, and consent decrees require a permittee to admit violations in order to be issued. Inclusion of a schedule that is expected to stretch beyond one permit cycle in the initial permit is consistent with EPA interpretive memoranda[25] and creates an enforceable obligation without the disadvantages associated with the other two options.

> *c(2). Compliance schedules must achieve compliance "as soon as possible" and the permit evaluation report (permit fact sheet) must document how the permit writer arrived at a particular compliance schedule length and composition.*

Draft Best Practice – Length of compliance schedule: *EPA and delegated states should establish guidance for permit writers to use in making a determination of the compliance schedule length for meeting WQBELs. Permit writers should examine all relevant data in making this determination and thoroughly describe the basis for their decision in the permit evaluation report (Permit Fact Sheet).*

Commentary: The regulatory agencies try to keep compliance schedules as short as possible and try to achieve compliance "as soon as possible,"[26] as required by the federal regulations and guidance. Much has been written on trying to determine what is "as soon as possible." EPA refers to its internal "Hanlon Memo"[27] for direction and states often have specific guidance attempting to define this term.[28] The permit writer must perform a reasonable evaluation of

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[24] Compliance schedules are supported by EPA to address water quality standards that were developed after July 1, 1977 so long as the state issuing the permit has clearly indicated in its water quality standards or implementing regulations that it intends to allow for them. Compliance schedules are also only considered valid to aid in the achievement of WQBELs. Memorandum from James A. Hanlon, Director, Office of Wastewater Management, to Alexis Strauss, Director, Water Division, EPA Region 9, Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits (May 10, 2007), *available at* http://water.epa.gov/lawsregs/guidance/wetlands/upload/signed-hanlon-memo.pdf [hereafter "Hanlon Memo"].
[25] The Hanlon Memo acknowledges that compliance schedules may extend past permit expiration dates. Hanlon Memo, at 2 ("Any compliance schedule *that extends past the expiration date of a permit* must include the final effluent limitations in the permit in order to ensure enforceability of the compliance schedule as required by CWA section 502(17) and 40 C.F.R. § 122.2 (definition of schedule of compliance).") (emphasis added).
[26] 40 C.F.R. § 122.47(a).
[27] *See supra* note 24.
[28] For example, Oregon has an IMD and regulation. OAR § 340-041-0061(14); Oregon DEQ, Compliance Schedules in NPDES Permits IMD § 3.2 (2007, updated 2010) (emphasis added), *available at* http://www.deq.state.or.us/wq/pubs/imds/ComplianceSchedule.pdf. Washington has XXXX. Idaho has XXXX.

the individual permittee's situation. In particular, permit writers should evaluate data from the facility and the watershed to determine how quickly the permittee could establish a program and how soon credit-generating projects could be completed. In addition to considering the time needed to find project sites and assess their credit-generating potential, the permit writer should contemplate the time it will take to establish site-specific contracts with landowners (to install credit-generating projects), the time necessary to design and install projects, and any potential time lags between installation of a BMP and that BMP's full maturity. Consideration should also be given to resource supply constraints (e.g., supply of materials, equipment, and labor). If any or all of these factors exist, it may take time for a permittee to come into compliance with effluent limitations, and so the compliance schedule should provide the permittee the appropriate amount of flexibility. The permit writer needs as much information as possible to make a professional judgment as to an appropriate time period to complete all this work and offset the effluent limitation. This evaluation must be documented in the permit evaluation report (permit fact sheet) and be available for public review at the time the permit is placed on public notice.

c(3). TMDL-established implementation schedule providing the basis for the permit compliance schedule.

Draft Best Practice – TMDL established implementation schedule: To the extent possible, new and amended TMDLs should include an implementation schedule that permit writers can use to define and support permittee-based compliance schedule analysis. The TMDL schedule should discuss timelines and milestones for meeting Wasteload Allocations, Load Allocations, and water quality standards.

Commentary: There is increasing interest in building TMDLs that can be more easily implemented. To the extent TMDLs can describe the timelines and milestones needed to reach water quality standards over a defined period of time, permit writers can rely on that information when developing individual compliance schedules for permittees. The TMDL process requires a watershed analysis and engages stakeholders in a way that allows for careful thought about the time needed to meet goals set in the TMDL. To date, few TMDLs include such timelines because it places a heavy burden on the TMDL program to develop the needed schedule and to achieve necessary stakeholder agreement on timing.

d. Special Conditions

In this permit section, the permit writer may include requirements for a permittee to develop and implement programs needed to comply with state and federal water quality regulations. All such conditions should support the achievement of water quality standards and the protection of beneficial uses. A trading program will likely need special conditions in a permit if the permittee is to be deemed in compliance with its effluent limitations.

d(1). Inclusion of general water quality trading program components in the permit

Draft Best Practice – Including trading components in permit Special Conditions: *Permit should contain a special condition describing the content of a trading program: The permit Special Conditions must at least include a general outline of all of the necessary components of a permittee's trading program. Ideally, the trading program outline should articulate that the following would be addressed in a final trading program:*

- *Trading area (justification and how it is protective of beneficial uses);*
- *Baseline (sources of applicable regulation or law, how baseline is expressed in the permit – i.e., as a set of minimum BMPs, as a % load reduction target, an overall program requirement);*
- *Description of credit quantification methodology (how pre- and post-project conditions modeled, how credit values are derived, how Baseline accounted for);*
- *Trading ratio (articulation of assumptions and components);*
- *Risk mitigation mechanisms (reserve pool, insurance, performance bonding);*
- *Project pre-screening (whether required or suggested);*
- *Allowable credit generating actions (actions, identification of quality and performance standards);*
- *Credit life (when credits becomes valid, how long credits remain valid, renewability of credits);*
- *Project site design, maintenance and implementation/performance confirmation (whether these components are required, frequency);*
- *Third party verification of project site implementation and performance (whether required, entity that will perform, standards by which performance judged);*
- *Credit registration (whether required, characteristics of credit registry, info disclosure minimums).*

The permittee may need time to develop a detailed trading program. If this is the case, the permit should establish a timeline by which the permittee must submit that plan to the relevant regulatory agency, and should clearly note that no trades may be used as offsets by the permittee until the detailed trading program is approved by the agency.

Commentary: Special conditions need to be included and written on a case-by-case basis. For many permittees, the specifics of a trading program may not be complete when a permit is issued or renewed. In fact, many permits may include trading as one treatment option, but lack the details related to that trading program at the time of permit issuance. Moreover, many other similar programs (i.e., biosolids, reuse water) are not detailed in full in the permit. Permit

writers will need to consider how much detail on trading is needed in the special condition at the time of issuance; this determination will likely hinge on the amount of time a permittee has spent considering a trading alternative prior to the issuance of its permit. Overall, the special condition should at least provide an outline of the type of detail needed for that permittee to develop and implement a program that meets its effluent limit.

Compliance with a special condition is often determined by whether the permittee has developed the program on the time schedule established in the permit. In a trading program this may include program monitoring, credit verification, credit life, etc. A special condition might also define the trading elements that the permittee must report annually to the permitting agency or a requirement to retain data in a report maintained within its files for a specific period of time.

d(2). Detailed trading program need not appear in the permit. However, a deadline to develop the detailed trading program plan should be in the permit if this is the selected option.

Draft Best Practice – Timeline to develop trading plan: *The detailed trading program need not be included within the permit so long as regulators provide public review and comment on the more detailed program once it has been fully developed. If the permittee's trading program is not included explicitly in the permit, the permit should specify where that detailed trading program plan will be publicly available. It is preferable to post the detailed trading program plan in the state's searchable NPDES permit database.*

If the permittee has not yet developed its detailed trading program by the date of permit issuance, it must, by some date certain identified in the permit's compliance schedule, fully develop its trading program, and the public must be provided adequate opportunity to review and comment on the trading program.

Commentary: For many permittees, the specifics of a trading program may not be complete when a permit is issued or renewed. Even if all program details are not included in the permit, the permittee should still be allowed to include trading as a treatment option provided that it is obligated to develop a detailed trading program by a particular date in time. A permittee needs to have a detailed trading program in place and approved by the agency before any trades can be used to offset a discharge in exceedance of its permit limit. Although it is generally understood that changes to required programs are modifications requiring public review, the permit should explicitly note that upon completion of the detailed trading program, the public will be afforded an opportunity to comment on the trading program.

d(3). Reporting obligations beyond DMR submission

Draft Best Practice – Reporting beyond DMB submission: *In addition to the submission of DMRs to the water quality agency, the Special Conditions section of a permit may also require a*

permittee to compile an annual trading program summary report. This report would detail the overall performance of the permittee's trading program. The permit or the attached trading program plan should specify where the public can access this information (e.g., permittee's office or agency website, or on-file in a particular location).

If the permittee is required to verify the implementation and/or performance of each of its credit-generating projects, the Special Conditions permit section or attached trading program document should specifically note where the individual project site reports can be found (e.g., at permittee facility, or on a publicly available website).

Commentary: The water quality permitting agency should require a permittee to submit credit quantities obtained on the monthly DMRs. Some states may have additional reporting requirements for a trading program. For example, requirements may extend to performance reporting of individual credit-generating BMPs to show that each BMP is achieving the requirements of the program (i.e., meeting particular quality or performance standards identified for that action) and generating the water quality benefits that offset the permittee's effluent limitation. These reports are important because they provide confidence that the credits reported on the DMR are performing as expected. This kind of project performance reporting is typically part of ongoing credit verification (described in Section 7.4), which indicates that credits remain valid and available for use. The permittee need not report this type of information in a DMR, but regulatory agencies may require this type of reporting via other special conditions within the permit.

Program and project site reports may then be more appropriately included in an annual report covering all credit-generating activity. The permit writer should request that a permittee develop and retain a report that examines this more detailed project level data. The permit and/or the attached trading program plan should detail where the public can find the necessary documents. If agencies require permittees to submit these reports, they should ensure that they have the resources to review those reports. In some cases, an agency's inability to review a submitted report has been interpreted as tacit approval by the agency.

Monitoring that is conducted to determine overall program effectiveness , although important to the long-term refinement of models and the trading program, is not necessarily data the regulatory agency needs in a DMR (unless it demonstrates noncompliance by particular sources). However, this broader trading program data still needs to be generated, reviewed, and acted upon if it shows that overall, credit-generating projects are not meeting trading program requirements. As such, even if it is not included in the monitoring section of the permit, this general program data should still be collected, documented, and used to improve the program. *See* Section 11.3 for further discussion of programmatic effectiveness monitoring.

e. General Conditions

Code of Federal Regulations (C.F.R.) 40 parts 122.41 and 122.42 contain a description of the general permit conditions applicable to all NPDES permits. These parts include such things as the duty to comply, the duty to mitigate, proper facility operation and maintenance, monitoring reports, monitoring and records, etc. These general conditions are largely included in every permit, but depending on each state or EPA permit outline, they may appear in different sections of the permit.

Draft Best Practice – General Conditions: *The permit should contain those conditions identified in 40 C.F.R. pts 122.41 and 122.42. The permittee should review these general conditions and be aware of the reporting and records retention requirements for data generated under an NPDES permit and how it affects its trading program.*

Commentary: The general condition section of an NPDES permit is essentially the same in all permits regardless of whether the permit contains a trading program or not. However, it should be clear to the permittee and permit writer as to how these general conditions affect the work conducted under an included trading program. For example, if data is collected at a specific trading project site, this data should to be retained and/or submitted to the permittee and then to the permit issuing agency.

f. Liability for project performance

Draft Best Practice – Liability for project performance*: Although the project developer is responsible for generating annual performance reports for project sites (see Section 7.4), ultimate responsibility for the functioning of project sites rests with the permittee. The permittee's recourse against a project developer that fails to perform rests in contract law. A project developer's breach of contract will not generally be deemed a permit violation if the breach is beyond the reasonable control of the permittee.*

Commentary: Permittees who rely on trading as a compliance mechanism often are reliant on third party project developers to produce the credits needed for permittee compliance. The permittee is ultimately responsible for meeting its permit limits. Therefore, if a permittee has a shortage of credits because of project failure (and credits are temporarily or permanently disqualified by the program administrator), a regulatory agency may choose to commence an enforcement action for non-compliance against the permitee. Similar to a traditional technology solution, where a credit shortage is beyond the reasonable control of a permittee, the project developer's breach of contract (in terms of providing sufficient credits) would not generally be deemed a violation of the permit. The onus is therefore on the permittee to select credible project developers. If a project developer is known to provide lower quality work, permittees cannot simply plead ignorance to avoid an enforcement action.

1.2.2 NPDES Permit Variances

Trading may occur by way of variances. Variances are authorized by federal regulations,[29] but are implemented through EPA-approved state regulations and guidance. If a permittee uses a variance, new requirements will need to be added throughout the permit. If trading is utilized as part of variance progress, these additional requirements may need to be tailored specifically to trading.

Draft Best Practice – Trading under NPDES permit variances: *If trading is to occur according to an approved variance, the permit should adequately explain how trading will occur in support of the variance. In particular, the Effluent Limit section of a permit should note that the permit limit is based on a variance and not the underlying water quality standard, note the duration of the variance (as compared to the trading program duration), and note that the permittee will follow the attached, approved pollution reduction plan associated with the variance. This plan will likely outline trading as an alternative for complying with the variance. The Special Conditions section of the permit should note that the permittee must comply with the attached pollutant reduction plan, which may include trading. The Monitoring section of the permit may require additional monitoring actions related to trading and variance progress, and may require an annual progress report.*

Commentary: none

1.2.3 Section 401 Certifications

Trading may also occur in conjunction with a CWA section 401 certification. Under this provision, if a federal permit or license applicant plans to undertake any activity (including facility construction or operation) that may result in any discharge into navigable waters, it must first obtain a certification from the relevant state certifying that the discharge will comply with select provisions of the CWA.[30] Regulators often have significant discretion to condition 401 certifications on mitigation or other measures, which could include trading.

Draft Best Practice – Trading under 401 certifications: *401 certifications that include trading should follow the draft best practices related to NPDES permits that are applicable.*

Commentary: none

1.3 Eligible credit buyers

Draft Best Practice – Eligible credit buyers*: Provided that it is in compliance with applicable*

[29] "States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances. Such policies are subject to EPA review and approval." 40 C.F.R. § 131.13.

[30] 33 U.S.C. § 1341(a)(1).

federal and state technology-based effluent limits, mixing zone and near-field requirements, and permit conditions, a point source may obtain credits to achieve water quality based effluent limits (WQBELs) from a nonpoint or point source seller of credits. As noted in the 2003 U.S. EPA Trading Policy, trading may not be used by point sources to achieve new or revised technology-based effluent guidelines or regulations unless explicitly authorized by state and/or EPA regulations. Where accepted by the relevant regulatory agency, public and private entities may also purchase quantified water quality outcomes (i.e., credits or equivalent) to meet other mitigation obligations (e.g., Endangered Species Act (ESA) Biological Assessment of Biological Opinion mitigation, Safe Drinking Water Act (SDWA) compliance, judicial or administrative consent decrees or orders), or to retire for net environmental gain.

Commentary: There are three types of water quality trades: point-point trades, point-nonpoint trades, and nonpoint-nonpoint trades. The focus of this regional agreement is primarily on point-nonpoint trades. Each permittee or buyer must meet certain, nonnegotiable conditions pursuant to state and federal law and guidance before they may be eligible to purchase credits.

U.S. EPA's 2003 Trading Policy recommends that "states and tribes consider the role of compliance history in determining source eligibility to participate in trading." 68 Fed. Reg. at 1612. In general, point sources should be in compliance with their current permit and/or any agency-approved schedule for compliance for the pollutant desired for trading. Trading may not be an option for a facility with a history of repeated, significant violations (e.g., criminal violations/convictions). Trading can be used to help a facility, with an otherwise good track record for compliance, come into compliance with a specific permit limit targeted by a trade (e.g., nutrient or temperature exceedances). In those cases, trading may need to be authorized under a particular enforcement agreement.

Prior to trading, a point source buyer must also demonstrate that it is not creating near-field or localized impacts, except as allowed in regulatory mixing zones. "EPA does not support any trading activity that would exceed an acute aquatic life criteria within a mixing zone or a chronic aquatic life or human health criteria at the edge of a mixing zone using design flows specified in the water quality standards." 68 Fed. Reg. at 1610. In this assessment, agencies should consider whether trading in this instance will comply with the Endangered Species Act and other species and habitat protection laws. Agencies should also consider whether or not trading will degrade groundwater in violation of any applicable state water quality regulations.

U.S. EPA does not support a point source trading to meet its technology-based effluent limits (TBELs) unless doing so is explicitly authorized in 40 C.F.R. § 420.03. 68 Fed. Reg. at 1610 – 1611. Some states may not support the use of trading to meet TBELs in any situation.

Finally, in addition to credits used for permit compliance, entities are not precluded from purchasing quantified water quality improvements to satisfy other mitigation requirements,

where approved by the relevant regulatory agency. This may include supplemental environmental project (SEP)[31] obligations stemming from civil penalty actions, and other CWA, ESA, SDWA or criminal/civil mitigation requirements—or to retire for net environmental gain. Any such purchases would need to comply with appropriate statutes, rules and guidance on the use of such funds, and would need to satisfy additionality concerns and other requirements associated with generating credits.

1.4 Trading area

Trading areas define the geographical boundaries within which buyers and sellers can trade.

Draft Best Practice – Eligible trading areas: *"All water quality trading should occur within a watershed or a defined area for which a TMDL has been approved." 68 Fed. Reg. at 1610. Within this hydrologically connected area, trades, by default, should occur upstream of a point of compliance, ideally in conformance with a point of concern defined in the TMDL (or another cumulative assessment of the watershed). Additionally, trades must occur within waters listed for the same beneficial use(s) as the waters into which the point source is discharging (e.g., if the pollutant is temperature for rearing salmonids - -the trade must benefit rearing salmonids in the same watershed).*

Commentary: "Establishing defined trading areas that coincide with a watershed *or* TMDL boundary results in trades that affect the same water body or stream segment and helps ensure that water quality standards are maintained or achieved throughout the trading area and contiguous waters." 68 Fed. Reg. at 1610 (emphasis added). Economically, larger trading areas likely facilitate an increase in the number of potential buyers and sellers who may engage in trading. Ecologically, however, nonpoint source credit production should be sourced from areas that can best address needed water quality improvements. Point sources may choose to purchase credits within a smaller area than what is defined by a trading area for a variety of non-compliance related reasons (e.g., a city may prefer to buy credits within its boundaries for civic reasons; credits may be purchased from particular areas in high need of ecological improvement and investment). Whatever the size of the trading area a clear link should exist between the credited pollution reduction and the entity ultimately using those credits.

[31] A supplemental environmental project (SEP) is an environmentally beneficial project which a violator voluntarily agrees to perform as part of a settlement of a civil penalty to offset some portion of the monetary penalty. In return, EPA agrees to reduce the monetary penalty that would otherwise apply as a result of the violation(s). SEPs are guided by several factors: First, the project must have a direct relationship, or "nexus," to the violation. Second, up to 80% of the value of the SEP can be applied towards the penalty amount unless the project is of "outstanding" quality, meaning that SEPs are often not pursued because a violator has to pay the remaining 20%. Third, the EPA cannot collect or manage any of SEP funds. Last, there are federal restrictions on how the funds may be designated. Memorandum from Steven Herman, Assistant Administrator, U.S. EPA, to Regional Administrators, Issuance of Final Supplemental Environmental Projects Policy (1998).

1.5 Eligible pollutants for trading

Draft Best Practice – Eligible pollutants for trading: *Pollutants currently eligible for trading include nutrients, oxygen-demanding parameters, sediment, and temperature. For each of these pollutants, the default units, pollutant form, and seasonality will be defined in a NPDES permit. Other eligible pollutants may be considered by EPA and the states for trading on a case-by-case basis.*

Commentary: Not all pollutants are identified as eligible for trading pursuant to U.S. EPA's 2003 Trading Policy. 68 Fed. Reg. at 1609 (encouraging programs for nutrients, sediments and other pollutants). However, "EPA recognizes that trading of pollutants other than nutrients and sediments has the potential to improve water quality and achieve ancillary environmental benefits if trades and trading programs are properly designed." Id. at 1610. Because the 2003 U.S. EPA Trading Policy did not mention temperature, participants in the Joint Regional Agreement process believe that it is important to include discussion of temperature as an eligible pollutant in addition to what is already mentioned therein. Most trading programs to date around the country have focused on phosphorous and nutrients, with temperature trades taking place primarily in Oregon.

"Clearly defined units of trade are [also] necessary for trading to occur. Pollutant specific credits are examples of tradable units for water quality trading. These may be expressed in rates or mass per unit time as appropriate to be consistent with the time periods that are used to determine compliance with NPDES permit limitations or other regulatory requirements." 68 Fed. Reg. at 1612. Each trading program needs to define its own standardized units of trade. It is difficult to set these standard units (e.g., a phosphorous credit is a pound of total phosphorous reduced per year—lbs TP/yr) at a regional scale because of differences in local watershed conditions and state water quality standards.

1.6 Eligible credit-generating actions and BMP Guidelines

Draft Best Practice – Eligible credit-generating actions: *Conservation or management actions, known as best management practices (BMPs), which generate credits must be quantifiable and verifiable. A list of BMPs that are eligible for generating credits should be provided by the relevant water quality agency.*

Draft Best Practice – BMP guidelines: *Each eligible BMP should include a guideline that defines: A) an approved quantification method, B) the appropriate pre-project site condition to use for calculating the reduction, C) installation and maintenance quality standards, and D) ongoing performance standards to ensure that each BMP is consistently achieving the desired water quality improvements. As appropriate, agencies may choose to assign differing uncertainty ratios (discussed in Section 4.1) to each BMP.*

Commentary: Not all BMPs will be eligible to generate credits for a given pollutant, watershed, land use type, state, etc. Existing BMPs also vary in the specificity of guidance available for BMP design and maintenance and the accuracy of available quantification methods. The development of a non-exhaustive list of eligible BMPs by agencies and the EPA will lend confidence to those actions that are approved to generate credits. Other components of BMPs will similarly be improved through such a process (e.g., criteria for effectiveness, design and maintenance standards, project implementation, and performance standards). As guidelines are developed for new or additional BMPs, there should be a process in place for each agency to review, reject, or approve/add new BMPs. Determining baseline pollution reduction requirements and conditions for BMPs is discussed separately in Section 2.

Components of a BMP guideline for a practice eligible for trading should include:

- A description of the BMP and how it works;
- technical summary of quantification method, as described in the draft best practice for quantifying net uplift;
- procedures for applying and documenting application of the quantification methodology;
- where the BMP should be applied (appropriate site conditions);
- potential side effects and ancillary benefits;
- design, installation, operation, and maintenance requirements;
- monitoring requirements and performance standards;
- procedures for validating and verifying credits; and
- substantiating information.

Additional detail on recommended components of a BMP Guideline is provided in Appendix A.

1.7 Approving new and modified best management practices

This section describes elements of a general process for receiving and processing requests to approve new Best Management Practices (BMPs) or modify existing BMPs for eligibility in trading programs. The general architecture of a process for approving new or modifying existing BMPs includes pre-proposal, practice review, and approval phases.

Draft Best Practice – Process for approving BMPs for trading*: To ensure the quality and transparency of BMPs that are used to generate water quality credits, a state agency or approved third party may provide a process for formal review and approval of BMPs to be used in trading programs.*

Commentary: Not all BMPs are appropriate for generating credits; it's important to develop a system that can evaluate and incorporate those BMPs that are effective in improving water quality and can be reliably quantified into credits. As new BMPs or modifications to existing

BMPs are proposed, states should seek to review and evaluate these proposals in a timely manner.

The scale at which BMPs are approved as eligible for trading will vary. In some cases, BMPs may be designated as eligible for trading statewide to avoid redundant evaluation of BMPs that are known to be widely applicable. Programs may also consider approving BMPs for trading at the watershed level, particularly where the applicability of available information around the BMP is limited to that specific geography or in an NPDES permit where the offset is for a new discharger. A tiered approach would involve selecting BMPs for use in a specific watershed's trading program from a larger list of BMPs that have been approved for trading at the statewide level. Review bodies may differ across states.

1.7.1 Pre-proposal

Draft Best Practice – Pre-proposal for BMP approval*: A state agency or approved third party may screen a proposed BMP before initiating formal practice review. If proposal screening occurs, and the screener determines that a proposed BMP will fail to qualify for formal practice review, the screener should notify the BMP proponent of this failure and provide overall feedback, recommendations for revision, and instructions for resubmission of the BMP proposal.*

Commentary: A water quality trading program may receive numerous requests to evaluate specific BMPs for inclusion in the program. A pre-proposal phase allows agencies to provide practice proponents with guidance early on, weed out inappropriate proposals, and prioritize requests so that most effective BMPs are identified and supported for use.

States should provide clear guidance on the information that must be provided for pre-proposal submissions. Requiring more information early on will give reviewers a better understanding of the proposed practice and may ensure that practice proponents are committed to the process. However, more information also increases the risk, time and resources a BMP proponent must invest in a pre-proposal, thus increasing the risk of the phase for a BMP proponent. States should also provide guidance on the evaluation criteria that will be applied and reasons why a BMP might be rejected. Rejection at the pre-proposal phase may result because the BMP is not consistent with broader watershed goals, the science necessary to support reliable credit quantification is not available, the practice does not create a net positive impact (e.g., load of the target pollutant moves elsewhere, or loading of another pollutant increases) or simply because the proposal was incomplete.

1.7.2 Practice review

Draft Best Practice – Review of BMPs: *After a BMP qualifies for formal review, the agency, designated third party, and/or relevant technical workgroup may convene a review panel representing expertise on the relevant practice, geography, and pollutant(s). The BMP proponent would then submit a BMP package to the expert panel for formal review.*

Commentary: Evaluating BMP for trading can involve significant work to develop definitions, quantification metrics, and monitoring frameworks, all of which will also need to be reviewed and evaluated.

States should provide clear guidance on what information a BMP proponent must submit and who is responsible for developing that information (e.g., the BMP proponent or agency staff). Clear expectations may help reduce costs and confusion while increasing the overall pace towards approval. In most cases, information developed to support BMP review should address all the components of a BMP Guideline, as described in Section 1.6 and further detailed in Appendix A.

In some states, review and technical analysis may be conducted internally, while in others, stakeholders and outside experts will play a role in both the review and technical analysis. Where external experts are engaged in BMP review, states should provide clear guidance on the necessary qualifications of those experts and the process through which they are chosen. As necessary, the review panel may provide review and guidance to the BMP proponent, which may prompt modifications, further research, and/or field testing, before the BMP is recommended for approval.

1.7.3 Practice approval

Draft Best Practice – Approval of BMPs: *The decision to approve a new BMP or modification of an existing BMP should document confirmation that review has occurred according to the process followed in the relevant state, an assessment of the review panel's recommendation, and confirmation that all necessary documentation is in place.*

Commentary: none

2. Determining Baseline & Additionality Requirements (Placeholder)

The draft best practices around Baseline & Additionality Requirements will be incorporated upon review and further discussion with agency staff. These draft best practices have been provided separately in the materials for the December 2013 interagency workshop along with a memo covering the underlying research and legal analysis. Draft Best Practices for this section include:

2.1 Implementing Baseline in Trading

This section discusses the implementation of Regulatory Baseline and TMDL-Derived Baseline in a trading program, include (2.2.1) how TMDLs may be implemented and developed so as to allow for easier calculation and implementation of TMDL-Derived Baseline at the site-specific level, and (2.1.2-2.1.2) how phased nonpoint source excess load reduction targets may be incorporated into TMDLs, including details related to implementation timing and sequencing, site-specific reductions and BMPs, and TMDL-Derived Baseline.

2.2 Details Related to Regulatory Baseline and TMDL-Derived Baseline at Individual Project Sites

This section outlines several aspects of Regulatory Baseline and TMDL-Derived Baseline implementation at individual project sites, including (2.2.1) programmatic base year for establishing pre-project site conditions, (2.2.2) how Baseline can be expressed, (2.2.3) individual vs. group-level attainment of Baseline requirements, (2.2.4) sequencing of Baseline and credit generating activities, (2.2.5) additionality/business-as-usual at project sites, and (2.2.6) use of cost-share and conservation funding toward meeting Regulatory Baseline requirements.

3. Quantifying Net Uplift

Credit quantification relies on the best available science to predict and/or measure the pollution reduction from BMPs implemented (i.e., "net uplift"). Net uplift is the environmental improvement directly attributable to the credit-generating actions, and is used as the basis for determining the available credits, where credit quantity may also include incorporating baseline or eligibility requirements, trading ratios, etc. Net uplift is calculated by subtracting the pollution load associated with the post-project site conditions (i.e., "post-project performance") from the load associated with the pre-project site conditions (i.e., "pre-project performance"). Represented as an equation

Net uplift = post-project performance – pre-project performance

This calculation typically occurs using one or more of the following types of quantification methods: modeling, pre-determined rates/ratios, and direct monitoring.: In some cases, additional calculations are then used to estimate how much of the pollutant is transported from the edge of the field where it is generated to a point of concern downstream. The physical and biological processes by which nutrient load is reduced as it travels between two points is known as "attenuation." In this case, the net uplift quantification can be represented as:

Net uplift = (post-project performance – pre-project performance) attenuation*

Net uplift is then reduced by applicable Baseline requirements, and may be multiplied by trading ratios or retirement pool requirements in order to determine the number of credits that can be sold from a project site.

The best practices below discuss 1) characteristics of quantification methods that may be used to quantify credits in a trading program; 2) scenarios in which each type of quantification method is most appropriate; and 3) a process for selecting, calibrating, validating, and approving quantification methods for specific trading programs.

3.1 Characteristics of a credit quantification method

***Draft Best Practice – Quantification methods**: Quantification methods should be repeatable, sensitive, accurate, practical, and transparent. Methods that have a longer history of usage and application and a documented track record are preferred where available. Documentation of approved methods should include a thorough review of technical basis, procedures for consistent application, and a plan for improving the method over time. Methods and associated documentation should be publicly available, and, where feasible, vetted through a public- and peer-reviewed process.*

Commentary: The following was adapted from Willamette Partnership's *In It Together* (Vol. 2, p.20).[32] A quantification method for water quality trading should be:

- *Accurate*: representative of true pollution load reductions. Assessments of uncertainty, like reporting confidence intervals associated with model results, can help to represent the level of accuracy;
- *Repeatable*: if different people apply the method using the same data, location, and factors, the model will deliver the same result (i.e., not overly subjective). Protocols or user guidance can greatly improve the consistency with which a method is applied;
- *Sensitive*: variation in quantified credits reflects actual differences in the water quality indicators being measured, and not stochastic or background variation; and
- *Transparent*: easy to understand and well-documented relationship of inputs/indicators to the overall estimate of pollution reduction. Ideally, methods are well vetted in the scientific community and posted in the public domain for use by anyone without charge.

A quantification method should also be practical and economical to set up and apply, easy to use for the targeted user group, and compatible with other relevant models (e.g., TMDL models) so that its outputs can plug easily into evaluations of overall program performance.

Adaptive management of quantification methods: Quantification tools can always be improved, and sometimes the best way to improve them is through use. In addition to confirming that projects are in place and conforming to quality and performance standards, trading programs should seek to monitor a representative subset of projects and that the data needed to improve quantification tools over time is collected. The data needed to validate quantification tools/models can be collected by a number of measurement strategies (e.g., installing direct measurement devices at a representative number of sample project sites). For nutrients, appropriate model validation data might include various types of water and soil samples, and flow discharges. For temperature, appropriate data might include characterizations of shade-generating features on the project site (e.g. riparian vegetation type), measurements of effective shade, and/or upstream and downstream temperature measurements. Importantly, this data would <u>not</u> be used to determine compliance for the permittee purchasing credits, but would only be used to improve the models/quantification tools that drive the trading program.

3.2 <u>Standard methods quantifying water quality improvements for trading</u>

[32] Willamette Partnership, USDA Office of Environmental Markets, Pinchot Institute for Conservation, and World Resources Institute, In it Together: A How-to Reference for Building Point-Nonpoint Water Quality Trading Programs (2012), *available at* http://willamettepartnership.org/in-it-together.

Quantification methods can be grouped into three general types: pre-determined rates/ratios, modeling, and direct monitoring.

A. Predetermined rates: This approach involves setting standard values for water quality improvement based on the best available science. These values are often expressed as ratios/percentages (e.g., 50% of the phosphorus load will attenuate between points A and B), or absolute loads (e.g., use of cover crop will reduce sediment loading by 35%). Some rates are grounded in extensive research and modeling, while others are adapted from relevant literature.

B. Modeling: This approach involves predicting the fate of pollutants using mathematical simulation procedures. Many water quality trading programs use modeling to estimate net uplift and attenuation of pollutants.

C. Direct measurement: This approach includes monitoring of both water chemistry (e.g., river turbidity or temperature) and surrogates for water quality (e.g., eroding stream banks or shade from riparian vegetation). It is often used for ambient water quality monitoring at the reach- or watershed-scale, and serves as an important tool for calibrating and validating models. Direct monitoring is not typically used to quantify water quality credits in trading programs because it is both difficult to causally link BMPs to measurable improvements at a single site, and it is the most costly measurement system to implement.

Draft Best Practice – Use of standard approaches to quantifying uplift*: Trading programs should have standard methods or models for quantifying net uplift, and should clearly state which versions of the method(s) are approved for use. Quantification methods selected should be those used to develop a TMDL or should be consistent with the approaches used in a TMDL. Methods should also be well-referenced and well-documented. Where a permittee commits to using an approved method and version, the regulator overseeing the trading program should continue to support (e.g., provide guidance on data collection, troubleshooting for calculations, etc.) that version for a set period of time (e.g., one permit cycle).*

Draft Best Practice – Types of quantification methods*: Trading programs should use the most appropriate method to quantify credits. The types of available methods to choose from include: A) use of pre-determined pollution reduction rates; B) use of water quality models; and C) use of direct monitoring. Where standard methods do not apply, trading programs may also consider* project-specific water quality improvement or load reduction estimates.

A. Pre-determined pollution reduction rates are the most appropriate method for quantifying credits where sufficient data exist to develop these rates for a specific basin. Justification for pre-determined rates should include documentation of how the rates were selected, why those rates are appropriate for/transferable to the proposed trading geography and conditions, and some guidance/analysis about the likely sources of variation in performance of those BMPs based on local conditions. Prior to approving

pre-determined rates, state agencies should perform a technical review and formal approval similar to that described for modeling approaches.

B. *Water quality models are the most appropriate method for quantifying credits when data are not sufficient to develop location-specific pre-determined pollution reduction rates for individual BMPs. Water quality models are also most appropriate when credits are based on water quality improvements attenuated from points of generation to points of compliance or concern. Models should undergo calibration and validation based on best available water quality monitoring data, as well as technical review, before being approved by state agencies for use in trading programs.*

C. *Direct monitoring may be an appropriate method for quantifying credits in those cases where the project developer can "control" enough of the factors shaping water quality to show a measurable improvement in water quality (e.g., improvements across an irrigation district where inputs and outputs can be closely monitored in one or a set number of ditches and drains). To use direct monitoring, a program must require a clear monitoring/sampling plan and a quality assurance plan approved by the state agency, or its designee. The project developer needs to use instrumentation capable of capturing water quality samples at intervals frequent enough to: A) create an estimate of average water quality improvement over a specified time (e.g., year, season, or month), and B) produce estimates of variation within that time period.*

Where standard quantification methods are inappropriate or insufficient, such as for unique, large-scale restoration efforts (e.g., large-scale treatment wetlands or floodplain connectivity), it may be most appropriate to develop a project-specific calculation of water quality improvement/ load reduction. Project-specific methods must meet the same standards (e.g., repeatable, sensitive, transparent, and ideally vetted through a public- and peer-reviewed process) that are applied to program-approved models and tools. Review of these projects will require significant effort by agency staff, and so is likely most appropriate for projects that will already require substantial design and review, and will generate substantial water quality improvements. If the action is regularly implemented, project specific calculation methods may be adopted as trading program-approved quantification techniques provided that the calculation proves to be robust and can be appropriately applied beyond the original project location.

Commentary: There are considerations associated with each type of quantification method.

A. Pre-determined rates:

BMP effectiveness rates provide a high level of repeatability and predictability in a trading program, because there is no need to verify user-determined inputs into models, or worry about errors in direct monitoring data collection. Yet, BMP efficiency rates by themselves are not as sensitive to site-specific conditions as modeling approaches. Many of these rates are also only relevant in the local geographic area for which they were developed.

Start-up costs to generate these rates may be high where relevant studies or modeled values are not available, but the cost of maintaining the approach over time is likely to be low. Ongoing costs would be associated with obtaining the long-term data necessary to evaluate and improve attenuation rates or absolute load reduction.

If pre-determined rates are used, they should be tailored to the region or watershed of use. Rates should not be transferred beyond their region of development (i.e., rates developed for nutrient trading in the Chesapeake Bay should not be applied to trading in the Puget Sound). Instead, the methods to develop those rates should be applied to generate contextually appropriate rates calculated for the new geographic area. When predetermined rates cannot be tailored to the region of application, this quantification method is not recommended because results will likely be too coarse.

B. Modeling

Where existing models can suit program needs, and where sufficient local data is available for calibration and validation, models can provide more site-specific information than pre-determined BMP effectiveness rates. Selection and review of modeling approaches may occur by: 1) identifying methods that fit the intended uses, users, and evaluation criteria; 2) adaptation to local conditions; 3) technical review; and 4) formal approval.

1. *Identify relevant methods*: at the most basic level, a model needs to deliver outputs in useful units. For water quality trading, this means model outputs should be expressed or convertible to the same units as the regulatory water quality standard, or its surrogate targets. These units are typically expressed as load (e.g., lbs), on a timescale that is monthly or finer (e.g., seasonal outputs that can correspond with seasonal load limits), though annual averages may also be appropriate. A model also needs to operate at an appropriate geographic scale and resolution: models for estimating field-scale pollutant reductions and those for delivering pollutants from the field to the waterbody will typically need to work for a 1–3 acre field up to a 300–3,000 acre field. Attenuation models should be applicable to the size of the area that needs to be evaluated—this may be a stream reach (i.e., “reach-scale”) or a watershed (i.e., “watershed- scale”)— and should accommodate multiple inputs and outputs to better reflect cumulative patterns and loading processes.

   It may be difficult to find the perfect model that meets all of these criteria and the criteria for all quantification methods (accurate, sensitive, repeatible, transparent, and practical). Depending on the program’s objectives, trading program administrators will usually have to make some tradeoffs in selecting and adapting models. For example, models that are more complex may more accurately represent the dynamics driving water quality changes, but that complexity may also make them harder to use and therefore less transparent.

2. *Adapt to local conditions (Calibrate)*: model parameters must be adjusted to better match local conditions. Ideally, calibration occurs using measured water quality data

from various locations in the watershed, including a representative set of project sites. Calibration may also require the development and integratation of standard datasets for the local area (e.g., soils, climate, and crop management), or alteration of the coefficents for certain model parameters based on expert judgement.

3. *Technical review (Validate):* model outputs or other methods must be confirmed as meeting evaluation criteria (accurate, repeatible, sensitive, transparent). Often, validation includes comparison of model results with measured data, sensitivity analyses, and uncertainty analyses. Validation may also include a comparision with other model outputs, literature values, and/or expert judgement. Where measured data is not available to validate accuracy, adapative management and monitoring to improve the model over the time is particularly important—*see* Section 11 (discussing adapative management). An analysis of uncertainty in model estimates provides important information when validating accuracy. Modeling uncertainty should be accounted for in credit quantification or as a trading ratio. Trading Ratios are discussed in Section 4.1.

   Model validation may be an internal process or may be conducted by an independent entity. In either case, results of the technical review should be made publicly available and incorporated into technical documentation as possible (i.e., publishing of results in peer-reviewed scientific literature).

4. *Formal Approval*: approval might come in the form of inclusion of the tool within state guidance, an approval letter from the state water quality agency and/or EPA, or approval to use the tool within a particular permit.

C. Direct measurement

Where direct measurement is employed, 1) instrumentation needs to be objectively verifiable—a verifier can confirm that the instrument is appropriate for the purpose, installed and calibrated correctly, and producing adequate results; 2) records need to be kept for each sample taken, including date, time, method of data collection, and results; and 3) state agencies would need to perform a technical review and formal approval of the monitoring/sampling plan or quality control report.

Direct measurement has a very important role to play in terms of effectiveness monitoring and as a basis for adaptive management, but may not be the best approach for initial uplift quantification in many cases. If direct monitoring is used at even a few project sites, the data gathered should be used to improve modeled results over time (i.e., creation of feedback loop).

3.3 Components/scales of quantifying net uplift

Estimating net uplift often involves multiple tools or models, operating at multiple scales. Appropriate models for use at each scale should be identified by the trading program. Not all trading programs will require uplift estimates at each scale.

1. Field-scale: The foundation of any uplift quantification is an estimate of the pollution load occurring on a given site or field, and the change in that load resulting from BMP implementation. Nutrient and sediment models that operate at the field-scale are often referred to as "edge-of-field" models because they provide estimates of the pollutant load within runoff from the down-slope edge of the field being evaluated.
2. Delivery from the field to the waterbody: In some cases, it is then necessary to understand how much of the pollutant load is delivered from the field into the waterbody (e.g., where a BMP is installed in a location that is separated from the nearest ditch or stream by another field or landcover type). Where a trading program includes these scenarios, it may use a quantification method that can estimate the dynamics of run-off across multiple landcover types.
3. Delivery to a downstream point of concern (i.e. "instream attenuation"): Instream attenuation of pollutants accounts for the change in pollutant quantity as it moves from a point upstream to a point downstream, such as from the location of an installed BMP to the point of concern in a TMDL, or point of compliance for the permittee. Watershed-scale or instream models are appropriate for this application. In some cases, instream attenuation is estimated on a project-by-project basis. In other cases, standard ratios are developed (based on measured data or model simulations) to describe attenuation from various portions of the watershed to the point of concern.

Not all components of quantification are necessary for every program or every trade. For example, once field-scale delivery is estimated, 100% delivery to water body or some other ratio might be assumed rather than using a field-to-waterbody model. Utilizing multiple quantification methods increases the technical burden on those reviewing and approving quantification methods, as well as on those applying them to calculate uplift. Trading programs should balance these practical considerations with the extent to which each component of the uplift calculation impacts overall accuracy.

3.3.1 Quantifying conditions at the field-scale

Draft Best Practice – Field-scale quantification*: Each trading program should identify one or more standardized method(s) to quantify the pollution reductions for BMPs at the field-scale. Where possible, these methods should synchronize with the reach and/or watershed models used in the TMDL so as to enable tracking of progress toward TMDL goals.*

Commentary: There are a number of field-scale quantification methods that may support trading in the Pacific Northwest:

1. *Nutrients:* Hydrologic characterization tool (developed by University of Idaho); Agricultural Policy Extender (APEX); Nutrient Tracking Tool; BMP efficiency rates

(e.g., those explored for Spokane); Spreadsheet Tool for the Estimating Pollutant Load (STEP-L).

2. *Sediments*: Surface Irrigation Soil Loss (SISL) model; Hydrologic characterization tool (developed by University of Idaho); STEP-L ; streambank erosion inventory (Idaho); Revised Universal Soil Loss Equation (RUSLE).

3. *Temperature*: Heat Source modules and extensions--Shade-a-lator (OR, ID); Shade (WA, similar to Shade-a-lator); QUAL-2K; CE-QUAL-W2; HEC-RAS; Potential Natural Vegetation (PNV) shade analysis; W3T to quantify temperature benefits of in-stream flow (in development by National Fish and Wildlife Foundation).

3.3.2 Delivering pollutants from the edge-of-field into the waterbody

Not all nonpoint source land is directly adjacent to a stream, and not all pollutants will transfer from the edge of a field into the nearest waterbody. Some trading programs have assumed that 100% of pollutants leaving the edge of a field adjacent to stream reach the water column. Other trading programs have used delivery ratios to determine the percentage of pollutant that reaches a waterbody. A growing number of programs are now using attenuation models to quantify the delivery of pollutants from the field into a waterbody, and between points in the watershed. [33]

Draft Best Practice – Accounting for pollutant delivery to the waterbody*: A calibrated and validated method or an approved delivery factor based in science is preferable, but a transparent surrogate for field-to-waterbody delivery such as location alongside a stream or other permanent water body may be considered. This component of uplift quantification may not be necessary for irrigation system BMPs where the hydrologic connection between the discharge water and receiving water body is direct or nearly so. However, for practices where the receiving waterbody is not immediately connected hydrologically to the field, a field-to-waterbody delivery factor may be necessary.*

Commentary: Accounting for the movement of pollutants from the point of generation into the waterbody is also sometimes discussed in the context of trading ratios.[34] The use of trading ratios is discussed in Section 4.1.

3.3.3 Attenuating pollutants downstream

[33] *See* EPRI, Pilot Trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Project, App. E-4, § 4.B (2009), *available at* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf (Section 8 on Credit Calculation Methodologies).

[34] *See* EPA, Water Quality Trading Toolkit for Permit Writers, at 30-31 (2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit_fundamentals.pdf.

This component of quantification is almost always based on models, often the same models that were used to develop the TMDL in a watershed. In some cases—either where there is no TMDL yet or where a TMDL is not sensitive enough to attenuate load reductions from a smaller nonpoint source—other models may need to be used.

Draft Best Practice – Accounting for pollutant attenuation*: Where the TMDL model is sensitive enough to model the attenuation of pollutants through a reach or watershed, those models should be used. If a TMDL or watershed model is not available or not applicable, another model should be selected based on appropriate model selection criteria. These models should be calibrated to the best available data, and should undergo technical review and state-agency approval processes.*

Commentary: Attenuation is often included in the TMDL models (e.g., the Chesapeake Bay Watershed Model),[35] and reflected in the credit calculations themselves (e.g., Nutrient Net as applied in the Chesapeake).[36] Attenuation may also be accounted for through a trading ratio, as suggested by the U.S. EPA Permit Writers Toolkit on Water Quality Trading.[37] The use of trading ratios is discussed in Section 4.1.

Incorporating attenuation through the watershed, through modeling or ratios, usually incentivizes action closer to the point of discharge, which may not always be appropriate or consistent with achieving watershed health. For example, Idaho's Lower Boise River program defined the mouth of the river near Parma, Idaho as the point of concern in a TMDL[38] because the highest value nutrient reductions came from irrigation canals downstream from point source dischargers but upstream from Parma. The Lower Boise program used attenuation ratios that gave more credit for reductions generated closer to Parma, even if they were downstream of the buyer, to more accurately reflect the benefit of those reductions. Below is a pollutant-specific list of some of the tools in use and/or available for use in trading in the region that can be applied to understand pollutant attenuation:

1. *Nutrients*: QUAL2K, QUAL2Kw, CE-QUAL-W2 and flow duration curves have been used in many nutrient TMDLs. Their ability to attenuate nutrients for trades is

[35] U.S. Environmental Protection Agency, Chesapeake Bay Program Office, Chesapeake Bay Phase 5.3 Community Watershed Model, EPA 903S10002 - CBP/TRS-303-10 (2010), *available at* http://www.chesapeakebay.net/about/programs/modeling/53.

[36] Branosky E, C. Jones and M. Selman, World Resources Institute, Comparison Tables of State Nutrient Trading Programs in the Chesapeake Bay Watershed: WRI Fact Sheet, at 10 (2011), *available at* http://www.wri.org/publication/comparison-tables-of-state-chesapeake-bay-nutrient-trading-programs.

[37] *See* EPA, Trading Toolkit, at 30-31 (2009)

[38] Idaho Dep't of Environmental Quality and Ross & Associates Environmental Consulting, Ltd., Lower Boise River Effluent Trading Demonstration Project: Summary of Participant Recommendations for a Trading Framework, at 12 (2000), *available at* http://www.deq.idaho.gov/water-quality/surface-water/pollutant-trading.aspx.

unclear. Other watershed models used or considered for use in trading include: Watershed Analysis Risk management Framework (WARMF), Better Assessment Science Integrating point & Non-point Sources (BASINS), and Soil and Water Assessment Tool (SWAT) can be considered for nutrient dynamics quantification.

2. *Sediment:* BASINS, Spatially Referenced Regressions On Watershed attributes (SPARROW), Watershed Erosion Predition Project (WEPP); and SWAT model suite also can be considered for sediment mobilisation and transport quantification.

3. *Temperature*: Heat Source, HEC-RAS, CE-QUAL-W2, Water Temperature Transaction Tool (W3T) to quantify temperature benefits of in-stream flow for small reaches (in development by National Fish and Wildlife Foundation)

3.4 Project site assessment

This section discusses how to develop and document the information necessary to input into the quantification methods (specifically pre-determined rates and models) discussed above, including the data/documentation necessary to establish pre-project conditions on a credit project site, and the post-project site conditions that will generate water quality benefits.

3.4.1 Pre-project site conditions assessment

To quantify credits, a project developer needs to understand conditions at the project site and operations within the recent past. This allows them to establish the "pre-project site conditions." This information is used to show that project activities are additional to current practices, and act as inputs when modeling the "pre-project site performance" as part of the credit calculation process. For example, if a multi-year crop rotation is employed at a potential project site, the project developer may need to look back over the last 3 – 5 years to obtain a comprehensive understanding of what practices have previously and are currently occurring at the site.

Trading programs should also consider how best to ensure that information about the pre-project site conditions is accurate. One approach is to require that project developers attest that the information is accurate; another is to require specific monitoring techniques be used for a given type of information (e.g., photopoint documentation of existing vegetation).

Draft Best Practice – Pre-project site conditions assessment*: Pre-project site conditions for calculating uplift are established based on site condition in the program's base year, prior to implementation of practices that will generate credits. Pre-project site conditions may be assessed during a site visit by a verification entity, but this may be costly and not necessary. If no site visit is conducted, a project developer should document pre-project site conditions using state-approved guidelines, where they exist, for each eligible BMP. For structural BMPs, "photo*

point monitoring" should be included to document pre-project site conditions. Project developers should collect this documentation and attest that the information is complete and accurate. During verification, this documentation is reviewed for completeness. For more complex projects, additional documentation of pre-project conditions may be required.

***Draft Best Practice – Documenting pre-project conditions in new trading programs**: At the outset of a program, the content, consistency, and quality of information that landowners have available is likely to vary widely. Thus, in the first 1 – 2 years of a trading program, some flexibility as to the rigor of required documentation may be appropriate because it may take time to establish and disseminate program expectations for documentation of current and recent operations.*

Commentary: The information required to document pre-project site conditions will vary depending on both the BMPs being proposed for credits and the type of pollutant credit being targeted. Some samples of information and documentation that may be required for specific BMPs are shown in Table 5.4.1 below.

There is a tradeoff between program costs and the level of confidence in documentation of pre-project site conditions, and ability to independently verify those conditions. Comprehensive documentation of site conditions will typically improve confidence in the pre-project site performance from which uplift calculations are developed and may simplify verification. However, comprehensive documentation requirements have transactional costs to project developers and ultimately to credit buyers.

Table 5.2.1. Example documentation for assessment of project site conditions.

BMP	Information/Documentation Required
Nutrient management	The Ohio River program requires three years of farm practice history, including fertilizer application quantities and rate/acre, including fertilizer brand and mixture.[39]
Riparian forest restoration	Current canopy cover, buffer width, stem density, species composition, invasive cover, and channel characteristics (e.g., wetted width). A map with location and extent of BMPs.[40]

[39] Electric Power Research Institute, Pilot trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Program, at 4 (2012), *available at* http://wqt.epri.com/overview.html.

[40] Willamette Partnership, Draft General Crediting Protocol Addendum: Riparian Planting Standards (Sept. 2011), *available at* http://willamettepartnership.org/tools-templates/Draft%20Addendum%20Riparian%20Planting_2011.pdf.

Cover crop or crop rotation	Previous crop rotations documented through available geospatial data or landowner records. A map with location and extent of BMPs.
Change in irrigation	Last 3 years of irrigation type, sources of irrigation water (e.g., water diversions, groundwater wells), application rate, and documentation of application. A map with location and extent of BMPs.

Open enrollment

In some cases, the trading "base year" (discussed in Section 2.1.2) may be linked to the date prior to the development of a trading program (e.g., base year is 2008 when the TMDL was issued, the trading program is approved in 2013). Those project developers seeking credit for projects completed after the base year but prior to the approval of a trading program must demonstrate conformity with all trading program requirements later identified, including documentation of pre-project site conditions. An "open enrollment" period provides an opportunity to involve early actors that may have already implemented positive practices, but do not yet have the documentation necessary to sell credits. This mechanism allows a trading program to avoid penalizing and thereby inhibiting early action to restore water quality.

***Draft Best Practice – Open enrollment**: Landowners must provide sufficient documentation of pre-project site conditions. Regulators may provide an "open enrollment" period during which early-adopter landowners who installed conservation practices during the appropriate look-back period, but do not yet have sufficient data to qualify for new trading program eligibility standards, can enroll their credits in the program, pending compilation of appropriate documentation during a probationary period.*

Commentary: In some instances, landowners may have undertaken environmentally beneficial practices that would otherwise qualify under more recently adopted trading program guidance. However, these landowners may not possess sufficient information to prove their eligibility. In an effort to avoid penalizing these landowners for their early action, their actions may be eligible to sell as credits during an open enrollment period. Enrollees would then have a probationary period during which to collect the appropriate documentation, or else their enrollment would lapse.

3.4.2 Initial estimate of post-project site conditions

To complete an uplift calculation, project developers will also need to document post-project site conditions after a BMP is installed. Where a modeling approach is used to quantify credits, the post-project site conditions are then used as the basis to model post-project site performance (i.e., the amount of credits generated from the site), and are therefore particularly important.

For BMPs that become fully effective upon the completion of installation (e.g., nutrient management), the post-project site condition is simply the presence or absence of that BMP at a site. For BMPs that take longer to mature (e.g., wetlands to reduce nutrients), project developers may need to forecast post-project site conditions in order to calculate the final post-project site performance and estimate the full anticipated uplift.

***Draft Best Practice – Estimating post-project conditions**: For each eligible BMP, trading programs should identify the characteristics assumed to be present in the post-project site condition. This condition is used to calculate the total anticipated uplift from a site. For BMPs that become fully effective upon the completion of installation, the post-project site condition is simply the presence or absence of that BMP at a site. For BMPs that take longer to mature, project developers need to clearly document the assumptions about the anticipated post-project conditions that are built into post-project site performance estimates.*

The modeling assumptions used to translate post-project conditions into a post-project site performance must be documented in a way that can be independently verified. State trading guidance, rules, and/or an individual permit may provide direction on allowable modeling assumptions. States may choose to review these documented estimates of post-project performance on a case-by-case basis.

Commentary: For some BMPs, forecasting post-project site conditions is straightforward. For example, consider a scenario in which the pre-project site condition is a corn field with no grassed filter strip and a project developer intends to install a 25-ft wide grassed filter strip and reduce application of fertilizer by 1/3, which will be immediately installed and effective. The post-project site condition therefore includes all the implemented BMPs.

For BMPs that take longer to mature, forecasting the final post-project conditions may be more challenging. For example, forecasting the benefit of animal exclusion to reduce stream bank erosion would involve estimating the rate at which banks generate regrowth and stabilize. For BMPs that take time to mature and provide their full functional value, agencies will determine whether the post-project site condition is used to determine the number of credits released upon verification or if credits are released in phases. See Section 5.1 Credit Life for a deeper discussion on the timing of credit release for BMPs that take time to mature.

These actual and/or estimated post-project site conditions are then used as the basis to model post-project site performance (i.e., the amount of uplift generated from the site). For either of these scenarios, trading programs should provide guidance to project developers as to how to estimate and verify post-project site conditions and performance.

4. Ratios & Reserve Pool

This section describes two fundamental risk management components for a trading program: trading ratios and reserve pools.

4.1 Trading ratios

A trading ratio is a value that is multiplied by the number of credits that would otherwise be required. Ratios are applied to account for various factors, such as watershed processes (e.g., attenuation), risk, and uncertainty— both in terms of measurement error and project performance, ensuring net environmental benefit, and/or ensuring equivalency across types of pollutants. Ratios are applied to the final calculated credit amount.

***Draft Best Practice – Development of trading ratios**: Ratios should be based in science. Where specific policy objectives, including watershed goals, economic feasibility, and appropriate levels of risk need to be considered, they will be included in trading ratio decisions. The assumptions underlying the chosen ratio should be carefully documented in a transparent manner in the regulatory documents (i.e., NPDES or other individual permit, relevant TMDL and/or state trading policy/rules). Trading ratios may be set at the state, watershed, or individual permit level. Where ratios are set for individual trades, their development should follow a consistent approach. Where trading ratios contain multiple components, they may be applied separately or combined into a single factor. In either case, the technical or narrative reasoning behind treatment of delivery/location, equivalency, uncertainty, and retirement should be clearly documented.*

***Draft Best Practice – Minimum trading ratio**: In combination, the various ratios applied to a point source (i.e., delivery/location, equivalency, uncertainty, retirement) should always be greater than 1:1 (e.g., for every unit of pollution discharged by a point source, there must be more than one unit reduced through trading). As a default, trading programs should consider including at least a small retirement ratio to generate net environmental benefit.*

Commentary: Trading ratios should never be less than 1:1, unless compelling reasons exist. This best practice (and commentary) draws heavily from U.S. EPA's Water Quality Trading Toolkit for Permit Writers ("Trading Toolkit"), which defines ratios for uncertainty or reserve and retirement (this section of the Trading Toolkit also provides detail on delivery or location, and equivalency ratios, although these are discussed separately in Section 3 of the best practices). The following definitions of ratio types are adapted from the Trading Toolkit and Willamette Partnership's *In It Together.* Ratios will likely vary depending on the target pollutant, and the types of uncertainties associated with trading the pollutant. The risk and uncertainty represented in each of these categories can be accounted for as ratios or through other program components (e.g., margin of safety and conservativeness in credit calculations, or through delivery/location and/or equivalency factors in modeling, instead of through the

application of an uncertainty ratio). The best practice above suggests documenting consideration of each of these types of ratios, whether they are incorporated into a final ratio or elsewhere in the process. That documentation can be based on sophisticated analysis and modeling or based on a narrative description that documents the reasoning behind selection of a certain ratio value.

4.1.1 Delivery or location ratios

Delivery ratios account for the attenuation of pollution from one point in a stream down to another. Accounting for pollutant delivery or location is often thought of in the context of trading ratios.[41] However, accounting for delivery and location is most relevant to quantifying net uplift, and so are discussed in full in Sections 3.3.2 and 3.3.3 of the best practices.

4.1.2 Equivalency ratios

Equivalency ratios adjust for trading of different species of the same pollutant.[42] For example, some forms of nitrogen or phosphorus are more biologically available than others, meaning that they can readily be utilized by algae and lead to algal blooms, impacting the system more severely. Equivalency ratios can also be used to account for a) the variation in the availability of the different species of the same pollutant within a system, or b) cross-pollutant trades. For example, where nutrient loading causes algal growth or low DO concentration and the system is phosphorus-limited, reducing a pound of phosphorus on farms might equal ten pounds of nitrogen discharged from a wastewater facility.

Equivalency between different species of the same pollutant can also be addressed as part of the quantification method. In this case, a mathematical model or conversion factor would be used to adjust net uplift from one species of pollutant into another. Incorporating equivalency in quantification methods is also discussed in Section 3.

4.1.3 Uncertainty or Reserve ratios

Uncertainty ratios help account for measurement and implementation uncertainty. Better science, better understood BMP outcomes, experience with trading, and clearer understandings of risk can reduce the need for a large uncertainty or reserve ratio. Measurement uncertainty accounts for errors in credit calculation methods. Implementation uncertainty buffers against potential project failure, both from the failure of best management practices (BMPs) to perform as anticipated, and from unanticipated events such as a flooding or fires. In some programs, a portion of credits is held in "reserve" to account for these failures.

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[41] *See* EPA, EPA 833-R-07-004, *Water Quality Trading Toolkit for Permit Writers*, 30-31 (August 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit_fundamentals.pdf (hereafter "Trading Toolkit").

[42] See id.

The Ohio River program requires that all projects reserve 10% of all credits sold to account for uncertainty and project failures.[43] Sometimes, different BMPs may have different uncertainty ratios.[44] If a trading program is already accounting for uncertainty in other places (e.g., through margins of safety in TMDL assumptions or conservative model assumptions), uncertainty ratios may not need to be as large, or may not be necessary.

4.1.4 Retirement ratios

This ratio term has at least four meanings. If all meanings are used, each will need to be calculated separately and then recombined, if desired:

1. *To ensure that the trading program generates a net water quality improvement*. For example, a ratio can ensure that for every pound of sediment discharged into a stream, at least 2-4 pounds of sediment are removed, and "retired" for environmental benefit. This approach only works if the ratio is greater than 1:1;
2. *To fulfill regulatory and/or TMDL-derived baseline requirements at an individual nonpoint source landowner site*. This approach effectively retires a portion of the credit generated from a landowner's site in order to account for the requirements of pre-existing laws and regulations or reduction requirements derived from a TMDL;
3. To build up the credit reserves in a basin as part of a programmatic risk management strategy. (*See* Section 4.2 on Reserve Pools); and
4. To account for ongoing BMPs that are renewing their credits over time, and the need to retire a percentage of credits from a previous credit cycle (*See* Section 5.1.3).

4.1.5 Other ratios:

In unique circumstances, programs may choose to define ratios to cover other factors. One of these factors includes accounting for any temporal loss from credits awarded to BMPs that take time to mature. For example, riparian forests may take 10+ years to provide the shade they are given credit for when they are planted. There are several ways to account for this time lag, but some trading programs may choose to apply a trading ratio. Another situation may be assignment of a lower trading ratio to incentivize BMPs that have multiple benefits, or are ecologically preferred. For example, a BMP may create phosphorous credits, but if it can also control toxics, temperature, and provide wildlife habitat, there may be justification to provide a lower retirement or other ratio. This is often a policy decision, but needs to be documented with an appropriate justification.

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[43] Electric Power Research Institute, Pilot trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Program, at 4 (2012), *available at* http://wqt.epri.com/overview.html.

[44] Wisconsin Department of Natural Resources, A Water Quality Trading How To Manual, at Appendix A. Uncertainty Ratios (2013); *available at* http://dnr.wi.gov/topic/surfacewater/waterqualitytrading.html

Mathematically, trading ratios have an enormous impact on the quantity of credits available for sale (if applied to the seller) or required for purchase (if applied to the buyer) and should be applied carefully. Setting ratios too high reduces potential cost savings for point sources (because they have to purchase more credits), but setting ratios too low may not adequately account for risk to the environment.

4.1.6 Documenting trading ratios

The different types of ratios discussed above can be merged together in a single ratio, or kept separate. A single trading ratio applied across the state or the watershed/trading area works well where pollution reductions anywhere in the watershed will have similar benefits to the overall water quality standards and other goals. This approach is straightforward and provides a high level of predictability for buyers and sellers. However, combined ratios reduce a program's ability to account for site-specific factors and variation in delivery/attenuation (unless these factors are included in quantifying net uplift). Keeping ratio components separate and applying them individually to each project may provide incentives to install BMPs in the closest, most effective, and/or lowest risk locations. The tradeoff is that it creates an extra step for the project developer to determine the quantity of credits that will be generated from a given project and complicates analyses of available credit supply within a watershed. To counteract this outcome, some trading programs have built models and software to ease this analysis. For example, the Ohio River Basin has generated delivery factors using the WARMF model and they are displayed to the buyer through the registry interface.[45,46] Regardless of whether ratios are broken apart or combined, there must be clear documentation of how each factor was considered and included/not included in the permit, TMDL, watershed-specific trading program or permit, and/or state policies/rules.

4.2 Reserve pool

Several recent trading programs have established a reserve pool of credits to programmatically manage the risks stemming from uncertainty and project failure. Typically, a reserve pool is built by applying a reserve/retirement ratio to each credit-generating project. It may also be possible to populate a reserve pool through private or public investment in reserve projects. These credits are then placed in a reserve managed by a trading program administrator (e.g., a state agency or its designee). The reserve pool manager controls access to the reserve based on rules set forth in the trading program.

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[45] Electric Power Research Institute. Credit Registry. WQT.EPRI.com. Retrieved October 2, 2013, from http://wqt.epri.com/credit-registry.html

[46] The Ohio River Basin trading program considers the delivery factor to be part of credit quantification, as opposed to a trading ratio. See EPRI, Pilot Trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Program, at 4.

***Draft Best Practice – Use of reserve pool**: Trading programs should provide a reserve pool option. If a reserve pool is used, the trading program needs to define its manager, how it will be populated over time, the circumstances under which a point source may access credits, the rules regarding when credits must be permanently purchased versus temporarily loaned, and a mechanism for dealing with the accumulation of credit surpluses.*

Commentary: The 2003 U.S. EPA Trading Policy states that "[w]here appropriate, states and tribes may elect to establish a reserve pool of credits that would be available to compensate for unanticipated shortfalls in the quantity of credits that are actually generated."[47] In water quality trading programs in the Northwest, reserve pools have garnered less interest than anticipated. As such, this draft best practice merely highlights the various considerations to account for if/when implementing a reserve pool. The biggest advantage of a reserve is that it provides a mechanism for pooling and addressing risk of project performance across the entire program. Reserve pools make the most sense in trading areas where several point sources are participating in a trading program. Not all trading programs use a reserve, however. In some trading programs, NPDES permit holders are individually responsible for remedying any project failure that affects the credits they hold for permit compliance. As such, these entities would rather "self-insure" either by 1) developing extra credit generating projects, or 2) maintaining contingency funds. The self-insurance approach is most attractive in trading areas with a small number of participating point sources, and thus few options for pooling risk.

[47] EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1612 (Jan. 13, 2003) (hereafter "2003 Trading Policy").

5. Credit Characteristics

Trading programs define the essential characteristics of a credit, including standards that identify when a credit is created, when it expires, how it is treated from an accounting standpoint, and whether multiple credits from the same action can be used for compliance with other obligations (e.g., stacking).

5.1 Credit life

A credit's "life" spans the period between when a credit becomes usable as an offset by a permittee (i.e., its "effective" date), and when that credit is no longer valid (i.e., its "expiration" date). The life of a credit may differ from the project or contract length with a landowner to generate the credits via BMPs. For example, the life of nutrient credits from a grassed buffer will likely be one year or less (e.g., seasonal or monthly credit lives), even if the landowner has entered a 5-year lease protecting project activities in the riparian area. On the other hand, some credits (e.g., thermal credits) have a 20-year life, backed up by a 20-year project lease at the credit generating site.

5.1.1 Are credits annual or seasonal?

Pollution reductions eligible to generate credits for trading should address loading issues at the appropriate periods of time during a year.

***Draft Best Practice – Annual and seasonal credit life**: The credit life, or the time period over which pollution reductions are eligible to be used as credits, should be tied to the critical periods identified in a TMDL, watershed plan, or in a permit. In some cases that period is a year, a season, a month, or even a period of days. A credit may have a life longer than the critical period if it is quantified based on delivery of water quality improvements from the BMP during the critical period. For example, nutrient credits generated from a BMP may have a 1-year life if they are quantified based on reductions anticipated specifically during the critical period or season. Using this approach, the delivery of pollution reductions from credit-generating BMPs should occur at the same point in time as the maximum excess load that must be offset.*

Water quality agencies may choose to allow for annual crediting periods that use average annual reductions where the period of time in the TMDL does not match up with the periods of time where pollution is reduced by priority BMPs.

Commentary: The seasonal dynamics of pollution matter. If a stream has a summertime nutrient problem and BMPs reduce pollution in the spring, then there may not be a real offset to "trade." Tying credit life to critical time periods defined in the TMDL appears to be a

straightforward approach, however most trading programs use annual averages48 (meaning that there is an annual credit life) as opposed to seasonal crediting periods because of the difficulty and costs associated with tracking, verifying, and reporting credits on a seasonal, monthly, or daily period. Even if annual averages are used, the regulatory body should ensure that BMPs installed to generate an annual credit are providing the benefits needed at all times of the year when a permit exceedance occurs.

5.1.2 When does a credit become valid?

Draft Best Practice – Effective date for credit use*: In all cases, credits should not be issued prior to a BMP being installed and verified. In general, a credit becomes valid after BMP installation has been verified and quality standards have been met. In cases where specific BMPs help a watershed move toward water quality standards or are identified as supportive of beneficial uses (e.g., riparian forest restoration for water temperature), credits may be issued even if that BMP is not yet providing its full functional value.*

Commentary: Many BMPs begin reducing water pollution as soon as they are installed (e.g., cover crops, manure management, and flow augmentation). For these BMPs, there is general consensus that a credit becomes valid as soon as the installed BMP is verified as meeting its full functional performance.

Other BMPs, however, take time to mature and provide their full water quality improvements (e.g., riparian forest, grassed buffers, and animal exclusion for the purposes of reducing streambank erosion). Often, these BMPs not only provide the needed pollution reduction, but are closely linked to providing ecological benefits supportive of designated uses in an impaired watershed and may help to accelerate progress toward water quality standards. Understanding the need to promote these types of restoration actions, regulators should consider allowing for these credits to become valid after verifying that the BMP has been properly installed. If the credits generated from these practices are not valid until they provide full functional value, purchasers will encounter the following disincentives to investing in these types of BMPs: A) the purchaser will have to make a capital outlay upfront to fund the restoration activity, but will not be able to claim the credits until a later date—this delay in investment realization is likely prohibitive for many credit purchasers, especially where a purchaser is a governmental entity answerable to ratepayers, and timeframes are short; and B) some permittees may need BMPs that get them into compliance sooner than the time period required for the BMP to fully mature—this delay between the effective date of a credit and required compliance milestones

[48] Branosky E, C. Jones and M. Selman, World Resources Institute, Comparison Tables of State Nutrient Trading Programs in the Chesapeake Bay Watershed: WRI Fact Sheet, at 8 tbl. 4 (2011), *available at* http://www.wri.org/publication/comparison-tables-of-state-chesapeake-bay-nutrient-trading-programs; Electric Power Research Institute, Pilot trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Program, at 3 (2012), *available at* http://wqt.epri.com/overview.html.

may expose permittees to potential liability for noncompliance unless a permit includes an appropriate compliance schedule.

5.1.3 When does a credit expire? Can credits be renewed?

Draft Best Practice – Project and credit renewal *: So long as a BMP continues to function at a site, stewardship funds are obtained to maintain the BMP and confirm project performance, and new/renewed project protection is in place at a site, then that BMP and associated credits generated from that site can be renewed for subsequent periods. In these subsequent renewal periods, states may choose to require that a portion of the credits carried over from a previous credit cycle be retired for net environmental benefit.*

Commentary: Allowing for the renewal of credits from ongoing BMPs may help to keep effective BMP practices on-the-ground for longer periods of time, and therefore further solidify the ecological gains achieved in the first crediting cycle. The credit purchaser will no longer pay for continued monitoring/maintenance or landowner lease payments when the uplift generated from a site is no longer creditable, however many BMPs require ongoing investment and maintenance to sustain their water quality function (e.g., manure management, or riparian forest buffers), and landowners require ongoing incentives to maintain them on the land, or to provide access to those responsible for maintaining them. Without the ability to renew credits from ongoing BMPs, there is no certainty that they will continue to be maintained.

Another benefit to credit renewal is that BMPs are generally more effective the longer they are installed.[49] Thus, a new BMP may not generate as much benefit for water quality as one that has been implemented for some time. Finally, there are transaction costs associated with engaging new landowners and with the initial implementation of a BMP (e.g., development of a nutrient management plan, site preparation, credit calculation costs). Maintenance of BMPs over time can make improvements to water quality more cost effective than continual investment in new BMP installations.

As a contribution toward net environmental gain, states may also require that a permittee retire a portion of the previously installed credits (meaning that, for example, only 90% of credits generated in a previous cycle can be renewed in a subsequent credit cycle, thereby requiring the permittee to invest in new conservation actions to generate that retired 10% and any other needed reductions). The non-renewal retirement percentage might vary for different types of BMPs. Another option is to retire all credits from a given BMP after a certain number of credit renewal periods (e.g., shade credits might be valid for four credit cycles, but then all of those credits are retired after the end of the fourth credit cycle). These options increase credit costs for permittees over time, and if overly burdensome, would disincentivize purchasers from

[49] M.D. Tomer and M.A. Locke, The Challenge of Documenting Water Quality Benefits of Conservation Practices: A Review of USDA-ARS's Conservation Effects Assessment Project Watershed Studies, 64 Water Science and Technology 300, 300-310 (2011).

investing in trading. There is likely some middle ground that both creates net environmental gain, and mirrors the technological upgrade/replacement cycles that would otherwise be encountered by credit purchasers if they instead installed technological solutions.

5.2 Accounting treatment of credits

Credits are a form of natural capital, but neither private nor government accounting standards provide clear guidance as to how to define or value these kinds of assets. Trading programs need to consider how their rules and processes affect the accounting treatment of credits because this question affects the ability of permittees to finance credit purchases.

***Draft Best Practice – Accounting treatment of credits**: Credits are certified, tradable goods with an ascertainable value. To the extent a credit purchaser can add credit assets to its capital asset ledger, as allowed under commonly accepted accounting principles and federal, state and local law, trading programs should encourage this practice so as to: A) increase the credit purchaser's ability to leverage capital asset funding mechanisms; and B) provide a mechanism to more easily fund ongoing maintenance and monitoring. To the extent possible, trading programs should clarify whether program credits are "securities" regulatable under relevant federal and state securities laws.*

Commentary: If credits are seen as capital assets, it will likely be easier for permittees to fund credit purchases through traditional financing mechanisms like bonds and government loans. If credits are treated as non-depreciable, non-capital expenses for public purchasers, it may be more difficult to fund the maintenance and monitoring components of credits with traditional financing money that is often oriented toward capital investments. Moreover, treatment of credits as capital assets allows buyers to place those purchases on the asset side of a balance sheet, thus maintaining the entity's bond rating. The Governmental Accounting Standards Board (GASB), an independent, non-governmental organization that is a national leader in setting generally accepted accounting principles for state and local governments, defines a capital asset as "land, improvements to land, easements, buildings, building improvements, vehicles, machinery, equipment, works of art and historical treasures, infrastructure, and all other tangible or intangible assets that are used in operations and that have initial useful lives extending beyond a single reporting period."[50] Dams, power plants, water resources projects, and environmental remediation efforts intended to make a property usable again (often through decommissioning or decontamination) are considered capital assets.

Credits may be deemed "securities" if based on benefits that have not yet materialized, or if actively traded on a market. Programs may wish to obtain an interpretation of the nature of credits from relevant federal and state trade bodies. This consideration is likely to become

[50] Governmental Accounting Standards Board (GASB) Statement No. 34, Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments, ¶ 19.

more relevant if and when more robust trading markets develop, and credit speculation or banking become more robust.

5.3 Relation of water quality trading to other programs – "Stacking"

Several sources provide detailed definitions of "stacking,"[51] The role of stacking in ecosystem service markets is subject to considerable debate due to additionality and double-dipping concerns (where a single credit performing multiple ecological functions and addressing multiple regulatory obligations, is counted or sold twice). Stacking has several derivations: horizontal, vertical, temporal, and payment stacking:

A) *Horizontal/Proportional stacking*: Where a site performs more than one distinct environmental benefit on non-spatially overlapping areas;
B) *Vertical stacking*: Generate and sell more than one kind of credit from the same action on the same area of land;
C) *Temporal stacking*: One restoration action where credits are generated for one purpose now, but if future markets develop, more values may be considered at that time;
D) *Payment Stacking:* Using public dollars dedicated to conservation to help fund credit-generating actions.

5.3.1 Horizontal/Proportional Stacking

Draft Best Practice – Horizontal/Proportional stacking*: Horizontal stacking is allowed. A project developer may create more than one credit for a given action on the same area, however, all credits generated by the same action in the same area are linked and should be sold (or retired, if not needed) proportionally (i.e., as a x% of one type of credits are sold, y% of all other credits types generated under that same action and location must be simultaneously deducted from the ledger (see Figure 5.3.3.). For this scenario to be viable, when a project is implemented at one time, all credits generated from that project should be validated, calculated, and verified at the same time. Where credit release schedules and stewardship requirements differ among the multiple credit types produced through a single action, all credits should be held to the highest and most comprehensive standard (e.g., if one credit is released on installation and the other is phased, the slower, phased release schedule applies to both credits).*

[51] *See*, *e.g.*, David Cooley & Lydia Olander, Nicholas Institute Working Paper, Tacking Ecosystem Services Payments: Risks and Solutions (2011), *available at* http://nicholasinstitute.duke.edu/sites/default/files/publications/stacking-ecosystem-services-payments-paper.pdf; Fox, Gardner, and Maki, Stacking Opportunities and Risks in Environmental Credit Markets, 41 Environmental Law Reporter 10122 (2011), *available at* http://wqt.epri.com/pdf/credit-stacking-environmental-opportunities-and-risks.pdf.

Commentary: This type of stacking—which is not really "stacking" to many[52]—is generally allowed because the benefits are not sold more than once from the spatially overlapping areas, and so are additional. New credit quantification methods are able to articulate water quality, habitat, carbon sequestration, and other ecological values from BMPs, and accounting approaches allow for easy segmentation of credit values from larger restoration site. Willamette Partnership has adopted the proportional approach to credit stacking described in the best practice statement above. This approach still provides a project developer choices, but avoids the perception of "double dipping." This approach is consistent with joint interagency guidance developed in Oregon.[53]

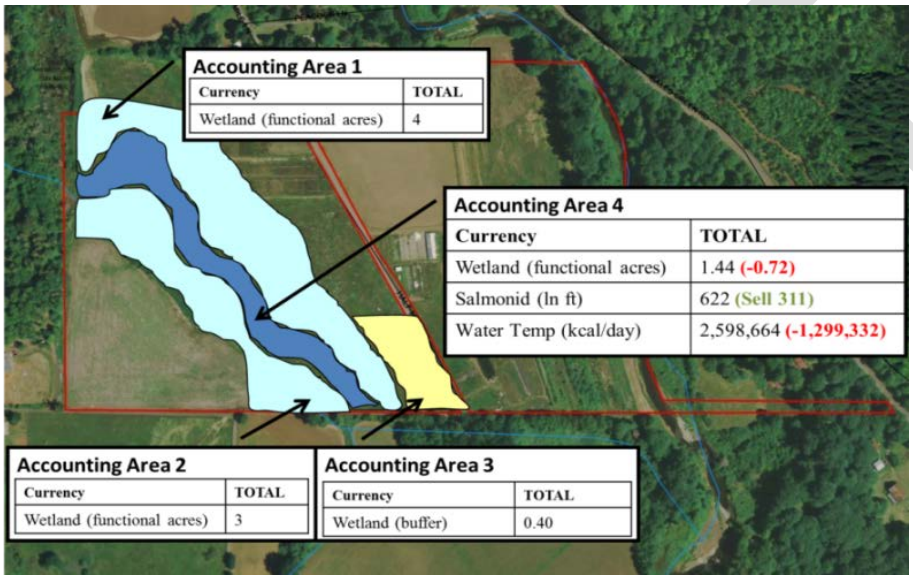


Figure 6.3. Linking credits generated from the same action

5.3.2 Vertical Stacking

***Draft Best Practice –Vertical stacking**: Vertical credit stacking is generally not allowed because it raises double counting and non-additionality concerns.*

[52] *See* David Cooley & Lydia Olander, Stacking Ecosystem Services Payments: Risks and Solutions, 42 Envtl. L. Rep. News & Analysis at 10156 (Feb. 2012).

[53] U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, Oregon Department of State Lands, Oregon Watershed Enhancement Board, Oregon Department of Fish and Wildlife, Oregon Interagency Recommendations: Public Funds to Restore, Enhance, and Protect Wetland and At-Risk, Threatened and Endangered Species Habitats: Appropriate Uses of These Funds in Species and Wetland Mitigation Projects (2008), *available at* http://www.fws.gov/oregonfwo/LandAndWater/Documents/PublicFunding-final.pdf

Commentary: Vertical stacking continues to generate lively debate. Vertical stacking of credits is generally not allowed. Arguments in favor of vertical stacking include:

- If an action generates multiple actions, then a project developer should be able to sell multiple benefits—increasing the revenue potential for conservation and restoration projects, so they are more competitive with other land use choices such as agriculture or development. Stacking could allow entities with multiple compliance requirements to design mitigation alternatives that have reinforcing environmental functions and values;
- Other regulatory frameworks suggest future opportunities for vertical stacking.[54]

Arguments against vertical stacking include:

- Vertical stacking may limit net environmental gain because purchasing entities are allowed to invest in less conservation;
- Vertical stacking may create challenges for consistent accounting;
- Vertical stacking may violate additionality requirements. For example, if an action is already required, one can argue that the benefit would have occurred anyway, and so is not creditable.

Some programs, such as North Carolina's Ecosystem Enhancement Program did not disallow vertical stacking (in that case, of nutrient and wetland credits). Originally, North Carolina wanted to capture and release credits that reflected the multiple benefits of complex restoration, but the backlash from a sale of stacked credits prompted the state to disallow the practice.[55] In carbon trading—which faces similar questions related to stacking—The Climate Action Reserve does not allow for vertical credit stacking at this time, but does allow for the horizontal/proportional approach to payment stacking (described in Section 5.3).[56]

5.3.3 Temporal Stacking

Draft Best Practice – Temporal stacking*: Temporal stacking is generally not allowed at this*

[54] In the wetland mitigation context, the joint EPA and Army Corps regulations prohibit double-dipping, but also state: "where appropriate, compensatory mitigation projects, including mitigation banks and in-lieu fee projects, may be designed to holistically address requirements under multiple programs and authorities for the same activity." 30 C.F.R. § 3323(j)(1)(ii) and 40 C.F.R. § 230.93(j)(1)(ii)).

[55] Jessica Fox, RC Gardber, and T Maki, Environmental Law Institute, Stacking Opportunities and Risks in Environemtnal Crdit Markets (2011), *available at* http://wqt.epri.com/pdf/credit-stacking-environmental-opportunities-and-risks.pdf; North Carolina Program Evaluation Division, Department of Environment and Natural Resources Mitigation Determinations: Special Report to the General Assembly, Rep . No . 2009-3 (Dec . 16, 2009); Alice Kenny, When is Credit Stacking a Double Dip?, Ecosystem Marketplace (2009), *available at* http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=7147&section=home.

[56]Climate Action Reserve, Nitrogen Management: Project Protocol Version 1.1, § 3.5.3 (2013), *available at* http://www.climateactionreserve.org/how/protocols/nitrogen-management.

time.

Commentary: Temporal stacking is largely another form of vertical stacking, and is therefore not likely permissible under current regulatory frameworks. However, if the credit is generated for one purpose now, but later converted to a more valuable use in exchange for the current use, then temporal stacking is much more like horizontal stacking, and would be generally permissible because only one value is being sold from a single unit of land at one time.

5.3.4 Payment Stacking

***Draft Best Practice – Payment stacking**: Payment stacking with funds from programs identified as public funds dedicated to conservation[57, 58] or "Fee-in-Lieu" (FIL) funds[59] is generally not allowed to pay for credits used for compliance purposes. Public dollars dedicated to conservation can be used to address Baseline obligations on the compliance portion of a site, and to pay for additional net environmental benefits outside of the compliance portions of the site (i.e., extended buffer areas, or extra management practices). The project developer should identify the percentage of the overall project funded by public dollars dedicated to conservation, if any, and provide a map that clearly identifies which area of a project site can/cannot be funded by particular funding sources.*

Commentary: USDA explicitly states the BMPs that it funds via its conservation incentive programs, and any associated credits, belong to producers.[60] Several trading programs allow USDA-cost share to fund the baseline portion of a credit-generating activity.

[57] Public funds dedicated to conservation are those targeted to support voluntary natural resource protection and/or restoration, with a primary purpose of achieving a net ecological benefit through creating, restoring, enhancing, or preserving habitats.(*see 51*, p.2 defining Public Resource Protection and Restoration Programs) Some examples include Farm Bill Conservation Title cost share and easement programs, EPA 319 funds, U.S. Fish and Wildlife Service Partners for Wildlife Program, state wildlife grants, and other sources. Public loans intended to be used for capital improvements of public water systems (e.g., State Clean Water Revolving Funds and USDA Rural Development funds), and utility stormwater and surface water management fees are not public funds dedicated to conservation.

[58] U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, Oregon Department of State Lands, Oregon Watershed Enhancement Board, Oregon Department of Fish and Wildlife, Oregon Interagency Recommendations: Public Funds to Restore, Enhance, and Protect Wetland and At-Risk, Threatened and Endangered Species Habitats: Appropriate Uses of These Funds in Species and Wetland Mitigation Projects (2008), available at http://www.fws.gov/oregonfwo/LandAndWater/Documents/PublicFunding-final.pdf

[59] "FIL funds are used to satisfy agency programmatic mitigation obligations. Some examples of FIL funds include the Oregon Department of State Lands (DSL) Payment in Lieu Wetland Grant Program, and the Northwest Power and Conservation Planning Council, and Bonneville Power Administration Fish and Wildlife Program grants (p.2)."

[60] *See, e.g.*, 7 C.F.R. § 1410.63 (CRP program); 7 C.F.R. § 1466.36 (CRP program); 7 C.F.R. § 1467.20 (WRP program).

6. Project Implementation & Quality Assurance Standards

This section describes the standards needed to ensure that trading projects seeking credits are appropriate, are implemented to a high standard, are implemented in a way that achieves the credited water quality improvements for as long as the credit is valid, and are consistent with other laws.

6.1 Project site screening (or "validation")

Project screening is the process of vetting projects for program eligibility. Such screening can give the project developer, regulatory agency, and NPDES permittee a quick idea of whether the proposed project will meet established eligibility criteria. Not all programs include this kind of screening. It can be required as part of a regulatory process, but more often, it is used to provide confidence that projects will generate valid credits later on.

***Draft Best Practice – Site screening**: A state agency or approved third party may screen a proposed project for eligibility. If eligibility screening occurs, and the screener determines that a proposed project will fail to meet eligibility criteria, the screener will notify the project developer with recommendations for revision and instructions for resubmission of the project plan. As the project meets relevant eligibility criteria, the screener can provide a written notice of eligibility.*

Commentary: Developing a credit project can be costly; therefore, an initial site screening can provide an important risk mitigation benefit (providing the project developer, regulatory agency, and NPDES permittee with a quick idea of whether a site will meet established eligibility criteria). Site screening is generally a good idea before project implementation begins. Site screening is one of the functions in trading program administration. The considerations around which entity (e.g., state agency, third party, permittee, project developer) can and should provide this function are discussed in Section 10.

6.2 Consistency with other laws

***Draft Best Practice – Consistency with other laws:** Prior to undertaking credit-generating restoration work, a project developer must obtain all necessary permits and approvals (including those required under the National Environmental Policy Act, the Endangered Species Act, the Clean Water Act, state permitting laws, and county/municipal land use codes). The project developer must also comply with all applicable federal, state, and local laws/regulations, including those that may form the basis of "Regulatory Baseline" requirements (which are described separately in Section 2 of the Draft Best Practices).*

Commentary: It is unclear which entity is responsible for determining consistency with other laws, and how much proof of that consistency a project developer would need to provide. On the one hand, project developers should be able to demonstrate their knowledge of applicable laws and provide details on how they are in compliance. On the other, it is likely to be difficult

for a state water quality agency to verify the accuracy of this information given that many rules apply in different locales for different land uses. In addition, were the legality of a project or property called into question, water quality agencies would be unable to assess the likely compliance status for programs outside of their jurisdiction. It is also unclear whether attestations as to the project's compliance with existing laws have legal implications (e.g., self-incrimination), and if and how states may delegate the authority to make this compliance determination to a third party.

6.3 Project implementation quality assurance

Most credit calculations are modeled assuming BMPs are performing at their best in reducing pollution. A trading program needs guidelines for BMPs that shape BMP design and set performance standards. Those guidelines make sure a BMP is being operated and maintained appropriately, and in a way that meets the assumptions modeled in the credit calculation. BMP guidelines are also an avenue for ensuring that the actions taken on the ground are enhancing ecosystem function in a way that is ecologically responsible and contributes toward watershed health and resiliency (e.g., using native species in riparian forests instead of non-native hybrids).

Draft Best Practice – Project quality standards: *Each eligible BMP should be designed, constructed, and maintained using a BMP guideline defined and approved by the relevant state agency. In cases where site-specific considerations necessitate a different design or maintenance standard, the project developer will need to work with the state water quality agency or their approved third party for approval of a site-specific BMP guideline.*

Commentary: BMP quality standards should balance flexibility in how projects get implemented (allowing project developers to be responsive to changing farm practices and seasonally-specific BMPs) with the certainty and dependability of project quality that is required for trading to be a viable method of complying with permit limits.

6.4 Project design and management plans

For structural and practice-based BMPs, there need to be some requirements for the design and management of the practice at project sites.

Draft Best Practice – Project design and management plans: *Project developers must develop an ecologically appropriate project design and management plan that conforms with approved BMP quality standards, outlines specific improvement and restoration goals, includes a plan for reporting on project site performance and maintenance actions, and performance milestones for ensuring that these goals are achieved in the future.*

Commentary: The project design should describe the proposed actions, restoration goals, anticipated threats to project performance, etc. The management plan component details how

the project developer plans to keep the practice in place and consistent with BMP guidelines (e.g., maintaining fences, controlling weeds in riparian buffers and other actions for the life of a credit).

6.5 Project stewardship – adequate legal protections and stewardship funds

Having adequate stewardship protections ensure that the planned-for installation, operation and maintenance outlined in the project management plan actually occur. Two primary actions can ensure that projects materialize as planned. Project sites/BMPs must have adequate legal protections for the duration of the credit life. Second, project developers must demonstrate that they have adequate funding to steward the site for the duration of the credit life. Different BMPs will require different BMP protection time periods.

Draft Best Practice – Ensure project site has adequate legal protections and stewardship funds for duration of credit usage period*: Project sites must be adequately protected by legal instruments, where appropriate. These protections must remain in place for the duration of the credit usage period, be legally enforceable under relevant state laws, and may run with the land (e.g., leases, conservation easements). Ideally, these protections will also mitigate against proximate disturbing land use activities. Project developers must also demonstrate that they have adequate funding to steward project sites for the duration of the credit life. These types of protections include performance bonds, restricted accounts, insurance, etc.*

Commentary: none

Draft Best Practice – Minimum BMP/project protection period: *For structural BMPs (e.g., fencing or riparian restoration), the minimum BMP/project protection period should be twenty (20) years. For practice-based BMPs (e.g., cover crops and tillage), the minimum BMP/project protection period should be five (5) years. Any other irregular term may be applied at the discretion of the regulatory agency. Site protection will generally occur through limited-term leases or other contracts, although easements may be used if the benefits of a BMP are expected to be more permanent.*

Commentary: The BMP/project protection periods above were selected because water quality impacts are rarely permanent, and so it may not make sense to structure water quality improvement projects as permanent solutions. Standard contract lengths are preferable, but must be balanced with flexibility to adjust BMP selection based on crops grown, market conditions, and environmental conditions. In the event that the mixture of BMPs implemented at a site changes in a given year, this might trigger a re-calculation of credits and additional verification, which could increase transaction costs significantly. Shorter-term protections may be considered if supply constraints arise or regulated entities develop diversified credit portfolios. There are also significant learning curves and costs involved in the first year of a project generating credits. Even for practice-based BMPs that can change year-to-year, a longer

site-protection period seemed appropriate. If the 5-year period becomes a barrier to project developers bringing credits for sale, then that minimum period can be revisited.

7. Verification & Certification

All permitted point sources have traditionally "self-monitored" end-of-pipe discharge limits by submitting monitoring reports on a regular schedule to the state agencies in charge of NPDES permit compliance and enforcement. There are important safeguards underpinning a self-reporting system, including EPA rules and state guidelines on monitoring and reporting discharges, as well as significant penalties assessed per day and per violation for not providing timely, complete or accurate information in accordance with those guidelines. With point-nonpoint trading programs, numerous and disperse nonpoint sources will provide the pollution reductions needed by a single point source to meet its requirements through dozens of different types of BMPs (each with its own eligibility and implementation quality standards). Because trading shifts the location of compliance from monitoring end-of-pipe discharges to documenting the efficacy of BMP implementation on a per-project basis over time, there are different challenges associated with verifying water quality improvements over time. In order to provide regulators with the same level of confidence as is engendered through point source DMRs, there are four analogous phases of the credit issuance process that provide an opportunity to review and approve water quality trades, programs, and/or developers: screening, verification, certification, and registration.

Once a project has been implemented, but prior to being eligible to sell credits, a qualified and approved entity verifies that a project is consistent with established BMP guidelines and eligibility requirements. This review process is known as verification. There are different verification methodologies, which may be combined in different ways depending on the structure of a program. One approach is to inspect every BMP/project or a sample of projects; another involves qualification of a project developer/third party to implement projects; yet another might be to approve an overall trading program with the option to inspect a representative sample of individual projects. These options are not exclusive, and each methodology has advantages and disadvantages. Ultimately, verification is trying to balance the scrutiny of BMPs to ensure water quality improvements are real with the associated costs of inspecting numerous and widely distributed BMPs.

A final step in this process is the formal "certification" by the program administrator that the credits are valid and that all necessary documentation is in place. Once projects are verified and certified, the credits generated from those projects are uploaded to a publicly available website. Public registration provides public disclosure, a mechanism to track credit quantity and ownership for compliance and enforcement, and a way to ensure that credits are not being used more than once. Each state may choose the appropriate frequency, scope and nature of verification/certification for its water quality trading program.

Verification methodologies may vary by state and watershed depending on preferences and capacities within state agencies, permittees, and third parties. This section also discusses site verifier accreditation, verification frequency/content, and formal certification of credits.

7.1 Verification of project sites and credits

Draft Best Practice – Verification: Completed projects should be verified onsite by an independent third party, the permitted point source, or a state water quality agency to determine compliance with appropriate standards. Any point source or third party performing verification should develop a Verification Plan, which is approved by the state or its approved third party. The Verification Plan should describe the proposed methods of verification, qualifications requirements for verifiers, and the verifier's protections against conflicts of interest. The Verification Plan should also clarify whether onsite inspection must occur for every BMP, or a representative sample. Even where a state water quality agency does not perform the verification, it may choose to inspect a credit-generating project or trading program at any time according to the relevant procedures outlined in the guiding regulations or statute.

Commentary: Independent project verification—from either a third party, or a water quality agency with authority to enforce water quality laws—provides significant programmatic integrity for the general public (i.e., neutral review of quality and integrity), and for permitted entities that rely on trading as a compliance solution. It also presents several challenges, including the ability of states to require verification; the question as to who will conduct the verification (and if not done by states, how to qualify permittees or other project developers to self-verify, or approve independent parties to perform this service); and additional costs for an activity that is not typically required by regulators.

In a NPDES framework where permittees and their contractors currently do their own monitoring for point source discharges, it is unclear which guidelines should be followed for self-verification in a trading context.

Common verification architecture (e.g., verification protocols, training and accreditation services, contracting procedures and templates) in the region could make verification more efficient to implement and enforce and easier for the public to understand.

7.2 Project site verifiers

Draft Best Practice – Qualifications of project site verifiers: All project verifiers must be qualified, trained, and accredited to inspect lands for particular credit-generating BMPs in a particular geography. Third party verifiers must be accredited by the relevant water quality agency or its approved third party.

Commentary: Accreditation ensures that verifiers are properly suited to analyze a particular project. It is unclear whether accreditation will be afforded by the state agency or an approved third party. It is not clear whether accreditation would be needed if permittees or their contractors are conducting verification of their own projects.

7.3 Frequency and content of initial verification

***Draft Best Practice – Content and frequency of initial verification**: After installation, at a minimum, the project verifier confirms that credit generating projects are eligible, that estimated credit quantities are accurate, that BMP design is consistent with approved guidelines, and that the project developer has an adequate management plan and legal protection for the duration of the credit usage period. In some cases, onsite visits might be conducted on a sample of projects or at a reduced frequency, particularly where an individual BMP has a satisfactory performance history.*

Commentary: none

7.4 Frequency and content of ongoing verification

Project site performance should be confirmed annually (or according to an approved schedule) to ensure that the sites are producing credits according to plan.

***Draft Best Practice – Frequency and content of ongoing verification:** Ongoing credit verification occurs frequently (e.g., annually), although in some cases (e.g., irrigation BMPs), verification may be required more frequently than annually). An onsite site performance monitoring visit is required in years one and five as part of verification (assuming a BMP is installed for at least 5 years), and if the credit usage period is longer than five years, every five years through the remainder of the credit usage period. In years in which no onsite monitoring occurs, verification includes review of project performance reports.*

***Draft Best Practice – Project performance reporting frequency**: A project developer should gather information on a site's BMP performance at least annually, and make that information available for review based on requirements for applicable BMPs. In some cases, confirmation of project performance might occur more or less frequently. For some BMPs (e.g., altering flow regimes, or where they may be prone to failure), confirmation of project performance may need to occur continuously or monthly. For some structural BMPs, confirmation of project performance may occur less frequently after the BMP has been established and confirmed as providing its full function.*

***Draft Best Practice – Annual project performance reporting from project developers to credit buyers**: Project developers should provide credit buyers an annual report at each project site that confirms the project is still functioning/on-track to function as planned. Annual site performance reports should include a comparison of site conditions to performance targets for the installed BMPs, a comparative set of photo points from the site, any significant changes or shortcomings of the site, and actions planned to address any significant problems. Parts or all of these annual site performance reports may be used in the compliance report summarizing the*

status of all projects active under the permit if required as a permit condition associated with trading.

Annual performance reports for individual project sites should be made available for review through posting to an online registry. The information in these reports should balance access to information with privacy and security concerns. Both the project developer and the permittee should retain copies of all site performance and annual compliance reports and records for the duration required of them by federal and state water quality regulations.

Commentary: Trading programs need guidelines for how BMPs implementation should be confirmed and maintained at individual project sites after they are installed and credits are verified and issued. For trading programs that involve hundreds of distributed BMPs (e.g., nutrient BMPs across an irrigation district), it may not be reasonable to monitor every BMP annually or more frequently. There may be a need to create a monitoring sample that inspects a rotating subset of BMPs each year (e.g., 50% of all BMPs are monitored each year). Guidelines for each eligible BMP should include a description of required data to be collected, frequency of ongoing verification, and data collection methods.

In general, it makes sense to make annual project monitoring reports available to the public through the credit registry and/or upon request. Trading program participants should clarify that one project report does not necessarily provide a broader picture of how the program is performing. There is some concern the public might unfairly question the performance of the entire program or permit because one project may be under-performing. This perception may be incorrect if other projects in the program are over-performing, or the permittee holds sufficient credits to meet their obligations. Project reports must also be careful to balance landowner privacy with access to information.

7.5 Certification

Draft Best Practice - Certification: *The relevant water quality agency or its approved third party provides a formal written certification of credits from individual projects, including confirmation that verification has occurred, a review of the verifier's report, and confirmation that all necessary documentation is in place.*

Commentary: Credit certification is the final step before a credit can be used, and includes a confirmation that all necessary paperwork and documentation are in place to support the quantity of credits proposed for registration. This does not refer to the approval of a trade or the transfer of credits between parties. At the outset, state agencies may be more actively involved in project verification and certification. Over time, agencies may reduce their engagement in certifying individual projects unless a compelling reason to do so arises.

8. Registration

NPDES permit monitoring reports and other required information is generally available to the public for inspection, review, and oversight through agency websites or upon request. Trades of credits associated with such permits must also be available to the public for similar purposes. Credit registration is a transparent way of providing this information. A registry that allows for disclosure and provides an easily searchable version of a permittee's ledger of credits allows agencies, the public, and permittees themselves to be sure that trades are helping to meet effluent limits, and that credits are not being used for more than one purpose.

8.1 Public disclosure and serialization of credits

Draft Best Practice – Public disclosure and serialization of credits: *Once verified and certified, credits must be disclosed on a publicly available website or credit registry. Permittees must use a website or registry approved or designated by the applicable state water quality agency and/or EPA. Each credit must be assigned a unique identifier or serial number through the registration process. The website or registry should allow the public to search for a particular permittee, watershed, or trading program at no cost, and should display credits sold and used for permit compliance.*

Commentary: "Easy and timely public access to information is necessary for markets to function efficiently and for the public to monitor trading activity." 68 Fed. Reg. at 1612. As such, consistent and transparent information on credits and trades should be available online to allow the regulators and the general public an easy method for tracking a permittee's trading activity and compliance. The use of an online registry will also help to prevent double-counting, and avoid usage of inconsistent nomenclature to identify credits. Utilizing common infrastructure is a way for multiple trading programs to easily identify activity occurring in their programs and all the documentation associated with those activities. Permittees and state agencies may also host duplicate copies of this information on their websites.

8.2 Information for public disclosure

Draft Best Practice – Information for public disclosure: *"EPA encourages states and tribes to make electronically available to the public [1] information on the sources that trade, [2] the quantity of credits generated and used on a watershed basis, [3] market prices, where available, and [4] delineations of watershed and trading boundaries." 68 Fed. Reg. at 1612. In addition, each website or registry listing for a credit-generating project must provide: (1) project latitude and longitude location, and (2) the identities of the parties to the credit transaction and correlating permit (if applicable). The listing should also provide, to the extent practicable: (1) verification and certification reports; (2) project site performance reports (including a representative set of photo points) and stewardship plans; and (3) project design and corroborating eligibility information. Sensitive or proprietary information that is not required for credit transparency (e.g., private landowner names and addresses, unrelated third party contact*

information, and/or proprietary or confidential information) may be redacted or kept confidential.

Commentary: Many of the materials included in the draft best practice may exceed what is currently required of regulated entities under NPDES permit monitoring reports and other documents. Nonetheless, "[t]his [type of] information is necessary to identify potential trading opportunities, allow easy aggregation of credits, reduce transaction costs and establish public credibility." 68 Fed. Reg. at 1612.

Some documents used by a verifier to approve credits may also contain sensitive or proprietary information. The registration process needs to balance discretion related to sensitive or proprietary information with the need to provide transparency. There is a need for explicit guidelines around which information should be confidential, which information should be actively posted to the registry, and which information is subject to public review but not actively posted to the registry.

9. Compliance Determination & Enforcement Actions

9.1 Compliance determination and appropriate enforcement actions

Trading distributes pollution reduction activities from the end-of-pipe to several locations, raising questions about compliance and enforcement determinations. Yet, there seems to be little difference between compliance determinations for trading and for other treatment processes.

Draft Best Practice – Compliance determination and appropriate enforcement actions: *Compliance is determined as the permittee demonstrates, via its DMRs and other reporting requirements, that it has secured an adequate credit balance to meet its established effluent limits. In addition, a permittee must comply with all provisions included within the Special Conditions section of its permit, and all enforceable aspects of its attached trading program plan (if not included in the permit).*

States will follow the same federal and state compliance and enforcement rules for trading as they do for other permit requirements. States may choose to evaluate whether their enforcement programs needs to be updated to include specific reference to trading programs.

Commentary: State and federal enforcement guidance list types of permit violations and organizes them into "classes" of violations. These guidance documents are typically very similar and it is common practice that a description of what the permittee needs to do to remedy the violation is included in the regulatory agency's enforcement action.

The actual assessment of civil penalties is then based on the severity of the violation, among several other factors, all of which are usually documented in rule or regulation. For example, if a permit contains a specific effluent limit and a facility's DMR shows that the facility exceeded that limit, the compliance officer would examine the data, verify the exceedance, determine the class of violation, and then consult the state or federal enforcement guidance to determine the next step, usually based on the severity of the violation (e.g., by how much was the limit exceeded). For a violation of minor severity, the compliance officer may then send the permittee a warning letter, if it is a first time offense. On the other hand, the enforcement guidance may prompt the compliance officer to directly assess a civil penalty, if the permittee is a repeat offender and/or the violation is of major severity. Below are two types of potential trading-related non-compliance situations and suggestions for how these violations may be addressed.

a. Insufficient credit balance

Draft Best Practice – Insufficient credit balance: *A permittee could violate its permit if it fails to secure and hold an adequate quantity of credits. This quantity should be identified in the*

effluent limit section of its permit and is equal to the number of units identified in the permit as necessary to address the permittee's excess load, and thus meet its effluent limit.

Commentary: As a threshold matter, agencies will need to build the systems whereby if the DMR report shows excess loading at the discharge point, this can be over-ridden if the permittee holds a sufficient credit balance. For example, if the facility is generating an excess discharge of 50 lbs of nitrogen and holds at least 50 lbs of nitrogen credit offsets in accordance with its credit schedule, there would not be a violation. Conversely, if the credit schedule requires the facility to generate credits to offset 50 lbs of nitrogen but the DMR shows credits to offset only 49 lbs of nitrogen, there is a violation. The permit writer, in reviewing the enforcement guidance, may send a warning for this first time offence for a failure to meet the limit by 4%. Alternatively, if the DMR showed only enough credit to offset 25 lbs of nitrogen, the permit writer would review the enforcement guidance for this failure to provide 50% of the credits and may need to send the violation on for assessment of a civil penalty regardless of whether it is a first time violation. In the first case, the permittee's warning letter would prescribe the actions needed for the permittee to come back into compliance and the time frame for doing so. In the case of the actual penalty assessment, the assessment document would also describe the actions needed to come back into compliance and the time frame.

b. Failure to meet special conditions

Draft Best Practice – Failure to meet special conditions: *A permittee would violate its permit if it failed to meet any of the special conditions outlined in the permit (e.g., provide a required annual report). The consequence of this violation would vary depending on the circumstances.*

Commentary: Not meeting permit special conditions is also a violation. For example, the failure to provide a required annual report would have different consequences for civil penalty if the permittee missed the submission deadline by a few days versus not submitting a report at all. Or there could be enforcement consequences if required sections are missing from the annual report received in a timely fashion. Each state has its own guidance on how to handle these types of violations.

10. Roles & Responsibilities in Program Administration (Placeholder)

10.1 Roles and responsibilities in trading program administration

This section describes the main functions performed when administering a trading program and outlines the capacity, cost, and authority required to perform each function.

11. Adaptive Management & Tracking Effectiveness

Current challenges in water quality make critical the exploration of innovative approaches in fairly rapid timeframe. In these cases, it is important to move forward with the best information currently available and to test assumptions through the collection and incorporation of new data as it comes to light. This process is broadly referred to as adaptive management. More specifically, adaptive management is a "systematic approach for improving natural resource management, with an emphasis on learning about management outcomes and incorporating what is learned into ongoing management. Adaptive management can be viewed as a special case of structured decision making, which deals with an important subset of decision problems for which recurrent decisions are needed and uncertainty about management impacts is high."[61] In the case of trading, an adaptive management framework would focus on: 1) improving trading program standards, protocols, and process; 2) generating and incorporating new information on quantification methods used to estimate water quality improvement associated with individual BMPs[62]; and 3) evaluating whether water quality improvement actions have been effective at meeting overall water quality goals. An adaptive management framework would not be used as a mechanism for assessing individual permit compliance.

11.1 Improving trading program standards, protocols, and process

The "data" on performance of program operations does not require study design, monitoring, or statistical analyses. Improving program operations comes from tracking comments, questions, and user experience. The benefit of tracking this information is a system that works more smoothly for the program administrator and participant (project developer)—more effectively meeting program objectives at a lower cost. Program updates may not need to occur every two years, especially after the first cycle of program improvements.

Draft Best Practice– Improving trading program management: *Each trading program should include an adaptive management plan describing how the program will track and gather the information needed to improve the performance of program administration (e.g., protocols, operational processes, etc.) and an interval for updating program documents (e.g., biennial or as needed). Program components that may be tracked include:*

- *Clarity of guidance and protocols: can project developers, verifiers, and other market participants clearly understand the operating procedures and standards that must be met?*
- *Ease of use of forms and systems for submitting documentation: what is the clearest and*

[61] U.S. Geologic Survey. Adaptive Management (2013. Available at: http://www.usgs.gov/sdc/adaptive_mgmt.html

[62] The incorporation of *new* BMPs and quantification methods is another component of program adaptation, but is considered separately in Section 1.6.

most efficient way to exchange needed information?

- *Cost to deliver services: are existing funding or fees sufficient to sustain needed service levels?*
- *BMP quality and performance standards: are the right metrics being used? At the right levels? Are BMPs performing as expected?*

Commentary: none

11.2 Improving quantification methods

Agencies need mechanisms for incorporating new versions of models and other quantification methods into trading programs as they become available. These mechanisms will help to encourage the use of the most up-to-date science, consistency with the regulatory process (i.e., water quality standards, TMDLs, permitting), and provide certainty for permittees and other market participants.

Draft Best Practice – Improving quantification methods: *Agencies manage the release of new versions for those quantification methods that they have created (e.g., models developed for a particular watershed or for TMDLs in general). Upon acceptance of a new version of a quantification method, all new subsequent trading programs should use the new quantification method. Where acceptable to the permittee and regulatory agency, existing programs may choose to use the new version for subsequent project sites. While effort to incorporate new versions into existing trading programs should be made, all previously quantified projects will continue to use the Net Uplift estimates derived from the model version that was in effect at the time the program began, unless the permittee and state agency choose to amend the relevant regulatory requirements applicable to a site, or a material error or limitation is discovered in the originally used model version.*

Where there is a third party proponent for a quantification method, an adaptive management plan, including protocols for version control and a monitoring plan that can support ongoing improvements to the method (e.g., calibration and validation), must be submitted before the method is accepted for use in the trading program. Reports of changes/improvements to the quantification must be submitted to the relevant state water quality agency. Agencies may choose to discontinue acceptance of a method where the monitoring plan was not followed, technical analyses are not considered sufficient, or better methods have become available. Where review by agency staff is required, fees may be considered to recover agency costs.

Commentary: Models, effectiveness rates, and direct measurement methods to quantify uplift from BMPs are all based on our best-available, yet evolving understanding of natural system dynamics. Water quality trading projects provide an opportunity to generate the data that will improve quantification methods over time, but a trading program should consider who will be responsible for setting up and conducting monitoring and how improvements should be incorporated.

Information needs will vary depending on the method being used. In order to improve quantification methods, it may be necessary to develop a robust sampling design and install sampling equipment at a number of sites. Considering the investment of time and equipment, the improvement of these methods is not likely to happen on its own. Some entity needs to take ownership of the management and improvement of the quantification method. Where application of a given quantification method is limited in scope or time, agencies may determine that it is not necessary to invest in monitoring and adaptive management.

In the event that new data were to reveal severe flaws in a credit quantification methodology, agencies may need options to make adjustments to a quantification method within a permit cycle in order to minimize any adverse impacts to water quality.

11.3 Effectiveness monitoring

Ultimately, many will want to answer the question, "Is trading fulfilling the obligations of point sources and is water quality improving?" However, detecting changes in ambient water quality that is causally attributable to trading will often be difficult, if not impossible, especially in watersheds where the impacts of point sources (i.e., those buying the credits from trading projects) are relatively small compared to the overall issues in a waterbody. Nonetheless, as part of overall watershed tracking, trading could be the impetus for establishing an *effectiveness monitoring* program, or could be tied into an overall TMDL effectiveness monitoring effort.

Draft Best Practice – Effectiveness Monitoring**:** *Each trading program should consider including a multi-tiered, long-term effectiveness monitoring strategy that identifies and prioritizes the types of information needed to evaluate effectiveness at different stages of program implementation. Not all types of monitoring may be appropriate at each stage, and the data collection efforts associated with some measures of effectiveness may span several years before analysis is possible. Therefore, effectiveness monitoring should be appropriately tiered over time in relevant regulatory documents, addressing increasingly more complex questions as possible (e.g., the first permit focuses on confirming BMP implementation; the second focuses on prioritizing location and type of BMP; and the third begins linking BMP performance to overall status and trends in water quality, and improvements relevant to protecting beneficial uses).*

An effectiveness monitoring strategy should include:

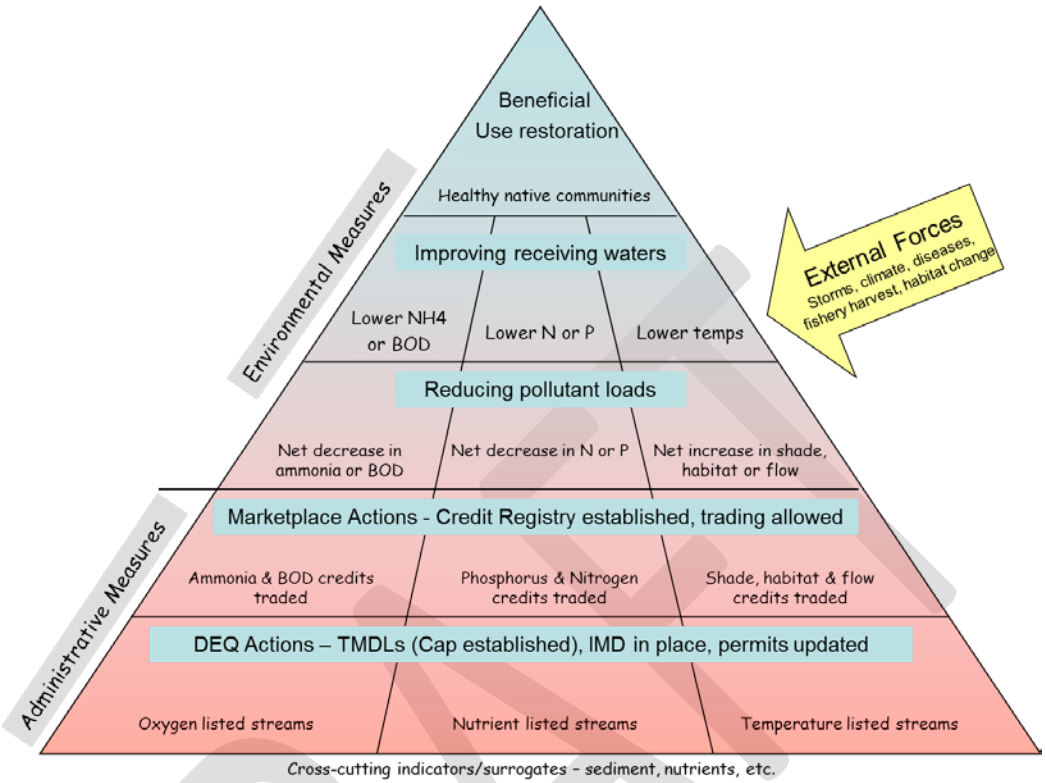
- *Identification of the evaluation questions that need to be answered for the overall watershed, and for a trading program;*
- *Identification of the different tiers of effectiveness monitoring, as well as the timing and metrics used to evaluate each tier;*
- *The data and data collection methods (both intensive and extensive methods) necessary to answer those questions; and*
- *A prioritization of data requirements and questions.*

Commentary: An effectiveness monitoring strategy should lay out a pyramid of metrics that can represent progress toward water quality standards, and toward improving beneficial uses.

Figure 12.3 (provided by Oregon DEQ) provides an example of a monitoring hierarchy, in which the program's ultimate goals, attainment of the water quality standard and support for the beneficial use, are at the top. A single trading program may not be able to achieve this ultimate goal, nor may it be possible to measure the impact of a trading program in isolation. However, the lower layers of the pyramid list surrogate measures that can be used as interim effectiveness benchmarks. Moving down the pyramid, the metrics become increasingly easy to measure relative to a given trading program, but increasingly removed from an understanding of whether the program is helping to achieve the beneficial use and attainment of water quality standards.

At trading sites, efforts should be made to establish pre-project conditions for all trading sites, as compared to post-project conditions after full implementation of the trading program. This information may help to demonstrate progress throughout the watershed. In addition to measuring reductions in loading and regulatory compliance, trading program effectiveness monitoring should endeavor to track metrics related to marketplace actions, and beneficial uses.

Figure 12.3. Hierarchy of monitoring metrics. Source: Oregon DEQ



If agencies determine that trading program effectiveness monitoring should be required, it is important to consider which entity will be responsible for its implementation. If state agencies manage trading program effectiveness monitoring in addition to TMDL effectiveness monitoring, there would be an opportunity to efficiently coordinate the two programs and to minimize the overall cost of determining program. Where states are not already undertaking TMDL effectiveness monitoring, however, it may be infeasible to add the additional study design, data collection, and analysis necessary to evaluate the impact of trading.

If a permittee is required (in its permit, or by rule) to implement an effectiveness monitoring plan for their trading program, agencies would be relieved of the responsibility and associated costs. However, this approach would likely over-reach the responsibility of permittees, which typically only extends to meeting permit obligations and does not include tracking progress on the watershed scale. In addition, where TMDL effectiveness monitoring is not already occurring, effectiveness monitoring could become a large financial obligation for permittees, and may therefore prove to be a barrier to entry for facilities wishing to engage in trading.

IV. Conclusion

The draft best practices described above are intended to spark conversations about how trading programs can be built and operated to best achieve water quality goals and strike that fine balance between cost effectiveness, usability, and transparency. As this first draft is completed, each of the states will work stakeholder to test, discuss, and better refine these draft best practices to meet the needs of locales throughout the Northwest.

With the state agencies and EPA Region 10, Willamette Partnership and The Freshwater Trust hope to revisit these draft best practices over the coming year and refine them to produce a proposed set of final best practices for November 2014.

During that period, the group welcomes thoughts, comments, discussion, and suggestions on any one or all of these draft best practices. Please direct feedback, questions, and comments to:

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V. Glossary

- **401 Certification:** as described in 33 U.S.C. § 1341(a)(1), when a federal permit or license applicant plans to undertake any activity (including facility construction or operation) that may result in any discharge into navigable waters, it must obtain a 401 Certification. The certification must come from relevant state, certifying that the discharge will comply with select provisions of the CWA.
- **Adaptive Management**: a systematic approach for improving natural resource management, with an emphasis on learning about management outcomes and incorporating what is learned into ongoing management.[63] Adaptive management in water quality trading programs may focus on improving program operations, quantification methods, and overall program effectiveness
- **Additionality:** In an environmental market, the environmental benefit secured through the payment is deemed additional if it would not have been generated absent the payment provided by the market system.[64]
- **Anti-Backsliding**: as defined in CWA sections 303(d)(4) and 402(o), and 40 C.F.R. § 122.44(l), unless falling under a relevant exception, a reissued permit must be as stringent as the previous permit.[65]
- **Anti-Degradation**: as defined in 40 C.F.R. § 131.12, and relevant state rules and implementation guidelines., these policies ensure protection of existing uses and of water quality for a particular waterbody where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. Antidegradation also includes special protection of waters designated as outstanding national resource waters. Antidegradation plans are adopted by each state to minimize adverse effects on water.[66]
- **Attenuation (pollutant)**: the change in pollutant quantity as it moves between two points, such as from a point upstream to a point downstream.
- **Baseline:** the pollutant controls and/or minimum conditions that must be implemented by buyers and sellers before they can participate in a given trading program. Further delineated as Regulatory Baseline and TMDL-Derived Baseline.
- **Baseline (Regulatory):** the management obligations imposed on a particular site by existing federal, state, and local laws and regulations.
- **Baseline (TMDL-Derived):** the uplift that *may* already be required by TMDL implementation plans.
- **Base Year:** the date after which implemented BMPs or Credit-Generating Actions become eligible to generate credits.

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[63] U.S. Geologic Survey, Adaptive Management (2013), *available at* http://www.usgs.gov/sdc/adaptive_mgmt.html.

[64] Willamette Partnership, Ecosystem Credit Accounting System General Crediting Protocol Version 2.0 at Appendix B (Glossary) (2013), *available at* http://willamettepartnership.org/ecosystem-credit-accounting/the-willamette-ecosystem-marketplace.

[hereinafter "Willamette Partnership, GCP 2.0"].

[67] EPA, Water Quality Trading Toolkit for Permit Writers, at Glossary-2 (2007), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit_glossary.pdf [hereinafter "EPA Trading Toolkit"].

- **Best Management Practice (BMP):** BMPs include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing management activities to reduce or eliminate the introduction of pollutants into receiving waters.[67]
- **BMP Guidelines:** a document that defines: A) an approved quantification method, B) the appropriate pre-project site condition to use for calculating the reduction, C) installation and maintenance quality standards, and D) ongoing performance standards to ensure that each BMP is consistently achieving the desired water quality improvements.
- **Business-as-Usual:** the typical project or program operations of an organization, and/or actions that represent sufficient cost savings to incentivize implementation without trading.[68]
- **Buyers**: credit buyers include any public or private entity that chooses to invest in water quality credits and other like quantified conservation outcomes. Buyers typically buy credits to meet a regulatory obligation. Eligibility criteria for buyers are described in Section 1 of the Draft Best Practices.
- **Calibration (modeling):** adjustment of model parameters to better match local conditions, ideally using measured water quality data and BMP site performance metrics representative of the geographic area in which the model will be applied.
- **Clean Water Act (CWA)**: 33 U.S.C. § 1251 et seq.
- **Credit Contract Period**: *See* Length (Credit Contract Period).
- **Certification:** The formal application and approval process of the credits generated from a BMP. Certification is after Verification, it is the last step before credits can be used toward a Compliance Obligation.
- **Compliance Obligation**: the total number of credits that a regulated entity must hold in its compliance ledger at particular points in time. In the case of NPDES permittees, this obligation is based on a calculation as to the facility's Exceedance over its Effluent Limit, as adjusted by a Trading Ratio, (and where applicable, other policy obligations, such as a reserve pool requirement),.
- **Compliance Schedule:** As defined in 33 U.S.C. § 1362(17), and 40 C.F.R. § 122.47, a Compliance Schedule is a schedule of remedial measures included in a permit or an enforcement order, including a sequence of interim requirements (e.g., actions, operations, or milestone events) that lead a permittee to compliance with the Clean Water Act and regulations.[69]
- **Credit:** A measured or estimated unit of pollutant reduction per unit of time at a specified location.[70]

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[67] EPA, Water Quality Trading Toolkit for Permit Writers, at Glossary-2 (2007), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit_glossary.pdf [hereinafter "EPA Trading Toolkit"].

[68] Willamette Partnership, GCP 2.0, at App. B Glossary.

[69] *Id.*

[70] *See* EPA Trading Toolkit, at Glossary-2.

- **Credit Generator**: a point or nonpoint source that generates credits through the installation of an eligible action or BMP on its property.
- **Credit-Generating Activity**: activities that generate Credits, including but not limited to land management practices (e.g., in-stream restoration actions, in-stream flow augmentation).
- **Credit Life:** *See* Length (Credit Life).
- **Credit Registry: a** service or software that provides a ledge function for tracking credit quantities and ownership. Credit registries may also act as a mechanism for public disclosure of trading project documentation.
- **Critical Period**: the period(s) during which hydrologic, temperature, environmental, flow, and other conditions result in a waterbody experiencing critical conditions with respect to an identified impairment.
- **Delivery Ratio:** *See* Trading Ratio (Delivery).
- **Designated Management Agencies (DMA)**: as defined in 40 C.F.R. § 130.2(n), an agency identified by a water quality management plan and designated by a state to implement specific control recommendations.
- **Designated Uses:** as defined in 40 C.F.R. § 131.3(f) and 40 C.F.R. § 131.10, designated uses are those uses specified in water quality standards for each water body or segment whether or not they are being attained. As defined in 40 C.F.R. § 131.10(a), examples of designated uses include public water supply, protection and propagation of fish, shellfish, and wildlife, recreation, agriculture, industrial, and navigation.
- **Discharge Point**: the point at which a point source adds/discharges a pollutant (as defined in 33 U.S.C. § 1362(6)) into a navigable water, which is defined in 33 U.S.C. § 1362(7)). A discharge of a pollutant is defined in 33 U.S.C. § 1362(12).
- **Effectiveness Monitoring:** systematic data collection and analysis to determine progress of a given water quality trading program toward the achievement of water quality standards or other program goals. Effectiveness Monitoring provides the basis for Adaptive Management.
- **Effluent Limitation**: as defined in 33 U.S.C. § 1362(11), an effluent limit means any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance. *See also* Water Quality-Based Effluent Limit (WQBEL), and Technology-Based Effluent Limit (TBEL).
- **Equivalency Ratio:** *See* Trading Ratio (Equivalency).
- **Horizontal/Proportional Stacking:** *See* Stacking (Horizontal/Proportional).
- **Length (Credit Contract Period):** the duration of a contract between a regulated entity and a Project Developer.
- **Length (Credit Life):** the period from the date a credit becomes usable as an offset by a permittee (i.e., its "effective" date), and the date that the credit is no longer valid (i.e., its "expiration" date). The life of a credit may be inconsistent with the Credit Contract Period, Project Life, or Project Protection Period.

- **Length (Project Life):** the period of time over which a given project or BMP is eligible to generate credits. Typically, the Project Life is also the minimum Project Protection Period.
- **Length (Project Protection Period):** the length of time over which a BMP or action must be protected by a Project Protection Agreement. Typically, the Project Protection Period is equal to the standard Project Life for a credit-generating BMP or Credit-Generating Activity.
- **Load Allocation (LA):** as defined in 40 C.F.R. § 130.2(g), this is the portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loads should be distinguished.
- **Location Ratios:** *See* Trading Ratios (Delivery).
- **Look-Back Period**: the time period preceding the implementation of a permittee's trading program during which landowners may take credit for installed BMPs. A Look-Back Period is intended to adjust for a market failure that disincentivizes early action by landowners.
- **Material**: a significant but unintentional error that affects the costs or benefits expected in a transaction.[71]
- **Regulatory Mixing Zone**: as authorized by 40 C.F.R. § 131.13, and implemented according to state law, the area where wastewater discharged from a permitted facility enters and mixes with a stream or water body. A mixing zone is an established area where water quality standards may be exceeded as long as acutely toxic conditions are prevented and all beneficial uses, such as drinking water, fish habitat, recreation, and other uses are protected.
- **National Pollutant Discharge Elimination System (NPDES) Permit**: as defined in 33 U.S.C. § 1342.
- **Near-Field Regulations**: minimum federal and state regulations that a permitted facility must meet at its discharge point in order to be eligible to engage in water quality trading.
- **Net Uplift**: the environmental improvement directly attributable to the credit-generating actions or practices at a site. Net uplift is used as the basis for determining the credits available for sale. Net uplift is calculated by subtracting the modeled post-project performance from the modeled pre-project performance.
- **Nonpoint Source**: Nonpoint sources are diffuse sources of water pollution, such as stormwater and nutrient runoff from agricultural or forest lands. *See* 40 C.F.R. § 35.1605-4. EPA guidance describes a "nonpoint source" as "includ[ing] pollution caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made pollutants into lakes, rivers, streams, wetlands, estuaries, other coastal waters, and ground water. Atmospheric deposition and hydrologic modification are also sources of nonpoint pollution."[72]

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[71] American Bar Ass'n, Contract Drafting, at 284 (2010).

[72] EPA, Nonpoint Source Program and Grants Guidelines for States and Territories, at 7 n.2 (2013), *available at* http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf.

- **Offset:** 1) *(noun)* Offsite treatment implemented by a regulated point source on upstream land not owned by the point source for the purposes of meeting its permit limit; 2) *(noun)* Load reductions that are purchased by a new or expanding point source to offset its increased discharge to an impaired waterbody. *(Note: EPA considers both types of offsets to be trading programs)*; 3) *(verb)* to compensate for.[73]
- **Open Enrollment Period:** time during which early-adopter landowners who installed BMPs during the appropriate Look-Back Period, but do not yet have sufficient data to qualify for new trading program eligibility standards, can enroll their credits in the program, pending compilation of appropriate documentation during a probationary period.
- **Payment Stacking:** *See* Stacking (Payments).
- **Point of Maximum Impact (Point of Concern)**: the point at which the greatest deviations from a particular water quality standard occurs, as identified through appropriate watershed-wide modeling.
- **Point Source**: as defined in 33 U.S.C. § 1362(14), this means 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, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.
- **Project Site Assessment:** the process of developing and documenting the information necessary to input the needed data into Net Uplift quantification methods. This may include a site visit and/or interpretation of remote data.
- **Program Administrator (Market Administrator)**: the organization responsible for the operation and maintenance of a water quality trading program or ecosystem credit accounting system. Specific responsibilities of a Program Administrator may include: defining credit calculation methodologies, protocols and quality standards; project site verification; and credit registration.[74]
- **Project Design:** the document that details how the proposed credit-generating action will be installed to meet BMP Guidelines, including a description of the proposed actions, installation practices, anticipated timelines, restoration goals, and anticipated threats to project performance.
- **Project Management Plan:** the document that details how the project developer plans to maintain the practice or action for the duration of the Project Life, and how the Project Developer plans to keep the practice or action consistent with BMP Guidelines**.**
- **Project Developer**: a third party (or a regulated entity) that develops, aggregates, or oversees the development of credits via BMPs or other credit-generating actions.
- **Project Life:** *See* Length (Project Life).
- **Project Protection Agreements:** the enforceable agreements to protect BMPs or Credit-Generating Activities at the project site, which may include leases, contracts, easements, or other agreements.

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[73] EPA Trading Toolkit, at Glossary-4.

[74] Willamette Partnership, GCP 2.0, at App. B Glossary.

Project Protection Agreements must cover the Credit Life and should run with the land to ensure the project will not be affected if ownership changes. *Ideally, these protections will also mitigate against proximate disturbing land use activities.*

- **Project Protection Period:** *See* Length (Project Protection Period).
- **Project Site**: the location at which Credit-Generating Activities or BMPs are undertaken/installed.
- **Protocols**: step-by-step manuals and guidelines for achieving particular environmental outcomes. Protocols include the actions, sequencing, and documentation necessary to generate credits from a eligible BMPs or Credit-Generating Activities.
- **Public Funds Dedicated to Conservation**: funding targeted to support voluntary natural resource protection and/or restoration with a primary purpose of achieving a net ecological benefit through creating, restoring, enhancing, or preserving habitats.[75] Some examples include Farm Bill Conservation Title cost share and easement programs, EPA section 319 funds, U.S. Fish and Wildlife Service Partners for Wildlife Program, state wildlife grants, and other sources. Public loans intended to be used for capital improvements of public water systems (e.g., State Clean Water Revolving Funds and USDA Rural Development funds), and utility stormwater and surface water management fees, are not public funds dedicated to conservation.[76]
- **Quantification Method:** scientifically-based method for determining the load reduction associated with a given Credit-Generating activity or BMP. Quantification methods can be grouped into three general types: pre-determined rates/ratios, modeling, and direct monitoring.
- **Quantification Method (Predetermined Pollution Reduction Rates):** standard modeled values based on the best available science that is used to calculate water quality improvement.
- **Quantification Method (Modeling)**: mathematical and/or statistical representation of processes driving changes in water quality, based in science, used to estimate the Net Uplift provided by the Credit-Generating Activities. Modeling is also frequently used to predict attenuation of pollutants.
- **Quantification Method (Direct Monitoring)**: sampling and analysis of both water chemistry (e.g., river turbidity or temperature) and surrogates for water quality (e.g., eroding stream banks or shade from riparian vegetation) used to measure the realized Net Uplift of BMPs and Credit-Generating Activities.
- **Reference Conditions**: local conditions that inform BMP and Credit-Generating Activity quality standards at a particular project site. Reference sites establish the benchmark for ecologically healthy site(s) within the same watershed (HUC5), and are based on historical conditions, literature, local knowledge, and/or the best professional judgment.

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[75] *See* U.S. Fish & Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, Oregon Department of State Lands, Oregon Watershed Enhancement Board, Oregon Department of Fish and Wildlife, Oregon Interagency Recommendations: Public Funds to Restore, Enhance, and Protect Wetland and At-Risk, Threatened and Endangered Species Habitats: Appropriate Uses of These Funds in Species and Wetland Mitigation Projects (2008), *available at* http://www.fws.gov/oregonfwo/LandAndWater/Documents/PublicFunding-final.pdf.

[76] Willamette Partnership, GCP 2.0, at App. B Glossary.

- **Registration (of Credits)**: The process of assigning a unique serial number to a verified and certified credit, and uploading the credit (and accompanying documentation) to a publicly available website.
- **Regulated Entities**: entities regulated under the Clean Water Act.
- **Regulator**: the state and federal agencies responsible for protecting environmental quality/permit issuance.
- **Regulatory Baseline**: *See* Baseline (Regulatory)
- **Reserve Pool:** A collection or bank of unused credits that is available to compensate for unanticipated shortfalls in the quantity of credits that are actually generated.[77]
- **Retirement Ratio:** *See* Trading Ratio (Retirement).
- **Site Screening:** *See* Validation.
- **Supplemental Environmental Project (SEP):** an environmentally beneficial project that a violator voluntarily agrees to perform as part of a settlement of a civil penalty to offset some portion of the monetary penalty. In return, EPA agrees to reduce the monetary penalty that would otherwise apply as a result of the violation(s). SEPs are guided by several factors, as described in *Memorandum from Steven Herman, Assistant Administrator, U.S. EPA, to Regional Administrators, Issuance of Final Supplemental Environmental Projects Policy (1998).*
- **Quality Standards**: the necessary specifications associated with a particular Credit-Generating Activity or BMP that ensures that the estimated ecosystem service benefits at a Project Site are actually achieved through implementation.
- **Site Conditions (Anticipated Post-Project)**: the characteristics and conditions of the project site that are anticipated to be present after the implementation of a BMP or action and assuming the project site continues to be managed as planned.
- **Site Conditions (Pre-Project)**: A description of site condition prior to implementation of the BMP action, used to calculate the current input level of a pollutant (in default unit of trade) from the project site into the waterbody).[78]
- **Site Performance (Anticipated Post-Project):** the anticipated pollutant load that will enter a waterway, as estimated by the relevant quantification method, as a result of the Site Conditions Anticipated Post-Project.
- **Site Performance (Pre-Project):** the modeled pollutant load that is entering a waterway, as estimated by the relevant quantification method, from a site prior to installing a BMP or action.
- **Stacking:** the ability of a Credit Generator to receive multiple payments from actions generated on the same spatial area.[79] This includes the generation of multiple credits from the same action or the

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[77] EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1612 (Jan. 13, 2003) [hereinafter "EPA Trading Policy"].

[78] Willamette Partnership, GCP 2.0, at App. B Glossary

[79] *See* David Cooley & Lydia Olander, Nicholas Institute Working Paper, Tacking Ecosystem Services Payments: Risks and Solutions, at Section I (2011), *available at* http://nicholasinstitute.duke.edu/sites/default/files/publications/stacking-ecosystem-services-payments-paper.pdf.

use of multiple payments for the same credits. Stacking is further delineated as vertical, temporal, horizontal/proportional, and payment stacking.

- **Stacking (Vertical):** the generation and sale of more than one kind of credit from the same action on the same area of land.[80]
- **Stacking (Temporal):** the generation of credits from a given action for one purpose now and the use of the same action to support generation of other credit types at a later date.[81]
- **Stacking (Horizontal/Proportional):** the generation of multiple credit types where a Project Site performs more than one distinct environmental benefit on non-spatially overlapping areas.[82] Although multiple credit values are produced, the sale of one credit has a corresponding reduction in the proportion of all other credits.
- **Stacking (Payments):** the use of multiple funding sources to support a credit-generating project. Payment stacking is most often discussed and addressed through water quality trading programs when the one or more funding sources are Public Funding Dedicated to Conservation.
- **Stewardship Funds:** the *funding necessary to maintain Project Sites for the duration of the Credit Life. Project Developers must demonstrate adequate stewardship funding is in place before credits can be verified. Stewardship funding instruments often include performance bonds, restricted accounts, insurance, etc.*
- **Technology-Based Effluent Limitation (TBEL)**: As described in 33 U.S.C. § 1311(b)(1)(A)-(B), a permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration. TBELs for publicly owned treatment works (POTWs) are derived from the secondary treatment regulations (40 CFR Part 133) or state treatment standards. TBELs for non-POTWs are derived from national Effluent Limitation Guidelines, state treatment standards, or on a case-by-case basis from the best professional judgment of the permit writer.[83]
- **Temporal Stacking:** *See* Stacking (Temporal).
- **TMDL-Derived Baseline**: *See* Baseline (TMDL-Derived).
- **Total Maximum Daily Load (TMDL)**: as defined in 33 U.S.C. § 1313(d)(1)(C), and 40 C.F.R. §§ 130.2(i), as well as in relevant state regulations. A TMDL is the calculation of the maximum amount of a pollutant a waterbody can receive and still meet applicable water quality standards (accounting for seasonal variations and a margin of safety), including an allocation of pollutant loadings to point sources (wasteload allocations) and nonpoint sources (load allocations).[84]
- **TMDL Implementation Plans**: the management plans designed by Designated Management Agencies to implement the wasteload and load allocations assigned to entities in the TMDL.

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[80] *Id.* at 3.2.1.

[81] *Id.* at 3.2.1.

[82] *Id.* at 3.2.1.

[83] EPA Trading Policy, 68 Fed. Reg. at 1612.

[84] *See* EPA Toolkit, at Glossary-5.

- **Toxics**: persistent bio-accumulative toxics (PBTs). PBTs are chemicals that are toxic, persist in the environment and bioaccumulate in food chains and, thus, pose risks to human health and ecosystems. PBTs include aldrin/dieldrin, benzo(a)pyrene, chlordane, DDT and its metabolites, hexachlorobenzene, alkyl-lead, mercury and its compounds, mirex, octachlorostyrene, PCBs, dioxins and furans, and toxaphene.[85]
- **Trading Ratio:** A trading ratio is a numeric value that is multiplied by the number of credits that would otherwise be required (i.e., the amount of Net Uplift reduced by Baseline obligations). Ratios are applied to account for various factors, such as watershed processes (e.g., attenuation), risk, and uncertainty— both in terms of measurement error and project performance, ensuring net environmental benefit, and/or ensuring equivalency across types of pollutants. Ratios are applied to the final calculated credit amount.
- **Trading Ratio (Delivery):** the factor applied to pollutant reduction credits when sources are directly discharging to a waterbody of concern that accounts for the distance and unique watershed features (e.g., hydrologic conditions) that will affect pollutant fate and transport between trading partners.[86]
- **Trading Ratio (Equivalency):** the factor applied to pollutant reduction credits to adjust for trading different pollutants or different forms of the same pollutant.[87]
- **Trading Ratio (Retirement):** the factor applied to pollutant reduction credits to accelerate water quality improvement. The ratio indicates the proportion of credits that must be purchased in addition to the credits needed to meet regulatory obligations. These excess credits are taken out of circulation (retired) to accelerate water quality improvement.[88]
- **Trading Ratio (Reserve):** a type of uncertainty ratio in which credits are held in "reserve" and then used to account for uncertainty and offset failures in project performance.
- **Trading Ratio (Uncertainty):** the factor applied to pollutant reduction credits generated by nonpoint sources that accounts for lack of information and risk associated with BMP or Credit-Generating Activity measurement, implementation, and performance.[89]
- **Uncertainty Ratio:** *See* Trading Ratio (Uncertainty).
- **Units of Trade:** the quantity of tradable pollutants, typically expressed in terms of pollutant load per unit time, at a specified location (e.g., lbs/year at the point of concern).

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[85] EPA Trading Policy, 68 Fed. Reg. at 1610 (EPA did not originally support trading of persistent bioaccumulative toxics). Notable PBTs are prioritized by EPA's Canada-United States bi-national toxics strategy. *See* EPA, Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Chemicals, http://www.epa.gov/pbt/pubs/fact.htm.

[86] *See* EPA Toolkit, at Glossary-3.

[87] *See* EPA Toolkit, at Glossary-3.

[88] *See* EPA Toolkit, at Glossary-5.

[89] *See* EPA Trading Toolkit, at Glossary-6.

- **Validation (Site Screening):** the initial site-screening process through which a project developer receives confirmation that their proposed project is likely eligible to produce credits, based on the information available at that time.
- **Validation (modeling):** process through which results from credit Quantification Methods are assessed relative to evaluation criteria. Often, validation includes the comparison of model results with measured data, sensitivity analyses, and uncertainty analyses. Validation may also include a comparision with other model outputs, literature values, and/or expert judgement.
- **Variance**: as authorized by 40 C.F.R. § 131.13, and implemented according to state law, a variance is a time-limited change in the water quality standards for a particular Regulated Entity, typically limited to three-to five-year duration, with renewals possible.
- **Verification**: Confirmation that Project Site BMPs or Credit-Generating Activities and credits conform to the applicable quality standards required by a Program Administrator or Regulator. This process includes: (1) on-the-ground statistical or scientific corroboration of the project developer's asserted Credit-Generating Activities or BMPs by an independent, third party; (2) review, inspection, or audit of the Project Developer's credit generation processes or models; (3) review of associated Project Protection Agreements, or other documents to ascertain credit ownership and duration; and (4) ongoing review of reports or models, as specified over time, to confirm that the project is performing to the applicable standards.
- **Verification Protocol:** the document that provides the standardized, specific guidance on the review and assessment of Credit-Generating Actions and BMPs and credit calculation methodologies under a water quality trading program (adapted from GCP).
- **Vertical Stacking:** *See* Stacking (Vertical).
- **Waste Load Allocation (WLA):** as defined in 40 C.F.R. § 130.2(h), this is the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.
- **Water Quality Criteria (WQC):** as defined in 40 C.F.R. § 131.3, WQC are elements of state water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.
- **Water Quality Standard (WQS):** as defined in 40 C.F.R. § 131.3(i), WQS are provisions of state or federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based on such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act.
- **Water Quality Based-Effluent Limitation (WQBEL)**: as described in 33 U.S.C. § 1312(a), a TBEL is an effluent limitation determined by selecting the most stringent of the effluent limits calculated using all applicable water quality criteria (e.g., aquatic life, human health, wildlife, translation of narrative criteria) for a specific point source to a specific receiving water for a given pollutant or based on the facility's wasteload allocation from a TMDL.
- **Water Quality Model:** *See* Quantification (Water Quality Model).

- **Watershed:** An area of the land that drains to a common lake, pond, river, stream, or other surface waters of the State that is delineated for the purpose of instituting water quality management activities.[90]

[90] Wisconsin Department of Natural Resources, Guidance for implementing water quality trading in WPDES permits, No. 3800-2013-04, at Glossary (2013), *available at* http://dnr.wi.gov/topic/surfacewater/documents/WQT_guidance_Aug_21_2013signed.pdf.

VI. Appendix A. Components of BMP Guidelines

Category		Components
Basic Information		• Title and description of practice • Load sources addressed by BMP

Quantification Method		• Unit of measure
		• Quantification approach and/or tool
		  o Technical documentation of quantification approach/tool, including assumptions and estimates of uncertainty
		  o Procedures/user guidance for consistent application of the method
		• Alternative quantification approach and/or tool
		• Effectiveness estimate, including justifications/references

BMP Quality Standards	Suitability/ Specific BMP Eligibility	• Eligible land-uses and practices • Locations in watershed where BMP is applicable • Potential interactions with other practices, e.g. riparian restoration with stream fencing increases combined effectiveness • Identification of ancillary benefits or unintended consequences, e.g. increased/reduced air emissions • Description of conditions where the BMP will not work (i.e. large storms) • Any negative results, e.g. relocated pollutants, negative pollutant reduction data

	Design criteria	• Installation instructions/guidance, e.g. installation according to manufacturer standards and/or NRCS standards.
		• Verifiable criteria for installation, including:
		  o Quantitative criteria, e.g. 2600 stems/acre planting density, 100 ft minimum buffer width, 30% residual residue, 2 hour inflow water capacity, 100 ft. from surface water
		  o Qualitative criteria for installation, e.g. watering hole outside riparian zone, fence/pipe material type
		• Management instructions/guidance, e.g. seeding rate, tillage plan, crop list, water application rates and method, fertilizer application rates and methods

	Monitoring	• Operation and maintenance requirements and how neglect alters performance • Description of how the practice will be tracked and reported, e.g. noting signs of erosion, measurement of vegetative cover, monitored irrigation systems.
	Performance standards	• Verifiable criteria for performance, e.g. no rills or gullies wider than 6”, stem density of 1600 stems per acre or greater, no more than 20% cover invasive species, at least 10 inches crop stubble height
Credit Issuance Procedures	Contract Duration and Credit Disbursement	• Cumulative, annual, or seasonal practice • Useful life; effectiveness of practice over time • Factors affecting temporal performance of the practice, including lag time between establishment and full functioning

	Validation	• Documentation that must be submitted to determine eligibility during a project screening/validation • Procedures for reviewing consistency with eligibility criteria • Applicable baseline requirements
	Credit Calculation Procedures	• Guidelines for applying methodology to pre-project site conditions • Guidelines for defining/predicting the future condition (for BMPs that take time to mature) • Guidelines for documenting assumptions and data included in quantifying net uplift
	Verification	• Procedures for documenting pre- and post-project conditions, e.g. farm records for 3 years prior, photo points documenting pre-project condition, site visit after installation • Procedures for reviewing consistency of pre- and post-project conditions with quality standards, e.g. no more than 15% discrepancy between reported and verified values

VII. Appendix B. Memo from The Freshwater Trust on Baseline Regulatory Framework (Placeholder)

This memo provides context, research, and legal analysis around the draft best practices for baseline and additionality. It was included separately in the materials for the December 2013 interagency workshop. It may be incorporated as an Appendix to the Joint Statement and Best Practices upon review and further discussion with agency staff.