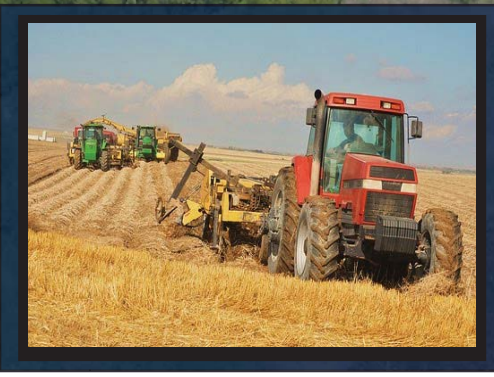
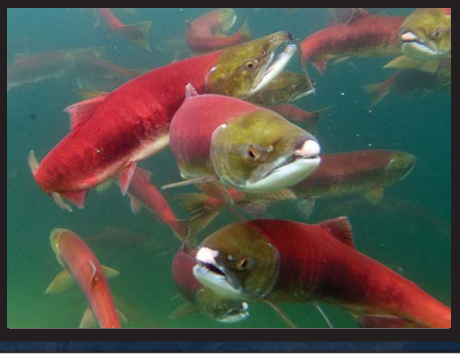
Draft Regional Recommendations for the Pacific Northwest on Water Quality Trading





Prepared By:
Willamette Partnership
The Freshwater Trust

In Collaboration With:
Idaho Department of Environmental Quality
Oregon Department of Environmental Quality
Washington Department of Ecology

Under the USDA Conservation Innovation Grant Award
Willamette Partnership, November 2012
Multi-State Agency Guidance for Water Quality Trading: Joint Regional Water Quality Trading Agreement (69-3A75-12-255)

REGIONAL RECOMMENDATIONS FOR THE PACIFIC NORTHWEST ON WATER QUALITY TRADING

Prepared By:
Willamette Partnership
The Freshwater Trust

Under a USDA-NRCS Conservation Innovation Grant Award

In Collaboration With:
Idaho Department of Environmental Quality
Oregon Department of Environmental Quality
Washington Department of Ecology

Advised by:
U.S. EPA Region 10, Seattle, WA

August 2014

Table of Contents

Executive Summary

In March 2013, water quality agency staff from Idaho, Oregon, and Washington, U.S. EPA Region 10, Willamette Partnership, and The Freshwater Trust convened a working group for the first of a series of four interagency workshops on water quality trading in the Pacific Northwest. Facilitated by Willamette Partnership through a USDA-NRCS Conservation Innovation Grant, those who assembled over the subsequent eight months discussed and evaluated water quality trading policies, practices, and programs across the country in an effort to better understand and draw from EPA's January 13, 2003, Water Quality Trading Policy,[1] and its 2007 Permit Writers' Toolkit,[2] as well as existing state guidance and regulations on water quality trading. All documents presented at those conversations and meeting summaries are posted on the Willamette Partnership's website.

The final product is intended to be a set of recommended practices for each state to consider as they develop water quality trading. The goals of this effort are to help ensure that water quality "trading programs" have the quality, credibility, and transparency necessary to be consistent with the "Clean Water Act" (CWA), its implementing regulations and state and local water quality laws. This effort stemmed from growing interest in trading in the region and from agencies' desire to respond to the wide diversity of proposed approaches in a more consistent way. The participating agencies were interested in comparing and contrasting approaches across the region in order to inform their own approaches to trading and to identify some common principles and practices in the region. In particular, these discussions focused on how trading can help "point sources" meet their permit "effluent limits" in a way that provides greater environmental benefits than traditional compliance solutions.

The initial focus of this effort is to provide recommendations on trades between point source "buyers" and "nonpoint source" sellers of "credits." Future efforts can incorporate more explicit considerations for point-point trades, nonpoint-nonpoint trades, and application of this framework to other water quality mitigation contexts. Many of the recommendations and elements will be similar in these other contexts.

Goals

To achieve these goals, the workgroup set out to identify the critical components of water quality trading and to recommend several approaches to achieve these components. Ultimately, the goal of this process is to help increase the confidence of participants and observers that trades will produce their intended "water quality benefits" and comply with applicable CWA regulations and state and local water quality laws.

---

[1] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf.

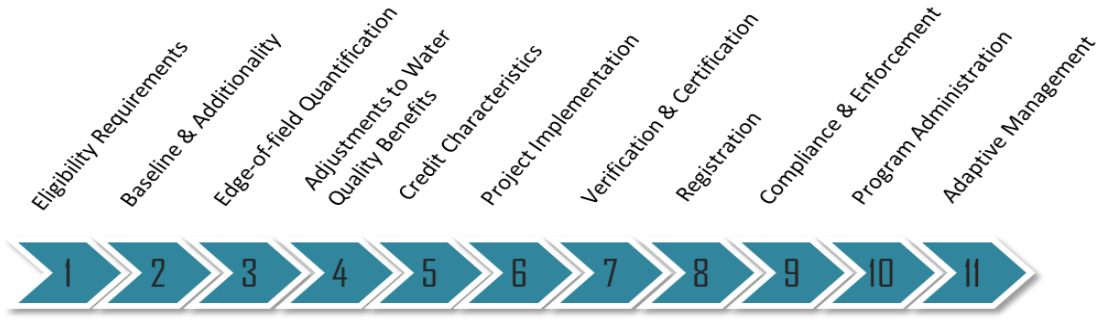
[2] *See* U.S. EPA, Water Quality Trading Toolkit for Permit Writers*,* 30–31, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.

The principles and practices included in this Draft Recommendations document build from the 2003 U.S. EPA Trading Policy[3] and cover each recommended component of a successful water quality trading program. The document is written to meet the needs of state water quality agencies and those leading the design, development, and implementation of trading programs. These draft recommendations should also be useful to participants in trading—point source buyers, sellers, environmental organizations, and other third parties.

Breaking "Trading Program" into Three Distinct Terms

The term "trading program" means different things depending on audience, and is often used as a catch-all term. Depending on the context in which this term is used, a trading program might mean a broadly-defined set of state trading parameters, a watershed-level framework, or a permittee-level trading initiative. In order to avoid ambiguity within the draft recommendations, this document establishes and uses the following three definitions so that the reader can better understand the nature and scope of each recommendation: 1) trading "guidance" (overarching state-level agency rules, policy, guidance that set the broad sideboards for trading in a state); 2) trading "frameworks" (watershed-level rules, policies, and guidance, which if they exist, provide more specificity on how trading should be implemented in a particular watershed; these documents may be developed by watershed stakeholder groups, but are vetted and endorsed by agencies); and 3) trading "plans" (permittee-level plans, either included in or attached to permits, that detail how a particular trading solution will be designed, implemented, verified, and tracked so as to meet effluent limits). To better clarify the implications of particular draft recommendations, this document frequently references these terms.

The Draft Recommendations document includes Guiding Principles to help steer agencies and stakeholders in making key decisions. It also provides background context and commentary for each of the draft recommendations and details when it might make sense to design a trading program differently. The topics covered in this document are shown in the diagram below. This diagram appears in the footer of each section of the Draft Recommendations document to orient the reader. All topics are also briefly reviewed in this Executive Summary.



[3] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at Reg. at 1609.

Principles for Water Quality Trading

Water quality trading is just one tool of many that may be used to help achieve the goals of the CWA, and other public objectives.[4] Trading is not appropriate for addressing many water quality challenges, and stakeholders must evaluate its efficacy before assuming it can be useful in every "watershed." However, when designed to include appropriate safeguards, trading programs can help achieve water quality goals in a way that is beneficial for permittees, landowners, communities, and the environment.

The Guiding Principles in the Draft Recommendations document can assist agencies and stakeholders in making key decisions when designing and launching "trading guidance," frameworks, and plans. Water quality trading is generally appropriate when it allows sources to more effectively comply with their allocations and permit effluent limits in a way that is consistent with the 2003 U.S. EPA Trading Policy, the CWA regulatory framework, and other relevant regulations. Trading should also be based on sound science such that it utilizes the best available methods to quantify water quality benefit and does not produce localized water quality problems. Finally, trading should be structured in a way to ensure that the promised water quality improvements are delivered, and should seek to do so with predictable and reasonable costs.

Eligibility for Water Quality Trading

Trading is not appropriate for every watershed or in every situation. Eligibility guidelines for buyers and sellers can provide clear direction as to when and where trading is acceptable, and when and where it is not.

Eligibility for Buyers

Buyers include permitted point sources and others with regulatory compliance needs or voluntary motives. All types of buyers should be allowed to purchase credits. Based on the preferences of the region's state environmental agencies, trades in the Pacific Northwest are expected to most often occur under individual, reissued "National Pollutant Discharge Elimination System" (NPDES) permits in basins covered by an approved "Total Maximum Daily Load" (TMDL) or a similar watershed analysis. These preferences fall within the range of available options under the 2003 U.S. EPA Trading Policy. Subject to agency discretion and conformance with the CWA and its implementing regulations, trades outside of a TMDL may be possible, but may require TMDL-like analysis. Trades also need to be consistent with relevant "water quality standards," including "anti-degradation," "anti-backsliding," and human or aquatic life provisions, and should not create localized water quality impacts (sometimes called pollution hotspots). Point sources cannot trade to meet their technology-based effluent limits unless explicitly authorized by EPA regulations.

[4] *Id.* at 1609 ("Water quality trading is an approach" to "[f]inding solutions to [] complex water quality problems.").

Trading Areas

Trades should only be valid within a defined "trading area" for that buyer. For example, "regulators" may determine that buyers need to purchase credits upstream of the "point of concern" in their watershed, which may be located downstream of their discharge.

"Credit Generating Actions"

Credits can be generated from in-stream or on-farm conservation and restoration actions, collectively referred to as "best management practices" (BMPs), so long as the associated water quality benefits are quantified and verified. A pre-approved list of eligible BMPs may make it clearer and easier for trading to focus on the most relevant BMPs. Each pre-approved BMP would then contain guidelines that describe quality implementation standards, a method for quantifying credits, and maintenance obligations. Trading guidance and trading frameworks should also consider including a process for evaluating and incorporating new types of BMPs.

Incorporating Trading in NPDES Permits

NPDES permits must include requirements to ensure BMPs will provide water quality benefits and provide sufficient detail for enforceability. A permit that includes trading should also contain all or some of the following elements:

- The applicable trading area and the eligible types, quantity, and units of credits needed to "offset" a permittee's water quality based effluent limits;
- A detailed trading program plan ("trading plan") in the permit or as a separate, publicly noticed attachment to the permit;
- The reporting requirements, timing, and contents of a permittee's "discharge monitoring report" (DMR) and other potential reporting requirements; and
- "Compliance schedules" if necessary to meet effluent limitations.

When developing a trading plan, permittees should rely on applicable agency trading guidance and trading frameworks. Trading plans should include: (1) a list of eligible BMPs for generating credits; (2) acceptable methods for quantifying water quality benefits; (3) "baseline;" (4) "trading ratio" and risk mitigation requirements, if applicable; (5) quality standards for BMP design, implementation, and performance; (6) requirements for project "verification," "certification," and "registration;" and (7) requirements for legal and financial protection. Further detail on these permit conditions may be provided in the "permit evaluation report." Even if a permittee relies on other entities to develop or implement its trading plan, ultimately, the permittee bears the regulatory liability for ensuring that credits are functioning.

Determining Baseline & Additionality Requirements

To generate credits, sellers will need to reduce pollutant loads beyond what is required and/or what would have occurred in the absence of a potential offset or trade. In other words, credits need to be "additional."[5]

Deriving Trading Baseline Requirements

"Trading baseline" is the threshold a nonpoint source is required to meet before selling credits. The 2003 U.S. EPA Trading Policy states that "pollutant reductions [should be] greater than those required by a regulatory requirement or established under a TMDL."[6] At a minimum, all nonpoint sources need to meet existing minimum requirements, which are typically affirmative obligations or non-disturbance regulations stemming from state and local law (e.g., all farms must have "nutrient management plans" in place or riparian vegetation may not be actively disturbed) prior to selling credits. Where a TMDL exists, and it establishes, through TMDL "load allocations" (LAs) and/or "TMDL implementation plans,"[7] requirements that differ from existing state, local, and tribal requirements, then the requirements stemming from TMDL LAs and/or TMDL implementation plans will supplement the existing regulatory requirements. In the absence of existing regulatory requirements or requirements stemming from TMDL LAs and/or TMDL implementation plans, the state has general nonpoint source control authority[8], it can also choose to set its trading baseline for trading guidance, frameworks, or plans based on that authority.

Where TMDL LAs, TMDL implementation plans and/or regulatory requirements are clear for individual nonpoint sources, trading baseline should be set to satisfy all of the applicable requirements. Yet, many TMDL LAs are set for entire nonpoint sectors and regulatory requirements might only provide general guidelines (i.e., they are not clear on what individual nonpoint sources are required to do, or by when, prior to selling credits). As a result, when regulatory requirements, TMDL LAs and/or TMDL implementation plans do not establish clear baseline requirements for individual nonpoint sources, states may need to derive site-specific trading baseline thresholds

[5] U.S. EPA, Technical Memorandum: Components of Credit Calculation, at 9 (May 14, 2014), *available at:* http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/TradingTMs/CreditCalculationTM_FINAL_5_14_14.pdf.

[6] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

[7] In some states, baseline may be based directly on TMDL LAs. In others, TMDL LAs need to be translated into state, local or tribal statutes, rules, regulations or orders to become a baseline requirement. It is therefore necessary to consult with the water quality agency in each state to determine how each respective TMDL program interacts with trading requirements.

[8] *See, e.g.,* WASH. REV. CODE § 90.48.080 (2014) ("It shall be unlawful for any person to throw, drain, run, or otherwise discharge into *any of the waters of this state*) (emphasis added). The Washington Supreme Court recently upheld the Washington Department of Ecology's authority to regulate nonpoint sources under this law. Lemire v. Washington, 178 Wash.2d 227 (Wash. 2013).

from existing regulatory requirements, TMDL LAs, TMDL implementation plans, and/or general nonpoint source control authority.

Improving TMDLs to Support Trading

If trading is to be used to help meet water quality goals in a watershed, then considering how several actions may affect trading early on in TMDL development will make it easier to set a trading baseline later on. These actions include clearly defining load allocations, examining the expected role of trading in achieving TMDL goals, and making clear statements about the role and timing of trading in implementing the TMDL. It is often up to states, including other non-water quality agencies, and other federal and local management agencies that implement TMDLs, to set the site-specific TMDL implementation requirements that may become part of a site's trading baseline.

Currently, many TMDL implementation plans lack clarity as to when desired future conditions will be attained, what sequence of actions, and by when, will be necessary to reasonably assure progress toward compliance with water quality standards over the longer-term. Without such specificity, it may not be clear how to set a trading baseline, which entity will address what amount of the problem during TMDL implementation, and by when (e.g., whether LAs would need to be met in 5 years or 75 years, or how much load must be reduced before trading can occur).

Implementing Baseline Requirements

To implement baseline requirements, trading frameworks and trading plans developed by agencies, watershed stakeholders, and/or permittees should identify a "base year" after which credits can be generated. Conservatively, the base year can be the year a seller completes a project consistent with the requirements of an applicable trading framework or a permittee's trading plan. It may also take the form of the date of TMDL issuance or similar watershed strategy informing allocations. In some cases, sellers may be allowed to sell credits from prior existing projects if the developer of that project can: A) document consistency of the project with all applicable trading requirements, and B) demonstrate that the project was implemented after the chosen base year or another appropriate date selected by regulators.

The trading guidance, trading framework or trading plan should also detail how baseline and other additionality criteria are expressed:

- Baseline requirements may be expressed as a technology-based requirement (e.g., a minimum set of BMPs), as a performance-based requirement at the nonpoint source seller's site level (e.g., percentage or numeric load reduction target), or as a performance-based requirement at the watershed level.
- Baseline requirements will most often be applied to individual sellers, but may sometimes be applied to groups of nonpoint source sellers or to a sub-watershed. Trading frameworks or trading plans might consider incentives for collective implementation of BMPs.
- Sellers may implement BMPs that simultaneously meet their baseline requirements and generate credits (i.e., no need to first install a project to meet baseline requirements, and then undertake a separate project to generate credits).

- "Cost share" dollars (i.e., "public dollars dedicated to conservation"[9]) may be used to help landowners meet baseline requirements, but the use of such funds should be disclosed and carefully accounted for. Section 5.3 discusses how to use and account for credits generated when using multiple funding sources.

Quantifying Water Quality Benefits

Through the use of best available science, quantification tools can predict and, depending on the tool, measure the pollution reduction from BMPs. These reductions are then translated into credits. Credits are thus a function of the pollution reductions at the edge of a field, adjusted for delivery into and "attenuation" through a waterway if necessary, application of baseline or eligibility requirements, and adjustments via trading ratios.

To quantify pollution reductions, a seller should first document a site's "pre-project conditions" at the base year in a way that can be independently verified. Pre-project conditions could simply be the presence or absence of minimum BMPs, or could be quantification of a pre-project pollution load. After the action is complete, a seller may then document or estimate the site's actual or anticipated "post-project conditions." Similarly, post-project conditions can be documented as the presence or absence of BMPs, or as a post-project pollution load. If pre- and post-project conditions were measured in terms of pollutant load, then no translation is needed in order to quantify pre- and post-project "site performance." If the pre- and post- conditions were documented in other ways, it will be necessary to translate that qualitative information into a net water quality benefit (or net "pollutant reduction") in order to calculate the net water quality benefit in units consistent with a NPDES permit or TMDL.

This net pollutant reduction, or water quality benefit, can be quantified in a number of ways, each with certain advantages and disadvantages. "Quantification methods" may include pre-determined BMP effectiveness rates, "water quality modeling," or direct measurement monitoring at sites. Regardless of the approach taken, however, the methods used to quantify water quality benefits should be repeatable, sensitive, accurate, practical, and transparent. Furthermore, they should be well-documented, include a thorough technical review, and contemplate a plan for improving the method over time. Moreover, each trading framework or trading plan should identify and use standard methods, with clearly defined versions approved by regulators for use.

[9] These are funds 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. Some examples include Farm Bill Conservation Title cost share and easement programs, EPA section 319 grant funds, U.S. Fish and Wildlife Service Partners for Wildlife Program, and state wildlife grants. Public loans intended to be used for capital improvements of public wastewater and drinking water systems (e.g., State Clean Water Revolving Funds and USDA Rural Development funds), bond-backed financing, and utility stormwater and surface water management fees from ratepayers, are not public funds dedicated to conservation.

Translating Quantified Water Quality Benefits to Water Quality Credits

Water quality benefits at the project scale are translated into water quality credits. However, application of some or all of the following factors may reduce the amount of credits that can be sold: baseline requirements, delivery and attenuation factors (if necessary), trading ratios, and "reserve pool" set asides. In other words, the water quality benefits from a site are discounted by all of these factors to generate a number of credits available to sell.

Delivery and Attenuation of Water Quality Benefits

After the edge-of-field water quality benefits have been quantified, additional calculations are often used to estimate how much of the pollutant is transported from the point at which it is generated to the point of concern downstream. In some cases, it is necessary to understand how much of the pollutant load is delivered from the field into the waterbody. It may also be necessary to account for instream attenuation of pollutants, which is the change in pollutant quantity as it moves from a point upstream to a point downstream. These delivery and attenuation factors are relevant in determining the amount of water quality benefit that can be sold as credits.

Accounting for delivery and attenuation may occur as part of a TMDL (e.g., modeling attenuation), through trading ratios, or through BMP eligibility rules (e.g., requiring eligible fields to have a direct hydrologic connection to a stream as a proxy for delivery to the waterbody). Where possible, the approaches used to estimate delivery and attenuation should be consistent with those used to estimate edge-of-field water quality benefits.

Trading Ratios

A trading ratio is a value used to adjust the available water quality benefits from a particular project that can be sold as credits. Trading ratios account for various factors, such as delay in BMP maturation, programmatic risk, uncertainty (both in terms of measurement error and project performance), and/or net environmental benefit creation. Some of these factors may be directly incorporated in the quantification of credits instead of as trading ratios. For example, measurement uncertainty can be accounted for via conservative model assumptions, and not as a back-end ratio adjustment. Trading ratios should be tailored to the applicable credit type and analyzed scientifically for appropriateness. Where specific policy objectives such as watershed goals, economic feasibility, or appropriate levels of risk need to be considered, it may be appropriate to incorporate these considerations into trading ratio decisions. Ratios can be applied to increase a permittee's credit purchase requirement, or can be applied to reduce the amount of credits an individual seller has available to sell.

The assumptions underlying the chosen ratio should be documented in a transparent manner in the applicable regulatory documents, such as an individual permit, relevant TMDL, or trading framework or plan. Where ratios are set for individual trades, ratios should be developed according to a consistent approach. Where trading ratios contain multiple components, they may be applied separately or combined into a single factor. The various combined ratios applied to a point source

should be greater than 1:1, such that for every unit of pollution discharged by a point source, it must generate or purchase more than one unit through BMPs or other credit generating activities.

Reserve Pools of Credits

To manage the risks stemming from uncertainty and project failure, states may require a reserve pool that sets aside a portion of credits from each credit-generating BMP project. A reserve pool might not make sense in trading areas with only one buyer or where permittees prefer to manage risks themselves, but may be important for larger programs involving multiple buyers and sellers. If a reserve pool is used, the trading program needs to define who manages the reserve, how the pool will be populated over time, the circumstances under which a buyer 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.

Credit Characteristics

Trading guidance, frameworks, and plans should define the essential characteristics of a credit. These documents should clearly note that credits are not property rights, since they are tied to permits, which may be issued, approved, and cancelled by agencies.

Project Life Versus Credit Life

A given BMP will start producing water quality benefits at a certain time, and will continue to provide those benefits for a particular length of time. The "project life" is a different concept from the "credit life," and, although the two may often overlap, a credit life may be shorter than a project life. Credits generated from a BMP or other activity may only be considered valid if the project is installed and verified according to quality standards and is functioning as expected. The period of time over which a BMP is expected to perform is known as the project life. Non-structural, practice-based BMPs (e.g., cover crops) may only produce water quality benefits for a handful of years, whereas structural BMPs such as riparian forest restoration may produce water quality benefits for decades or longer. Typically, the buyer and seller will enter into an agreement, contract, lease, or easement that will protect the installed BMP for the duration of the project life known as the "project protection period." After the initial project life expires, credits can remain valid if the BMPs continue to function, are still covered by a protection agreement, and are maintained according to applicable performance standards.

A credit becomes valid when a BMP is installed and verified. A credit can be used by a buyer only during its approved and verified period of performance or credit life. Regulators may set the default credit life for a given tradable pollutant consistent with the time period during which the water quality benefit is needed. For example, the default credit life within a trading framework could be tied to the "critical periods" identified in a TMDL or to an annual cycle. The U.S. EPA 2003 Trading Policy says, "[c]redits should be generated before or during the same period they are used

to comply with a monthly, seasonal or annual limitation or requirement specified in an NPDES permit."[10] It may be necessary to work with EPA regional offices to establish the allowable credit life for different pollutants and credit generating activities. This may be appropriate where permit limits are expressed as annual loads or where analysis shows that reductions in pollutant load from any point in the year are effective at improving water quality during the critical period (e.g., reductions in phosphorus loading at any point in the year contribute equally to improving dissolved oxygen during the critical period).[11]

Credit Stacking

"Credit stacking" is the term used to describe the sale of multiple types of environmental credits (e.g., salmon and nutrient credits) from the same BMP on the same piece of land. Trading guidance, frameworks, and plans should provide clear direction on credit stacking to ensure that the sale of a different credit from the same piece of land is not allowing for more impact than the environmental benefit created. One way to simplify that analysis is to consider a "proportional accounting" approach to tracking stacked credits. For example, a seller may generate multiple credits from a BMP, but would then need to sell those credits proportionally (i.e., as 20% of a project's phosphorous credits are sold, then 20% of a project's possible carbon credits are deducted from its ledger). Credit stacking from the same spatial area can complicate accounting and raise questions about whether multiple types of impacts are truly being offset by multiple credits generated from the one site. Due to concerns about this issue, the general presumption is that credit stacking is disfavored. The burden is on the credit buyer and seller to demonstrate that multiple credit sales from the same area actually provide additional benefits.

Payment Stacking & Use of Public Funds

"Payment stacking" is used to describe projects that leverage multiple funding sources to complete work to achieve environmental benefits. Increasingly, restoration and on-farm projects will rely on multiple funding sources to reduce pollution, improve wildlife habitat, and reduce energy and water use. Holistic projects that leverage multiple funding sources should be encouraged, but similar to credit stacking, trading guidance, frameworks, and plans should provide clear direction on payment stacking to ensure that it is clear which funding sources are achieving which benefits.

---

[10] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1612.

[11] EPA analyses show that the Chesapeake Bay and its tidal tributaries "in effect integrate variable point source monthly loads over time," such that variability in intra-annual loading of nitrogen and phosphorus has no effect on water quality of the main bay. *See* Memorandum from James A. Hanlon, Director Office of Wastewater Management, to Joe Capacasa, Director, Water Permits Division EPA Region 3, *Annual Permit Limits for Nitrogen and Phosphorus for Permits Designed to Protect Chesapeake Bay and its tidal tributaries from Excess Nutrient Loading under the National Pollutant Discharge Elimination System* (Mar. 3, 2004), *available at* http://www.epa.gov/reg3wapd/npdes/pdf/ches_bay_nutrients_hanlon.pdf.

"Project developers" may rely on multiple sources of funding, but must demonstrate that all credits sold from the site were not paid for by another source already expecting that particular environmental benefit. Clear accounting and disclosure of funding sources also helps funders quantify the value generated by their contributions. Project developers can demonstrate financial additionality easily by not using public dollars dedicated to conservation (which includes Farm Bill Conservation Title, CWA section 319 grant funds, or state conservation funds, but excludes public loans, bond funds, and ratepayer funds) to pay for a portion of a project generating credits. For example, if a seller uses Farm Bill or other public dollars dedicated to conservation to pay for 50% of a project, a trading framework or plan might allow that seller to only sell 50% of the total credits generated from the site. Leveraging public dollars dedicated to conservation with credit financing to treat larger areas, install additional BMPs, or enhance BMPs can be an important strategy for expanding the impact of restoration work so long as the funding trail can be easily tracked.

Throughout this document, "project developer" refers to any entity that develops credits, whether that entity is the permittee, a contractor of the permittee that develops or aggregates credits, or a landowner developing credits on a permittee's behalf.

Project Implementation & Quality Assurance Standards

Trading projects should be implemented according to quality standards so that the credited water quality improvements will occur and remain in place as long as credits remain valid. Projects should be screened for eligibility criteria, compliance with other laws, required permits or approvals, and BMPs must be installed according to the quality standards and consistent with the assumptions used to quantify credits. As discussed earlier in the Executive Summary, each BMP should be approved by the relevant state agency or its "designee" either as part of a permit review or other formal process. Each project developer should: A) submit a "project design and management plan," including a description of how a site will be maintained so as to meet BMP performance and restoration goals; and B) demonstrate that the project has adequate legal site protection and "stewardship funds" in place for the duration of the project protection period.

Regulators may choose to set minimum project protection periods. For structural BMPs (e.g., fencing or riparian restoration), the minimum BMP and project protection period should be 20 years to match the typical facility planning cycle of point source buyers. For practice-based BMPs (e.g., cover crops and tillage), the minimum BMP and project protection period should be five years. Any other irregular term may be applied at the discretion of the regulatory agency. Project protection will generally occur through limited-term leases or other contracts, although easements and property transfers may be used if the benefits of a BMP are expected to be more permanent.

Verification & Certification

Instead of using technology to meet CWA requirements at a single "discharge point," point-nonpoint trading arrangements rely on numerous and dispersed nonpoint sources to provide the pollution reductions needed by a single point source through different types of BMPs. Because

trading shifts the location of compliance from end-of-pipe discharges to many disperse nonpoint source sites, there are different challenges associated with verifying water quality benefits. Verification and certification of nonpoint source projects can and should provide regulators with the same level of confidence as traditional point source monitoring, which often may require discounting the credits using various ratios previously mentioned and later discussed.

Verification

Once a project has been implemented, but prior to being eligible to sell credits, a qualified entity should verify that a project is consistent with established "BMP guidelines" and eligibility requirements, that estimated credit quantities are accurate, and that the project developer has an adequate project design and management plan and a "project protection agreement" in place. This review process is known as verification, and is detailed in a permittee's "verification plan." Verification can be performed by agencies, permittees, or third parties ("verification entities"). The verification process may be tailored to achieve an appropriate balance between providing assurance that BMPs are creating real water quality improvements and the cost of inspecting numerous and widely distributed BMPs.

Completed projects should be verified on site at least once, and then at appropriate intervals through the project life, to determine compliance with appropriate standards. Information privacy and availability, conflicts of interest, and resource constraints are all relevant factors in determining the appropriate entity to perform this function. Various verification methodologies may be combined in different ways depending on the structure of a trading framework or plan (i.e., inspect every project, inspect a subset of projects, or provide programmatic approval for project types or project developers). All on-site project verifiers should be qualified to inspect lands for particular credit-generating BMPs in a particular geography (and clear direction from states as to minimum qualifications for verifiers would be helpful). Even where a state water quality agency does not perform verification, it may choose to inspect a credit-generating project or trading plan at any time, according to the relevant procedures outlined in its guiding policies, regulations, or statutes.

Certification

A final step in this process can be certification by an agency, permittee, or third party that the credits are valid, have been verified according to the applicable methodology, and that all necessary credit documentation is in place. Each state may choose the appropriate frequency, scope, and nature of verification and certification for its water quality trading guidance, frameworks, and plans.

Registration

NPDES permittee information and DMRs are available to the public. Information about trades associated with permits should also be available to the public. Ideally, a permittee's ledger of credits from trading activities should be posted on the permittee's website or a larger "registry" serving a trading area, or the entire state or region if multiple permittees are involved in trading activities. A registry allows agencies, the public, and permittees to be certain that credits are not being used or sold for more than one purpose and that trading projects are occurring as promised.

The information listed on a registry should include credit quantities, credit ownership, trading area boundaries, and might also include project location and design, the identity of the parties to the credit transaction, and "site performance reports" (accompanied by appropriate verification documentation). Sensitive, confidential, or proprietary information that is not required for credit transparency should be kept confidential.

Compliance Determination & Enforcement Actions

Trading distributes pollution reduction activities from the end-of-pipe to several disparate locations, thus raising questions about how compliance and enforcement determinations will be made. Yet, there is little difference between compliance determinations for trading and determinations for other treatment processes. Compliance is determined as the permittee demonstrates, via its DMRs and other reporting requirements, that it has secured an adequate credit balance to offset its established water quality-based effluent limits at the appropriate time(s) of the year or meet the interim milestones of its compliance schedule. In addition, a permittee must comply with the trading-related provisions of its permit and the enforceable aspects of its trading plan (within the permit, or attached if not included in the permit), as determined by the overseeing water quality agency.

Roles & Responsibilities in Program Administration

There are several stages in the credit issuance process where the public may be afforded an opportunity to review trading project documentation. Regulators and stakeholders need to consider which entity (i.e., agencies, permittees, or third parties) will administer the phases of the credit process: "site screening," verification, certification, and registration. In addition, states should identify the entity or entities responsible for maintaining and adaptively improving quality and performance standards, i.e., quantification methods. For each of these phases, agencies and trading participants should consider the following when determining roles:

- The skills and expertise required to perform each function;
- The administrative time and costs involved;
- Whether the phase should be required or just recommended;
- Whether it will be necessary to rely on third parties to execute trading functions; and
- The need to provide access to information, balanced against the need to protect some aspects of participant privacy.

Adaptive Management & Tracking Effectiveness

Adaptive Management

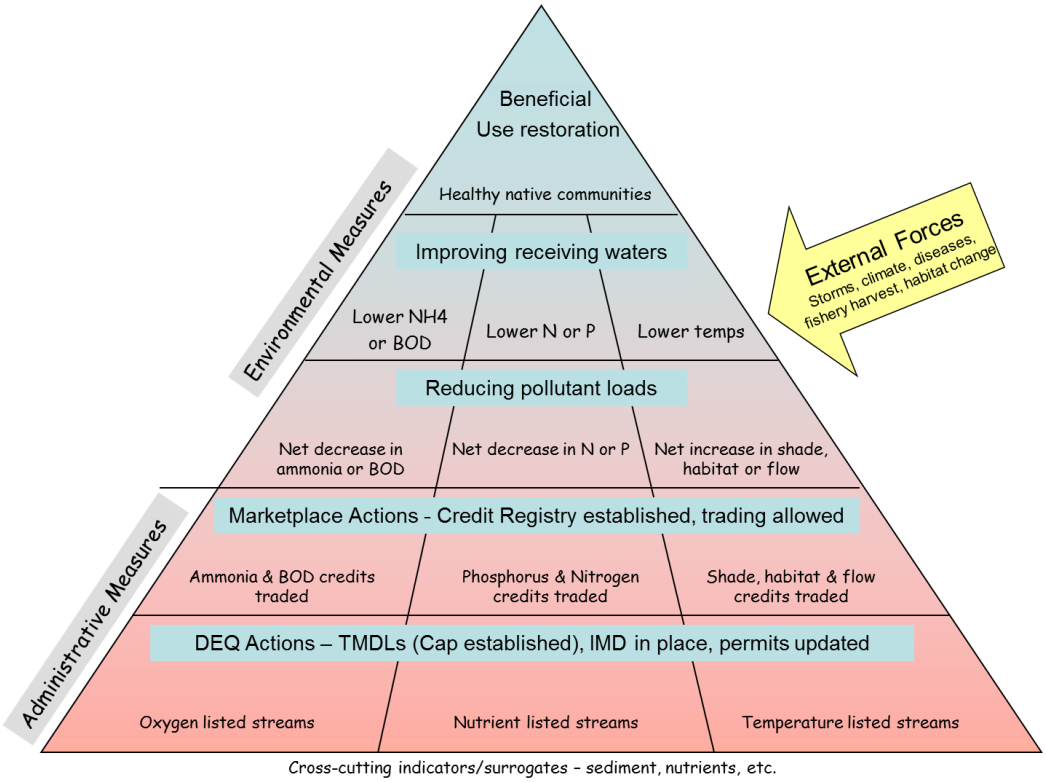
Current water quality challenges require flexible, innovative approaches that can be quickly adjusted and improved. In order to accelerate water quality improvements, it is important to move forward with the best information currently available and to test the assumptions underlying the current actions through the collection and incorporation of new data as it comes to light. This process is broadly referred to as "adaptive management." In the case of trading, an adaptive

management framework would focus on: A) improving implementation and performance quality standards, "protocols," and process; B) generating and incorporating new information on the quantification methods used to estimate water quality improvement associated with individual BMPs; and C) evaluating whether water quality improvement actions have been effective at meeting trading framework/trading plan and overall water quality goals. An adaptive management framework would not be used as a mechanism for assessing individual permit compliance.

Each trading framework or trading plan should include, or reference, an existing "adaptive management plan" describing how the program will track and gather the information needed to improve the performance of program quantification methods and administration (e.g., protocols, operational processes, which entity will perform these actions, etc.) and identify an interval for incorporating updates (e.g., biennial or as needed).

Effectiveness Monitoring

Ultimately, many will want to know whether trading is fulfilling the obligations of point sources and whether water quality is improving. Detecting changes in ambient water quality that is causally attributable to trading is typically very difficult, especially in watersheds where the adverse water quality impacts of point sources are relatively small compared to the impacts of other sources and background conditions in a watershed. Thus, an "effectiveness monitoring" strategy should lay out a pyramid of metrics that can represent progress toward water quality standards and improving beneficial uses (e.g., meeting BMP metrics first, then securing pollutant load reductions, and then finally restoring beneficial uses).



Nonetheless, as part of overall watershed-scale tracking, trading could be the impetus for establishing an effectiveness monitoring program, or could be tied to an overall TMDL effectiveness monitoring effort. Where states are not already undertaking TMDL or watershed effectiveness monitoring, the additional study design, data collection, and analysis necessary to evaluate the impact of trading alone may be infeasible. Until the responsibility for this task is clearly delineated and funds are available, effectiveness monitoring is unlikely to occur.

Glossary & Appendices

Also included in this document is a glossary of the key terms defined throughout this document. For each defined term, the first instance will appear in quotation marks, but all subsequent usages will not. Following the glossary are three appendices:

- Appendix A describes the components of BMP guidelines;
- Appendix B is a discussion summary of federal legal framework for water quality trading discussion that has occurred over the past year and a half between Willamette Partnership, The Freshwater Trust, and attorneys for the respective participating agencies; and
- Appendix C lists all the sources cited in this Draft Recommendations document.

Next Steps

The aspects of trading described above are intended to spark conversations about how trading guidance, frameworks, and plans can be built and used to best achieve water quality and compliance goals, and strike the fine balance between cost-effectiveness, usability, and transparency. As this first set of draft recommendations is completed, each of the states will work with stakeholders to test, discuss, and better refine these draft recommendations to meet the needs of locales throughout the Northwest.

The state agencies, EPA Region 10, Willamette Partnership, and The Freshwater Trust plan to revisit these draft recommendations over the coming year and refine them to produce a proposed set of final trading program recommendations by the end of the project in September 2015.

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

Carrie Sanneman
Ecosystem Service Project Manager
Willamette Partnership
sanneman@willamettepartnership.org
(503) 894-8426

I. Introduction

In 2003, U.S. EPA released its national policy for water quality trading, which describes conditions for allowing off-site compliance for NPDES permit "effluent limits." Since that time, only 13 states have developed state-level "trading guidance" describing how trading should occur.[12] Three of those states—Idaho, Oregon, and Washington—are located in the Pacific Northwest region, and have experienced considerable interest in trading.

In November of 2012, the Idaho, Oregon, and Washington water quality agencies, and U.S. EPA Region 10 began working together to define some recommendations 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" (CWA)[13] , its implementing regulations and state and local water quality laws. By identifying recommended approaches and options for critical components of water quality trading, 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 federal, state and local laws and regulations.

This Draft Recommendations document is based on discussions held at a series of interagency workshops convened between March 2013 and early 2014. This document is intended to represent a synopsis of the discussions among the attendees as to how each component of trading should operate. A number of the draft recommendations reflect points from the 2003 U.S. EPA Trading Policy,[14] and so where there is overlap, reference has been made to the policy, with supplementary explanation where needed.

Each section includes a draft recommendation, and where appropriate, commentary describing important considerations derived from agency comments and workshop discussions.

[12] This includes states with legislation, policy, guidance, or draft guidance on water quality trading at the state level as of June 2014 (i.e., Idaho, Colorado, Connecticut, Florida, Maryland, Minnesota, Montana, Ohio, Oregon, Pennsylvania, Virginia, Washington, and Wisconsin). This does not include states with individual authorized trading programs or pilot programs.

[13] Federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1387 (2012).

[14] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf.

Breaking "Trading Program" into Three Distinct Terms
The term "trading program" means different things depending on audience, and is often used as a catchall term. In order to avoid ambiguity within the draft recommendations, this document establishes and uses the following three definitions so that the reader can better understand the nature and scope of each recommendation: 1) trading "guidance" (overarching state-level agency rules, policy, guidance that set the broad sideboards for trading in a state); 2) trading "frameworks" (watershed-level rules, policies, and guidance, which if they exist, provide more specificity on how trading should be implemented in a particular watershed; these documents may be developed by watershed stakeholder groups, but are vetted and endorsed by agencies); and 3) trading "plans" (permittee-level plans, either included in or attached to permits, that detail how a particular trading solution will be designed, implemented, verified, and tracked so as to meet effluent limits). To better clarify the implications of particular draft recommendations, this document frequently references these three terms.

The draft recommendations in this document only represent recommendations. The draft recommendations discussed in this document do not change the rules or policies of any existing state trading guidance or frameworks.

Beginning in 2014, states will test some of the ideas from the Draft Recommendations document by implementing pilot projects. The framework will then be revised to incorporate lessons learned through the end of the project in September 2015. The participating states may choose to update their own trading rules or guidance to incorporate the recommendations. If states choose to do so, they would follow their individual applicable procedures for public participation and input.

II. Guiding Principles for Water Quality Trading

Water links us in ways that underpin healthy communities, economies, and ecosystems. When Congress passed the 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. As an additional compliance pathway for meeting NPDES effluent limits, water quality trading is just one tool of many to help achieve the goals of the CWA and other public objectives.[15] Trading is not appropriate for many water quality challenges, and its efficacy must be evaluated before assuming it can be useful in a particular "watershed." When designed well and combined with other tools, however, trading can help achieve water quality goals in a way that is beneficial for landowners, communities, and the environment. This is consistent with objectives identified in the 2003 U.S. EPA Trading Policy, which encourages water quality trading programs that "facilitate implementation of TMDLs, reduce the costs of compliance with CWA regulations, establish incentives for voluntary reductions, and promote watershed-based initiatives."[16]

The 2003 U.S. 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 guidance, frameworks, and plans should focus on how they can best support achievement of particular CWA goals,[17] including efficient and timely implementation of TMDLs.[18]

Individual trades will inevitably face many unique situations and issues. These guiding principles are meant to provide state agencies and other stakeholders with a cohesive approach to think through the tough design issues that should be contemplated when establishing water quality trading guidance, frameworks, and plans.

Water quality trading is generally supported when it is consistent with the 2003 U.S. EPA Trading Policy and where it meets the following criteria:

---

[15] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1609 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf ("Water quality trading is an approach" to "[f]inding solutions to [] complex water quality problems.").

[16] *Id.*

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

[18] *Id.*

1) More effectively accomplishes regulatory and environmental goals

Water quality trading is supported when it allows sources to comply with their allocations and permit effluent limits in a way that is linked directly to meeting applicable "water quality standards," protects the beneficial uses that the TMDL and permits are designed to achieve,[19]and addresses causes of a pollutant of concern without negatively affecting other parts of the environment. Additionally, water quality trading is supported when it achieves more pollution reduction and greater improvements to water quality than would have occurred without trading over a comparable period of time, and does so with reasonable and predictable costs.[20] Water quality trading should seek to achieve ancillary environmental benefits beyond the required reductions in specific pollutant loads (e.g., the creation and restoration of wetlands, floodplains and wildlife, fish and/or waterfowl habitat, reduction of multiple pollutants, etc.) and seek to provide for the long-term stewardship and management of practices that produce water quality benefits.[21]

2) Is based on sound science

Water quality trading is supported when program goals, credit "quantification methods," and "adaptive management" systems are based on sound science and on their ability to achieve water quality goals.[22] Because science evolves, trading frameworks and trading plans should monitor and evaluate outcomes to regularly improve and report on the progress toward water quality goals.

3) Provides sufficient accountability that promised water quality improvements are delivered

Water quality trading guidance, frameworks, and plans should seek to foster transparent information on trading rules and processes, location, and volume of transactions, as well as the effectiveness of trading over time. Trading documents should foster accountability by clearly articulating who is responsible for producing water quality improvements, and by providing a mechanism for identifying and correcting problems, including dispute resolution. Accountability in trading is improved when the public is engaged and participating at the earliest stages and throughout the development of trading infrastructure. The inclusion of public input strengthens trading effectiveness and credibility, and provides sufficient information for regulatory agencies

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

[20] Some states may choose not to consider transaction costs when developing trading guidance or trading frameworks.

[21] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1609–10.

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

and the public to regularly determine that trades and individual "credits" comply with a permittee's "wasteload allocation" and effluent limits.[23]

4) Does not produce localized water quality problems

The use of water quality trading is not supported where it leads to localized water quality problems (e.g., thermal barriers to salmonid migration, thermal shock/lethality for salmonids, impairment of known salmonid spawning habitat, algal blooms and areas of low dissolved oxygen caused by nutrient hotspots), or "exceedance" of an acute aquatic life criterion within a "mixing zone," chronic aquatic life criterion, or human health criterion at the edge of a mixing zone (using design flows specified in the water quality standards).[24]

5) Is consistent with the CWA regulatory framework

As described in the 2003 U.S. EPA Trading Policy, water quality trading should be consistent with the relevant provisions of the CWA and its implementing regulations (s*ee* Appendix B). This includes avoiding trading where it would circumvent the installation of minimum treatment technology required by federal and/or state regulations at the site of a "point source," adversely affect water quality at an intake for drinking water supply,[25] 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.[26]

[23] *Id.*

[24] *Id.* at 1611.

[25] *Id.*

[26] *Id.* at 1610.

III. Recommendations

1. Eligibility for Water Quality Trading

In this section:

- What are the pre-conditions for trading?
- How is trading incorporated into a permit?
- How should the trading area be determined?
- Which pollutants should be traded?
- Which BMPs can generate credits?

Trading is not appropriate for every watershed or every situation. The 2003 U.S. EPA Trading Policy identifies some specific conditions under which trading may occur. This section describes the project participants' recommended eligibility criteria for individuals and entities seeking to participate in trading and the generation of credits. This includes those criteria already identified in the 2003 U.S. EPA Trading Policy.[27] 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 can best proceed in the Pacific Northwest.

1.1 Eligible Regulatory Trading Environments

***Draft Recommendation – Eligible environments**: The 2003 U.S. EPA Trading Policy notes that trading may be used under the CWA to maintain high quality waters, in pre-TMDL impaired waters, pursuant to TMDLs, in pretreatment situations, and intra-plant.[28] Trades in the Pacific Northwest will likely be considered primarily via individual NPDES permit reissuance in basins covered by an approved 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.*

Commentary: Trading may be permitted under another type of permit or regulatory tool, such as CWA section "401 certifications," watershed trading permits, "variances," or other

[27] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1612 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf.

[28] *Id.* at 1610–11.

watershed-wide plans. 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 cumulative water quality analysis similar to the TMDL analysis is undertaken. Such a situation may be challenging for state agencies, where analysis would require large amounts of staff time and capacity. 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;
2) Agencies, permittees, or a qualified third party have assessed alternatives available for pollution reduction, including available control technologies, to ensure that reasonable options have been considered prior to spending public resources;
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 to maximize targeted water quality improvements;
5) The state agency or U.S. EPA has considered how an outside-of-TMDL trading environment would interact with the status of the waterbody on that state's "303(d) list";
6) Parties understand that trading provisions are subject to change. If a TMDL is promulgated, trading participants should understand the long-term implications if and when a TMDL is approved.

In basins where point sources have been given a wasteload allocation or other similar load limits (in a TMDL or another cumulative watershed analysis), or in situations where federally licensed projects receive a CWA section 401 certification in order to operate, agencies may wish to allow entities to initiate trading in advance of permitting/licensing with agreements that allow for those actions to count toward future permit obligations if those activities are still creating water quality benefits at the relevant future date when the permit or license is finalized.

1.2 The Regulatory Context for Water Quality Trading: Water Quality Standards & NPDES Permits

The CWA contains several regulatory programs designed to protect water quality. The establishment and attainment of water quality standards under section 303 is the cornerstone

of the CWA. The NPDES permit program under section 402 of CWA aims to limit pollutant discharges from specific facilities so as to protect water quality. Each "National Pollutant Discharge Elimination System" (NPDES) permit translates applicable water quality standards into effluent limits applied to a particular facility. If regulators allow point sources to trade to meet "water quality based effluent limits" (WQBELs),[29] this authorization will occur in the NPDES permit. Trading will most often occur via NPDES permits in which the permit holder is the "buyer" seeking an alternative, lower cost, or more flexible compliance option. If a permittee wishes to purchase credits to meet its water quality-based CWA "compliance obligation," the number of credits needed will be the difference between a permittee's effluent limits and its actual or projected pollutant discharge (also known as the exceedance). Under the TMDL program, the WQBELs in a NPDES permit are largely based on the TMDL wasteload allocation (WLA) established for that permittee. Within the context of the watershed covered by the TMDL, WLAs are the portion of a receiving water's loading capacity that a particular source can use up.[30]

1.2.1 Water Quality Standards

As stated above the water quality standards established under Section 303 of the CWA are the cornerstone for protecting water quality.[31] A water quality standard defines the water quality goals for a waterbody by designating the uses of the water, by setting the criteria necessary to protect those uses, and by protecting water quality through "anti-degradation" provisions.[32] Water quality standards are meant to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act (the Act).[33] Water quality standards both

---

[29] Unless authorized by EPA, point sources may not use trading to meet technology-based effluent limits. *Id.*

[30] 40 C.F.R. § 130.2(h) (2013).

[31] Water quality standards are "[p]rovisions 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 upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act." 40 C.F.R. § 130.2(d) (2013).

[32] U.S. EPA, Water Quality Standards Handbook - Ch. 1: General Provisions, 40 C.F.R. § 131—Subpart A (Sept. 15, 1993), *available at* http://water.epa.gov/scitech/swguidance/standards/handbook/chapter01.cfm.

[33] *Id.* at § 1.2. "Serve the purposes of the Act" means that water quality standards should: 1) wherever attainable, achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water, and take into consideration the use and value of public water supplies, and

establish the water quality goals for a specific waterbody, and serve as the regulatory basis for establishing water quality-based treatment controls and strategies beyond what is required for technology-based levels of treatment.[34]

Each state has the responsibility under the CWA to establish numeric or narrative water quality standards to protect its designated beneficial uses and submit them to EPA for approval. EPA has the authority under the CWA to review these proposed state standards and determine whether the proposed standards protect the beneficial uses in that state. Because a permittee's credit needs are based on its current or projected exceedance above its WQBELs, and WQBELS are based on the relevant water quality standards (and often, TMDLs structured to meet standards), water quality standards are important factors affecting trading. Even though trading is affected by standards and TMDLs, trading guidance, trading frameworks and trading plans do not establish standards, criteria, or TMDLs.

1.2.2 NPDES Permits

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).[35] In essence, the permit translates general requirements of the CWA into specific discharge, monitoring, and reporting provisions tailored to the operations of each entity discharging pollutants. A NPDES permit generally specifies an acceptable discharge level for a particular pollutant, and a permittee may then choose which approved technologies to use to achieve that level.[36]

All NPDES permits, at a minimum, consist of five general sections:

1) *Cover page*. This typically contains the name and location of the permittee, a statement authorizing the discharge, and the specific locations for which a discharge is authorized;

---

agricultural, industrial, and other purposes, including navigation; and 2) restore and maintain the chemical, physical, and biological integrity of the Nation's waters. *Id.*

[34] *Id.*

[35] Federal Water Pollution Control Act, 33 U.S.C. §§ 1311(a), 1342. The Clean Water Act prohibits anybody from discharging any pollutants into a "water of the United States" without a NPDES permit.

[36] 1993 EPA Water Quality Standards Handbook.

2) *Effluent limits*. These are technology- or water quality-based caps on pollutant discharges;
3) *Monitoring and reporting requirements*. These requirements are used to characterize waste streams and receiving waters, evaluate wastewater treatment efficiency, and determine compliance with permit conditions. A NPDES permit generally includes specific requirements for monitoring locations and frequency, sample collection methods, analytical methods, and reporting and record keeping;
4) *Special conditions*. These conditions supplement effluent limit guidelines, and may be incorporated in order to address unique situations, to add a preventive requirement, to address foreseeable changes to discharges, to add a "compliance schedule," to address other NPDES programmatic requirements, or to impose additional monitoring requirements or requirements for special studies; and
5) *Standard conditions*. These conditions uniformly apply to all NPDES permits issued by authorized states or the EPA Regional Offices (i.e., pre-established conditions that apply to all NPDES permits and delineate the legal, administrative, and procedural requirements of the permit[37]).

In addition to these components, other supporting documentation may be attached to or incorporated by reference into a NPDES permit.

Every permit contains these five basic components, but the contents and location of the components will vary depending on whether the permit is issued to a municipal or industrial facility, and whether it is an individual permit or a general permit.[38] Moreover, a permit writer has some discretion to determine what level of detail is necessary for different permittees, what components of a trading plan should be included in a NPDES permit, and where those components will appear within the permit. This Draft Recommendations document does not alter these regulatory requirements, but rather calls out the permit components necessary for a water quality trade.

---

[37] 40 C.F.R. § 122.41 (2013) (describing the general permit conditions applicable to all NPDES permits).

[38] U.S. EPA, Office of Wastewater Mgmt., Water Permitting 101, at 7–8, *available at* http://www.epa.gov/npdes/pubs/101pape.pdf. *See* 40 C.F.R. § 122.41 for the standard conditions that apply to all NPDES permits. *See also* U.S. EPA, Water Quality Trading Toolkit for Permit Writers, 30–31, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.

1. *Effluent Limits Section of the NPDES Permit*

Draft Recommendation – Identification of trading parameters, units, and quantity needed to offset effluent limits in the NDPES permit*: Trading is a compliance option that a permit writer may include in a NPDES permit to allow the permittee to "offset" its applicable WQBEL(s) at a potentially lower cost and potentially delivering greater environmental benefits to the watershed. These WQBELs would apply even in the absence of trading and are independent of any onsite control technology requirements that may apply. If trading is to be used as a tool for achieving NPDES requirements, 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 pollutant (including documentation of the calculation methodology and water quality standard that should be used in calculations). If a permittee needs a different amount of units at different times of the year (because of seasonal changes in river flow, discharge characteristics, or varying water quality standard requirements), this section of the permit should note the number of units needed for each discrete time period. Likewise, if a permittee is not projected to need credits immediately, this section of the permit should indicate when the permittee will need to obtain credits to offset its future exceedance of its effluent limits.*

Commentary: The effluent limit section would describe the applicable and enforceable WQBELs that would apply in the absence of credits. This limit cannot be less stringent than the technology-based effluent limit or minimum control limitation. Compliance with these limitations remains the sole responsibility of the permittee. Failure of another party to generate credit reductions does not excuse the permittee from meeting these limits. The NPDES permit and supporting documentation should clearly describe the parameter or pollutant that can be traded, in standardized units that are consistent with those in the TMDL or other watershed-wide plan, and the number of units that a permittee would need to obtain (at all points during a year) if it pursues trading. The "permit fact sheet" or "permit evaluation report" will document the methodology and calculations (based upon appropriate flow and effluent data) to be used to establish the applicable WQBEL(s), and the methodology and calculations used by the permit writer to calculate the facility's projected or existing exceedance above its WQBEL(s). In addition, this section of the permit should note whether and how the calculated exceedance has been adjusted in any way to reflect "baseline" requirements, delivery and attenuation factors, and/or "trading ratio" or "reserve pool" requirements (*see* Sections 2–4). In short, this section should identify the number of credits needed, as derived from the facility's exceedance above its WQBEL(s) and adjusted by any of these relevant factors. These factors need not be fully explained in this section of the permit, but reference should be made to other sections of

the permit, the permit fact sheet/evaluation report and/or an attached trading plan. The effluent limits section will also establish the point of compliance for both the on-site effluent limit to be met at the facility and the portion of the effluent limit to be met by the water quality trade.

2. Permit Compliance Point and the Trade Compliance Point

The NPDES permit establishes a specific compliance point for the effluent limits identified in the permit. Generally, the permittee must be in compliance with the effluent limits at the end of its discharge pipe. In a trading program, credits will likely be generated within the broad geographic trading area of the TMDL, but the permittee will use those credits to offset effluent limit exceedances that have a specific compliance point defined in the permit.

***Draft Recommendation – Compliance point**: The effluent limits section should identify the compliance point for the effluent limits and trades. Effluent limits should be met at the end of the discharge pipe. Trades should take place in a defined trading area (discussed more in Section 1.4).*

Commentary: In watersheds with a TMDL, the TMDL should identify areas where water quality is most impacted by discharges. The TMDL should 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. If a permittee wants to offset an exceedance above its WQBELs through use of a trading plan, the permit should identify a trading area (discussed in Section 1.4) where trading may be conducted consistent with the TMDL WLA(s) and any compliance points specified in the TMDL.

3. Monitoring and Reporting Requirements Section

A NPDES permit identifies the physical effluent monitoring that a permittee must conduct in order to show compliance with permit effluent limits. The monitoring section details the specific parameters to be monitored, monitoring frequency (i.e., daily, monthly, or annually), the type of sample required (i.e., grab, composite, or continuous), monitoring locations, the actual physical form of the report ("Discharge Monitoring Report" (DMR) or something else), 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 would describe the specific monitoring required by these programs (including identification of the parameter, the frequency of monitoring, and the type of sampling needed).

A trading plan may include a number of different monitoring elements, and so it is important to identify in this section of the permit the monitoring actions necessary to demonstrate that an exceedance above WQBELs has been offset by trading. 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). Trading-related monitoring obligations from state trading guidance or frameworks may be incorporated by reference into a permit. However, if trading guidance and frameworks are silent or incomplete on the issue of trading-related monitoring and reporting, it will be important to describe trading-related monitoring and reporting requirements in either the permit, or an attached trading plan, so that the public can track whether a permittee has demonstrated compliance with its WQBEL(s).

Draft Recommendation – Discharge monitoring reporting*: In the comment section of the DMR, a permittee should report the quantities of credits that it holds and 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 and held (monthly, seasonally, or annually).*

The special conditions of the permit and/or the trading plan should identify the monitoring and reporting requirements a permittee should utilize to demonstrate that the credit-generating BMPs it relies on for compliance are in fact performing as anticipated. This information would be provided to the regulatory agency on a frequency and in the specific manner required by the permit writer. The permit and/or trading plan should also identify the ledger/"registry" in which credits are reported so that the public and regulators can ensure the credits' existence and confirm that the same credits are not being used by more than one permittee.

Commentary: A viable trading program may require several forms of monitoring to successfully track permittee compliance with WQBELs and project performance. At a minimum, the DMR should specify and attest to the quantity and timing of credits. The comment section of the DMR should also include reference to the credit ledger/registry, where credits and associated project information are tracked. Ultimately, however, it is up to the permit writer to determine what additional monitoring requirements are needed to show compliance with permit limits and conditions. In a trading context, other monitoring and reporting safeguards may also exist (i.e., public "registration" of credits—*see* draft recommendation 8; ongoing "verification" of "site performance"—*see* draft recommendation 7.4; "site performance reports"—*see* draft recommendation 1.2.2(9), 7.4, and 8.2). In the DMR, therefore, the permittee should document the quantity of credits generated for permit compliance, and 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.

4. *Use of Compliance Schedules to Allow Time to Come Into Compliance with the CWA and Applicable Regulations.*

The NPDES regulations at section 40 C.F.R. § 122.47 allow permit writers to establish a schedule of compliance to afford permittees additional time to achieve compliance with the CWA and applicable regulations. There are restrictions on the use of compliance schedules. For example, if a permittee that is reliant on trading cannot immediately comply with its new WQBELs, its NPDES permit may contain a compliance schedule detailing how the permittee will achieve compliance with its effluent limits "as soon as possible."[39] This schedule will outline the enforceable milestones, interim effluent limits, timing, and deadline for coming into compliance.[40] Compliance schedules recognize that even though a permittee is not yet achieving the final effluent limit established in the permit, as long as the permittee abides by the schedule to design and build, and achieves its interim effluent limits and enforceable milestones, it is considered in compliance with its permit. Compliance schedules may not be appropriate for every permit, whether or not it involves trading.

Draft Recommendation – Compliance schedules*: To the extent that a permittee's trading plan will not allow it to meet a new WQBEL immediately, its permit should contain a compliance schedule outlining the enforceable milestones, interim effluent limits, timing, and deadlines for coming into compliance with its final WQBEL(s) "as soon as possible." When deciding upon trading-related compliance schedule milestones, interim limits, timing and deadlines, permit writers should examine all relevant data and thoroughly describe the basis for their decisions in the permit evaluation report or permit fact sheet.*

If a trading plan will not result in compliance with a new WQBEL within the 5-year cycle of the renewed NPDES permit, the permit should contain the entire compliance schedule necessary for the facility to achieve its new WQBEL via the trading plan, even though the schedule will extend beyond the renewed permit's expiration date.

---

[39] 40 C.F.R. § 122.47(a)(1) (2013). 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"].

[40] When the time needed to design, build, and operate a trading plan is lengthy, the permit writer may establish interim effluent requirements (which may be in the form of interim effluent limits) that the permittee must achieve while building its trading plan to the necessary capacity. 40 C.F.R. § 122.47(a)(3) (2013).

Commentary: If they are needed, regulatory agencies try to keep compliance schedules—including those related to permits with trading—as short as possible and try to achieve compliance "as soon as possible,"[41] as required by the federal regulations and guidance. Much has been written on trying to determine what is "as soon as possible." Compliance schedules should fit the facts of an individual permittee's situation. 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. for all trading situations. EPA refers to its Hanlon Memo[42] for direction and states often have specific guidance on how to determine length of compliance schedules.[43]

The permit writer should perform a reasonable evaluation of the individual permittee's trading plan when determining the length of a compliance schedule. In particular, when linking compliance schedules with a trading plan, permit writers should evaluate the information from the permittee and the information contained in "TMDL implementation plans" and/or watershed trading frameworks to determine how quickly the permittee could establish/implement its trading plan. This evaluation would examine information from the trading plan on how soon credit-generating BMP projects could be completed. In addition to considering the time needed to find BMP "project sites" and assess their credit-generating potential, the permit writer should examine the trading plan to see how much time it will take to establish site-specific contracts with landowners (to install credit-generating BMP projects), the time necessary to design and install BMP projects, and any potential time lags between installation of a BMP and that BMP's full maturity. Consideration should also be given to localized resource supply constraints in implementing the trading plan (e.g., supply of materials, equipment, and labor). If any or all of these factors exist, it may take time for a permittee's trading plan to yield compliance with effluent limits, 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 WQBEL(s) via trading as soon as possible. This evaluation

---

[41] 40 C.F.R. § 122.47(a) (2013).

[42] *See Hanlon Memo, supra* note 39.

[43] For example, Oregon has an IMD and regulation. OR. ADMIN. R. 340-041-0061(14) (2013); Oregon Dep't of Envtl. Quality, Interim Management Directive: Compliance Schedules in NPDES Permits, § 3.2 (2007, updated June 21, 2010), *available at* http://www.deq.state.or.us/wq/pubs/imds/ComplianceSchedule.pdf.

should be documented in the permit evaluation report, and should be available for public review at the time the permit is placed on public notice.

If a permittee's trading plan will not result in achievement of WQBELs by the end of a five-year NPDES permit cycle—which may occur if trading-related BMPs take time to fully recruit, implement or mature—permit writers should consider including the full compliance schedule period in the first NPDES permit. 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 five-year cycle. To the extent TMDLs and their implementation plans describe overarching timelines and milestones needed to reach water quality standards over a defined period of time, and note how trading will help to achieve those goals, permit writers can use that information when developing individual compliance schedules for permittees.

5. *Compliance with Anti-Degradation Policy*

***Draft Recommendation – 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: The 2003 U.S. EPA 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 C.F.R. § 131.12). EPA recommends that state or tribal antidegradation policies include provisions for trading to occur without requiring anti-degradation review for high quality waters. EPA does not believe that trades and trading programs will result in 'lower water quality' as that term is used in 40 C.F.R. § 131.12(a)(2), or that antidegradation review would be required under 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."[44] The permit writer conducts an anti-degradation review when writing a permit, and will discuss the relevant conclusions, including any related to trading, in the permit evaluation report/fact sheet.

6. *Compliance with Anti-Backsliding Policy*

[44] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611 (emphasis omitted).

Draft Recommendation – Compliance with anti-backsliding policy*: As stated in the 2003 U.S. EPA Trading Policy, 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 limits, wasteload allocations, or water quality standards than those previously achieved, except where allowed under the CWA. Furthermore, this document additionally recommends States should provide guidance as to how "anti-backsliding" applies to trading-related permit limits where a TMDL is either promulgated or withdrawn/revoked, and as a result, point sources receive less stringent limits than in previous permits.*

Commentary: The 2003 U.S. EPA Trading Policy states: "EPA believes that the anti-backsliding 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 limits 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.[45] These anti-backsliding provisions will also generally be satisfied where a point source generates pollution reduction credits by reducing its discharge below a water quality based effluent limit ("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 anti-degradation policy."[46] 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 one is established later, resulting in less stringent limits for permittees engaged in trading, anti-backsliding could become an issue unless an exception applies.[47] Anti-backsliding could also be an issue for a permittee engaged in

---

[45] It is possible that neither TMDLs nor watershed plans will outline the specific details of a trading program, and so effluent limits should be consistent with the relevant watershed trading framework or plan.

[46] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611.

[47] *See* 33 U.S.C. § 1342(o). "EPA has consistently interpreted CWA section 402(o)(1) to allow relaxation of WQBELs … if the relaxation is consistent with the provisions of CWA section 303(d)(4) or if one of the exceptions in CWA section 402(o)(2) is met." U.S. EPA NPDES Permit Writers' Manual, at § 7.2.1.3. CWA section 303(d)(4) is broken into two parts, the first of which applies to non-attaining waters and the second of which applies to attaining waters. For non-attaining waters, CWA 303(d)(4)(A) allows a less stringent WQBEL if the permittee meets two conditions: 1) the existing limit must have been based on a TMDL or "other WLA established under [CWA §

trading 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 for these situations.

The permit writer reviews all effluent limits established in the renewed permit to determine if they are at least as stringent as those in the current permit and will discuss the relevant conclusions, including any related to trading, in the permit evaluation report/fact sheet.

7. Special Conditions for Incorporating Trading into a NPDES Permit

When dealing with special conditions—which may be included in more than one part of a NPDES permit—the permit writer may detail how a permittee should develop and implement its trading plan so as to comply with the relevant state and federal water quality regulations. All such trading conditions should support the achievement of water quality standards and the protection of beneficial uses. A permit reliant on trading will likely need special conditions in order to be deemed in compliance with its WQBEL(s).

***Draft Recommendation – Incorporating trading components in permit special conditions**: Permits that include trading can contain special condition(s) describing or referencing the details of the trading plan or what is needed in a trading plan if one still needs to be developed. These permit conditions can: 1) incorporate by reference into an attached trading plan conditions developed in accord with trading guidance and/or a trading framework; 2) include a general outline of all of the necessary trading plan components within the body of the permit, with reference to an attached trading plan for details; or 3) fully describe the permittee's trading obligations within the body of the permit.*

Regardless of whether the permit incorporates trading plan details by referencing trading guidance or frameworks, separate permit attachments, or includes all of the details within the permit itself, a permit should in some way address the following elements, and should note in the permit evaluation report the source of information the permit writer relied upon for establishing such special conditions:

303]"; and 2) relaxation of the limit is only allowed if attainment of water quality standards will be ensured through the cumulative effect of the revised effluent limits or the designated use not being attained is removed in accordance with the UAA provisions of 40 C.F.R. 131.10(g). 33 U.S.C. § 1313(d)(4)(A).

- *Trading area: justification and how it is protective of beneficial uses (look to the applicable trading framework and TMDL);*
- *Baseline: sources of applicable regulation or law in trading area, how baseline is expressed in the permit—i.e., as a set of minimum BMPs for credit sellers; as a % reduction target applied to all credits sold; as an overall requirement imposed on the buyer (look to federal, state and local regulations applicable to the land uses at play in the trading area, TMDLs and/or TMDL implementation plans, and trading guidance/framework);*
- *Description of credit quantification methodology: how pre- and anticipated post-project conditions are modeled, how credit values are derived, how baseline is accounted for (look to TMDL and trading guidance/trading framework);*
- *Trading ratio(s): articulation of assumptions, calculations and components (look to TMDL and trading guidance/trading framework);*
- *Risk mitigation mechanisms, such as reserve pool, insurance, and performance bonding requirements (look to trading guidance/framework, and state and federal mitigation regulations);*
- *Project pre-screening: whether it is required or suggested (look to trading guidance/ framework);*
- *Allowable BMPs: actions, identification of quality and performance standards (look to trading guidance/framework, other relevant agency documents such as Natural Resource Conservation Service (NRCS) practice guides, state forestry or agricultural program BMPs);*
- *Credit life: when credits become valid, how long credits remain valid, renewability of credits (look to trading guidance/framework);*
- *Project site design, maintenance, implementation, and performance confirmation, i.e., whether these components are required, and their frequency (look to trading guidance/framework);*
- *Verification of project site implementation and performance: whether it is required, which entity will perform, frequency, and the standards by which performance is judged (look to trading guidance/framework);*
- *Credit registration: whether required, characteristics of "credit registry," information disclosure minimums (look to trading guidance/framework).*

The permit evaluation report and fact sheet can be used to provide the rationales and additional detail in support of the decisions made on trading within a particular permit.

Commentary: Ideally, a watershed will already have an established and state-approved trading framework that provides localized direction on each of the components listed in the

recommendation above. If possible, the permittee would be able to develop its proposed trading plan solely on applicable trading guidance and frameworks, and then submit it to the permitting agency with its permit renewal application. The permit writer would then insert the necessary and appropriate information from the proposed trading plan into the permit and/or permit attachment, with any supplemental explanation contained in the permit evaluation report/fact sheet. If a permittee operates in a watershed not covered by a trading framework, the permittee will likely need to develop a trading plan that addresses the above components but that relies more heavily on state and or federal trading guidance, statute, or regulation, and any relevant TMDL.

In determining where and how to incorporate these trading-related components into the permit, there are essentially two options: 1) fully describe the trading plan in the permit; or 2) generally reference trading plan elements in the permit, and include details in a separate attachment.[48] Because each permittee may find itself in a different situation, special trading conditions need to be included and written into the permit on a case-by-case basis. If specific credit-generating projects, project type and/or project locations are included in the permit or trading plan, a permit modification would be required if any of these details change.

8. Building a Trading Placeholder into a Permit

Draft Recommendation – Timeline to develop trading plan*: Permittees may not yet have a trading plan but may wish to have the option to pursue trading in the future in their permits. If the permittee has not yet developed its detailed trading plan by the date of permit issuance, but it wants to preserve the option for future trading in its permit, it should, by some date certain identified in the permit, fully develop its trading plan, and the public should be provided adequate opportunity to review and comment on the trading plan. In this case, the permit should clearly note that no trades may be used as offsets by the permittee until the permittee has submitted its detailed trading plan to the water quality agency and the permit has been modified to include the updated plan after appropriate public notice and comment.*

Commentary: For many permittees, the specifics of their trading plan may not be complete when a permit is issued or renewed. In fact, permittees may be considering trading as one

[48] In a recent independent assessment of trading-related NPDES permits, the Electric Power Research Institute (EPRI) reached the same conclusion on this point. ELEC. POWER RESEARCH INST., CASE STUDIES OF WATER QUALITY TRADING BEING USED FOR COMPLIANCE WITH NPDES PERMIT LIMITS, at 5-2 (2013), *available at* http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002001454.

treatment option to be examined and therefore the permittee may lack most trading plan details at the time of permit issuance. In these situations, permit writers may insert into the permit a trading option that affords the permittee the opportunity to develop a detailed trading plan by a particular date in time if the permittee selects trading as its treatment option. Other similar programs (i.e., biosolids, reuse water) are sometimes not fully detailed at the time of permit issuance. Following the precedent of these programs, permittees should be able to develop these programs in conformance with a permit condition and then later incorporate the completed trading plan into the permit via a permit modification process. Permit writers will need to consider how much detail on trading is needed in the special conditions at the time of permit issuance or renewal; this determination will likely hinge on the amount of time a permittee has spent considering a trading treatment option prior to the issuance of its permit. Overall, these placeholder conditions should at least provide an outline of the details that the regulators expect will be included in the trading plan.

A permittee needs to have a detailed trading plan in place and approved by the permitting agency before any trades can be used to offset a discharge in exceedance of its WQBEL(s). This trading plan should be made available to the public (*see* Section 8 on registration). Although it is generally understood that permit modifications require public review, the permit should explicitly note that the public will be afforded an opportunity to review and comment on the completed trading plan through a permit modification process.

9. Reporting Obligations Beyond DMR submission

***Draft Recommendation – Reporting obligations beyond DMR submission**: In addition to the submission of DMRs to the water quality agency, special conditions in a permit may also require a permittee to compile an annual, or more frequent, "trading plan report." This report would detail the overall performance of the permittee's trading plan and provide other information required by the permit. The permit or the attached trading 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 BMP projects, special conditions in the permit or the attached trading plan document should specifically note the reporting frequency and where the individual project site reports can be found (e.g., at permittee facility, or on a publicly available website).

Commentary: To document how trading is being used to offset WQBEL exceedances, the water quality permitting agency should require a permittee to report credit quantities obtained on the monthly DMRs. Some states may have additional reporting requirements for trading–related permits. For example, a permittee may be required to report on individual credit-

generating BMP performance to show that each BMP is consistent with the requirements of the program (i.e., meeting particular quality or performance standards identified for that action) and generating the water quality benefits necessary to offset the permittee's exceedance above its WQBEL(s). Site performance reports may be appropriately included in an annual (or more frequent) trading plan report covering all credit-generating activity. These reports are important because they provide confidence that the credits reported on the DMR are performing as expected. Site performance reporting is typically part of the ongoing credit verification process (described in Section 7.4), which determines whether credits remain valid and available for use. The permittee will typically not report this type of information in a DMR, but regulatory agencies may require site performance and/or trading plan reports via other special conditions within the permit.

The permit writer may request that a permittee develop a trading plan report covering all of its "credit generating activities." Regulators may require the permittee to retain the report in its files or may require that the report be made available on a public website. The regulator may, on the other hand, require that the report covering all credit generating activities be submitted to the permitting agency. In this case, the permitting agency would need to be clear as to how the report would be treated. The permitting agency could examine and comment on the report, accept the report and file it, use it for audit purposes, review the report before conducting compliance inspections, etc.

Monitoring that is conducted to determine implementation of a trading plan (i.e., selection, type and location of BMPs, modeled outcomes versus BMP results), although important, is not necessarily data that the regulatory agency requests in a DMR.[49] However, broader trading plan data should still be collected, documented, and used to improve trading overall (*see* Section 11.3 for further discussion of programmatic "effectiveness monitoring").

10. Additional Conditions Imposed by 401 Certifications

States and tribes may include limitations or conditions in their CWA section 401 certifications as necessary to ensure compliance with water quality standards and other provisions of the CWA

[49] Water quality agencies will determine if compliance enforcement is appropriate where the permittee fails to take corrective action when effectiveness monitoring data demonstrates non-conformance with trading plan requirements (*see* Section 9, discussing compliance and enforcement).

and appropriate requirements of state or tribal law.[50] Conditions to protect water quality need not focus solely on the potential discharge; rather, as part of the state or tribal CWA section 401 certification, the certifying agency may develop "additional conditions and limitations on the activity as a whole."[51]

***Draft Recommendation**: Through CWA section 401, state water quality agencies may impose additional conditions on a permit or operating license, including those related to trading. Trading-related conditions placed in section 401 water quality certifications for point sources become enforceable requirements on the permittee.*

Commentary: A state may not issue a section 401 certification for a permit or operating license unless it determines that "there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards."[52] In the point source context, water quality agencies may impose additional conditions on the permittee. Those conditions become enforceable aspects of the NPDES permit. If nonpoint source activities will result in a discharge of pollutants to a navigable water (i.e., a hydroelectric dam operation), the state water quality agency can issue a 401 certification if it deems that the activities will comply with water quality standards. In this instance, trading-related conditions associated with the certification would become enforceable aspects of the operator's license.

11. Liability for Project Performance

***Draft Recommendation – Liability for project performance:** The ultimate responsibility for the proper functioning of project sites rests with the permittee, even if the permittee hires an independent "project developer" to recruit, install, and/or maintain its credit-generating sites.*

Commentary: 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 permittee. If a permittee contracts with a third-party to help deliver credits, the permittee is responsible for selecting credible contractors. If an independent contractor for the permittee fails to perform, the

[50] 33 U.S.C. § 1341(a)(1).

[51] PUD No. 1 of Jefferson Cnty. v. Washington Dep't of Ecology, 511 U.S. 700, 712 (1994).

[52] 40 C.F.R. § 121.2(a)(3) (2013).

permittee's recourse against that party rests in contract law. If third-party contractor failure results in a permit violation, regulatory enforcement agencies may choose to consider this factor, but third party failure is not a defense to a permit violation. In recognition of this ultimate liability, permittees should consider other methods to reduce this risk, including the purchase of more credits than necessary to address its exceedance above its WQBELs.

1.3 Eligible Credit Buyers

***Draft Recommendation – Eligible credit buyers**: Provided that it is in compliance with applicable federal and state "technology-based effluent limits" (TBELs), mixing zone and "near-field" requirements, permit and 401 conditions, and any compliance actions and schedules for these actions requested for other parameter(s) exceeding permit limits, a point source may obtain credits to offset WQBEL exceedances 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 federal regulations with support by the state. Where accepted by the relevant regulatory agency, public and private entities may also purchase quantified water quality credits to meet other mitigation obligations (e.g., Endangered Species Act ("ESA") Biological Assessment of Biological Opinion mitigation, Safe Drinking Water Act ("SDWA") compliance, CWA 401 certification conditions imposed on operating licenses or permits, judicial or administrative consent decrees or orders). Public and private entities may also purchase credits voluntarily 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 document is primarily on point-nonpoint trades because they are the focus of more recent interest and can be more complex,[53] and because the largest number of actual trades already occur in well-documented point-to-

[53] Point-to-point trades can be directly measured at the discharge pipe and reported through the DMR. In addition, enforcement is more straightforward because the point source credit seller can be held accountable under its permit for the reduction it sold to another point source buyer. In contrast, the NPDES permit program does not provide regulators with clear mechanisms to hold nonpoint sources accountable for deficient credit-generating activity in nonpoint-to-point trades.

point programs such as the Nitrogen Control Program for Long Island Sound[54] and Virginia's watershed general permit for nutrient discharges into the Chesapeake Bay.[55]

The U.S. EPA 2003 Trading Policy recommends, but does not require, that "states and tribes consider the role of compliance history in determining source eligibility to participate in trading."[56] 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 or convictions). Trading can be used to help a facility with an otherwise good track record for compliance come into compliance with a specific WQBEL targeted by a trade (e.g., nutrient or temperature exceedances).

Each permittee or buyer must meet certain non-negotiable conditions pursuant to state and federal law and guidance before they may be eligible to purchase credits. As noted in the 2003 U.S. EPA Trading Policy, 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."[57] In this assessment, agencies should consider whether a trading plan will comply with the ESA and other species and habitat protection laws. Agencies should also consider whether or not a trading plan will degrade groundwater in violation of any applicable state water quality regulations.

---

[54] Connecticut Dep't of Envtl. Prot., Connecticut's Nitrogen Credit Exchange – An Incentive-based Water Quality Trading Program (Mar. 2010), *available at* http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/water_quality_trading_summary_2010.pdf.

[55] Virginia State Water Control Bd., Fact Sheet: Modification of General VPDES Permit to Discharge to State Waters and State Certification Under the State Water Control Law (June 25, 2012), *available at* http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VAN00FactSheet2012.pdf.

[56] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1612.

[57] *Id.* at 1610.

As stated in the 2003 U.S. EPA Trading Policy, U.S. EPA does not support a point source trading to meet its TBELs unless doing so is explicitly authorized in 40 C.F.R. § 420.03.[58] 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 when approved by the relevant regulatory agency. This may include "supplemental environmental project" (SEP)[59] 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 Recommendation – Eligible trading areas**: "All water quality trading should occur within a watershed or a defined area for which a TMDL has been approved."[60] 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 should 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 should benefit rearing salmonids in*

[58] *Id.* at 1610–11.

[59] 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 A. Herman, Assistant Administrator, U.S. EPA, to Regional Administrators, *Issuance of Final Supplemental Environmental Projects Policy* (Apr. 10, 1998), *available at* http://water.epa.gov/lawsregs/guidance/sdwa/upload/wsg_105.pdf.

[60] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

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."[61] Larger trading areas are more likely to increase the number of potential buyers and sellers who may engage in trading. However, smaller trading areas can direct nonpoint source credit production to locations that can best address the needed water quality and beneficial use impairments in the basin. Ideally, a TMDL should prioritize the areas where trading may result in the greatest water quality benefits. In this sense, economic and ecological forces may not align when regulators are establishing trading areas. Once a trading area is established, point sources may choose to purchase credits from specific locations for a variety of non-compliance related reasons (e.g., a city may prefer to buy credits within its boundaries for civic reasons, or from particular areas in high need of ecological improvement and investment).

1.5 Eligible Pollutants & Units of Trade

***Draft Recommendation – Eligible pollutants and units for trading**: Pollutants that have currently been traded include nutrients, oxygen-demanding parameters, sediment, and temperature. Eligible pollutants may be considered by EPA and the states for trading on a case-by-case basis. For each of these pollutants, the default units, pollutant form, and seasonality should be defined in a NPDES permit (or relevant regulatory document if outside of the NPDES program).*

Commentary: Not all pollutants are identified as eligible for trading pursuant to the 2003 U.S. EPA Trading Policy.[62] 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."[63] The 2003 U.S. EPA Trading Policy did not mention temperature, but this list is not exhaustive. Oregon and EPA have approved trades involving temperature, and Idaho is considering temperature trades as well.

---

[61] *Id.* (emphasis added).

[62] *Id.* at 1609 (encouraging programs for nutrients, sediments and other pollutants).

[63] *Id*. at 1610.

Most trading programs to date around the country have focused on phosphorous and nutrients, and temperature trades have taken place in Oregon.

"Clearly defined units of trade are 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."[64] Each trading guidance, trading framework and/or trading plan needs to define its own standardized units of trade, ideally using the same units for BMPs and permittee effluent limits. 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) across all states and watersheds because of differences in local watershed conditions and state water quality standards. However, doing so will facilitate developer, seller, and buyer transactions as they will be dealing in the same currency.

1.6 Eligible Credit-Generating Actions & BMP Guidelines

***Draft Recommendation – BMP guidelines**: Conservation or management actions, known as "best management practices" (BMPs), which generate credits, should be quantifiable and verifiable. Each credit-generating "BMP guideline" approved by a state should describe: A) the approved quantification method(s), B) the appropriate pre-project site condition to use for calculating water quality benefit, C) installation and maintenance quality standards, and D) ongoing performance standards to ensure that each BMP is consistently achieving its performance levels. 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 pre-determined, 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,

[64] *Id.* at 1612.

reject, or approve/add new BMPs for a watershed(s). 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, how it works, and its suitability for the watershed;
- A technical analysis of predicted BMP effectiveness;
- A technical summary of the quantification method, as described in the draft recommendation for quantifying water quality benefit;
- Procedures for applying and documenting application of the quantification methodology;
- A description of where the BMP should be applied (appropriate "site conditions");
- A description of the 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 & Modified Best Management Practices

With an approved BMP list for the trading area, it will be much easier for permittees to fully assemble their trading plans. Ideally, such a list can be exported from either trading guidance or an applicable trading framework, but this is not expected to be the norm for some time. Consequently, states should develop some general process for the review and approval of BMPs for permittees to draw from in developing and implementing their trading plans. This need is heightened in the absence of direction from trading guidance or frameworks because permit writers may lack the expertise and time to review BMPs for their appropriateness in a particular watershed, and so may therefore be more reluctant to include trading as a permit compliance option.

Draft Recommendation – Process for eligible BMPs for trading*: To ensure the quality, suitability, and transparency of BMPs that are used to generate water quality credits, and to aid permittees and permit writers in developing trading plans, states should develop some process for formal review and approval of BMPs eligible for trading. Ideally, states will identify eligible trading BMPs at the watershed level. States should also develop a streamlined and consistent BMP review process through which the public can propose new or modified trading BMPs.*

Commentary: Not all BMPs are appropriate for generating credits. Therefore, it is important to develop a system that allows regulators to evaluate and incorporate into trading guidance, frameworks, and plans those BMPs that are effective in improving water quality in a given watershed and that can be reliably quantified into credits. Also important is the identification of BMPs, if any, that already impose affirmative requirements on nonpoint source landowners (*see* Section 2, discussing Baseline). As new BMPs or modifications to existing BMPs are proposed, states should seek to review and evaluate these proposals in a timely manner.

Several options exist for developing an approved list of BMPs. 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 for all watersheds in the state. If a statewide list does not exist, or watershed stakeholders want to implement BMPs that have not been approved at the state level, it is preferable to develop a list of approved BMPs in trading guidance or framework. This approach may be particularly appropriate where the available information on a BMP is limited to a specific geography or a single NPDES permit. In the absence of this reality, one option may be to highlight and review BMPs during the TMDL development process and include those vetted BMPs in TMDL implementation plans. Another option is to incorporate BMPs approved in other state- or watershed-level programs (i.e., state forest practices act or state nonpoint plan), although before doing so, a full baseline screen should be conducted (*see* Section 2). Yet another option may be to include a process in the permittee's trading plan requiring the permittee to review and establish eligible BMPs for that trading plan's implementation. Regardless of the approach used, the quality, suitability, and transparency of the BMPs must be evident.

Even with approved BMP lists, regulators may receive numerous requests to evaluate specific BMPs for inclusion in trading guidance, frameworks, or plans. These requests may come from credit generators or from permittees (in a trading plan). One way to minimize the redundancy and volume of such requests is to develop a BMP pre-review screening process that allows agencies to provide BMP proponents with guidance early on, weed out inappropriate proposals, and prioritize requests so that the most effective BMPs are identified and supported for use. This process will be most efficient if agencies provide the public with a clear set of review criteria tied to information described in Section 1.6 and further detailed in Appendix A. Within this screening process, agencies should document formal approval of new or modified BMPs, as well as rejections of proposals (with reasons as to why).

2. Determining Baseline & Additionality Requirements

In this section:

- What "regulatory requirements" apply at the site level?
- What requirements do TMDL LAs and/or TMDL implementation plans establish?
- What is the "trading baseline"?
- How is baseline expressed?

"Trading baseline" is the threshold a nonpoint source is required to meet before selling credits. The 2003 U.S. EPA Trading Policy states that "pollutant reductions [should be] greater than those required by a regulatory requirement or established under a TMDL."[65] Many sources generally describe baseline requirements. For example, the 2007 U.S. EPA Trading Toolkit states that in the absence of a TMDL, baseline is equal to the pollutant control requirements that apply to a buyer and seller in the absence of trading.[66] "Where a TMDL has been approved or established by EPA, the applicable point source waste load allocation or nonpoint source load allocation would establish the baselines for generating credits."[67] While it is generally agreed that nonpoint sources must meet baseline prior to trading, it can be difficult to determine how to translate a particular watershed goal, TMDL LA, law, or regulation into a control requirement specific to an individual nonpoint source, and if multiple requirements of different types exist, how they overlap or impose distinct obligations. Where a narrative or general requirement does exist, it can be similarly difficult to ascertain how much of the water quality benefit generated from a nonpoint source is additional to the baseline, and therefore can be sold as credits. As a result, translating these requirements to the landowner level can prove challenging.

At a minimum, all nonpoint sources need to meet existing minimum requirements, which are typically affirmative obligations or non-disturbance regulations stemming from state and local law (e.g., all farms must have "nutrient management plans" in place or riparian vegetation may not be actively disturbed), prior to selling credits. Where a TMDL exists, and it establishes

---

[65] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1610 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf.

[66] *See* U.S. U.S. EPA, Water Quality Trading Toolkit for Permit Writers, 28–29, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.

[67] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

through TMDL LAs and/or TMDL implementation plans,[68] requirements that differ from existing state, local, and tribal requirements, then the requirements stemming from TMDL LAs and/or TMDL implementation plans will supplement the existing regulatory requirements. In the absence of existing regulatory requirements or requirements stemming from TMDL LAs and/or TMDL implementation plans, if a state has general nonpoint source control authority[69], that state can also choose to set its trading baseline for trading guidance, frameworks or plans based on that authority.

Where TMDL LAs, TMDL implementation plans, and/or regulatory requirements are clear for individual nonpoint sources, trading baseline should be set to satisfy all of these applicable requirements. Yet, many TMDL LAs are set for entire nonpoint sectors and regulatory requirements might only provide general guidelines (i.e., they are not clear on what individual nonpoint sources are required to do or by when). When regulatory requirements, TMDL LAs, and/or TMDL implementation plans do not establish clear baseline thresholds for individual nonpoint sources, states may need to derive site-specific trading baseline thresholds from existing regulatory requirements (state, local, or tribal regulations), TMDL LAs and/or TMDL implementation plans, and/or general nonpoint source control authority. Each state may decide to combine these sources of authority in different ways to derive the "trading baseline" applicable to a particular trading framework or trading plan, although states must recognize that applicable local and tribal obligations will still apply.

In this document, the "trading baseline" can be composed of several elements, depending on the state or watershed:

- **Regulatory Requirements**: In the absence of a TMDL, the 2003 EPA policy requires that that baseline at least satisfy state, local, and tribal regulations.[70] These "regulatory requirements" are typically affirmative obligations or non-disturbance regulations (e.g.,

[68] In some states, baseline may be based directly on TMDL LAs. In others, TMDL LAs need to be translated into state, local or tribal statutes, rules, regulations or orders to become a baseline requirement. It is therefore necessary to consult with the water quality agency in each state to determine how each respective TMDL program interacts with trading requirements.

[69] *See, e.g.,* WASH. REV. CODE § 90.48.080 (2014) ("It shall be unlawful for any person to throw, drain, run, or otherwise discharge into *any of the waters of this state*) (emphasis added). The Washington Supreme Court recently upheld the Washington Department of Ecology's authority to regulate nonpoint sources under this law. Lemire v. Washington, 178 Wash.2d 227 (Wash. 2013).

[70] *See* 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

all farms must have nutrient management plans in place, or riparian vegetation may not be actively disturbed).

- **TMDLs**: Where a TMDL exists, and it establishes through TMDL LAs and/or TMDL implementation plans requirements that differ from existing state, local, and tribal requirements, then the requirements stemming from TMDL LAs and/or TMDL implementation plans will supplement the existing regulatory requirements. The 2007 U.S. EPA Trading Toolkit notes that for a nonpoint source seller in a watershed under a TMDL, the source's baseline "would be derived from the nonpoint source's [load allocation]."[71] Deriving the required pollution reduction from a TMDL for an individual landowner can be challenging. Many TMDLs define nonpoint LAs for entire sectors, thus making it difficult to translate LAs directly into a site-specific trading baseline. There is often additional ambiguity as to the time horizon for achieving TMDL objectives. Moreover, because TMDLs are not self-implementing, required implementation actions must often be established by other supporting agencies.
- **State General Nonpoint Source Control Authority**: In the absence of or in addition to TMDL and/or TMDL implementation plan requirements, or clearly articulated state obligations for nonpoint sources, some states may have general, broad authority to control nonpoint source pollution,[72] which can be used to set baseline requirements within its control.[73] States may not have translated these mandates into clear BMP or management requirements that can be incorporated into trading plans. Similar to categorical TMDL LAs, this can complicate translation to the site-specific level.

This section provides some recommendations for how to identify relevant regulatory requirements, and how to derive baseline requirements from TMDL LAs, TMDL implementation plans, and/or a state's general nonpoint source control authority. This section also includes

---

[71] *See* 2007 U.S. EPA Trading Toolkit, at 29.

[72] *See, e.g.,* WASH. REV. CODE § 90.48.080 ("It shall be unlawful for any person to throw, drain, run, or otherwise discharge into *any of the waters of this state*") (emphasis added). The Washington Supreme Court recently upheld the Washington Department of Ecology's authority to regulate nonpoint sources in Washington under this law. Lemire v. Washington, 178 Wash.2d 227 (Wash. 2013). Likewise, all California dischargers are subject to regulation under California state law. CAL. WATER CODE § 13260(a)(1) (2014). On the other hand, the federal CWA definition of "point source" specifically excludes "agricultural stormwater discharges and return flows from irrigated agriculture." Federal Water Pollution Control Act, 33 U.S.C. § 1362(14) (2012).

[73] Although a state may have the ability to enact legislation or promulgate a rule that consolidates all state-level baseline requirements into one requirement, landowners must still also abide by requirements established by other levels of government (e.g., local ordinances, tribal requirements, federal requirements imposed by statute).

recommendations for states on how they can use TMDLs to better clarify baseline expectations, and how baseline requirements can be operationalized and expressed in trading guidance, frameworks, or plans.

2.1 Deriving Trading Baseline Requirements

Trading baseline requirements are derived from a hierarchy in which states first look to applicable state, local, and tribal statutes and regulations. If a TMDL exists, it is necessary to review TMDL LAs and/or TMDL implementation plans to determine whether and how these plans establish additional baseline requirements. A state may also rely on general nonpoint source control authority to set the minimum level.

2.1.1 Using Regulatory Requirements to Inform Baseline

At a minimum, trading baseline can be set equal to the level of pollutant load associated with specific land uses and management practices that comply with existing requirements in applicable, state, local, or tribal regulations.

Draft Recommendation *– Prior to selling credits, every nonpoint source project developer must comply with all enforceable state, local, or tribal affirmative or non-disturbance regulations. Even if a TMDL exists in which TMDL LAs and/or TMDL implementation plans establish some baseline requirements, nonpoint sources still must also meet all applicable site-specific regulatory requirements.*

Commentary: Depending on location and land use, the regulations applicable to a nonpoint source project developer will vary. Relevant regulatory requirements can typically be found in state laws and regulations (i.e., animal exclusion fencing, minimum riparian buffer widths, or a specific prohibition of pollutant discharge) and/or local and tribal ordinances. For example, as part of trading baseline, an Oregon nonpoint source located on forestland must "grow and retain" a riparian buffer that conforms to width and stem density requirements,[74] and only the water quality benefit generated beyond those requirements can be sold as credits.

2.1.2. Using TMDLs to Inform Baseline

[74] *See* OR. ADMIN. R. 629-640-0000(2) (2013). For example, on fish bearing streams, operators "shall retain" all understory vegetation within 10 feet of the high water level, all trees within 20 feet of the high water level, and all trees leaning over the channel. *Id.* 629-640-0100(2). Moreover, operators must retain downed wood in riparian management areas, at least 40 live conifer trees per 1000 trees, and trees/snags at least six inches or greater in DBH. *Id.* at -0100(3)–(6).

When a TMDL exists, at a minimum, trading guidance will have to meet any baseline requirements for nonpoint sources established in the TMDL and/or TMDL implementation plans. This can be challenging since TMDLs are not typically written with trading in mind. The 2003 U.S. EPA Trading Policy states that "pollutant reductions [should be] greater than those required by a regulatory requirement or established under a TMDL."[75] When applying this concept to a single nonpoint discharger, the 2007 U.S. EPA Trading Toolkit notes that a nonpoint source's baseline "would be derived from the nonpoint source's LA[,]"[76] but does not specify how to derive baseline for particular sites from the LA. If TMDLs are unclear about how LAs apply to individual nonpoint sources, states and TMDL-implementing agencies will need to determine the site-specific requirements derived from the TMDL that may inform and/or set trading baseline.

1) Incorporating Trading into TMDL Drafting

Draft Recommendation – *If trading is considered a possibility for meeting water quality goals in a watershed, considering several actions early on will make it easier to inform a trading baseline from the TMDL where a TMDL exists or is planned. This includes clearly defining LAs, the expected role of trading in achieving TMDL goals, and making clear statements about the role and timing of trading in implementing the TMDL.*

Commentary: This draft recommendation is not intended to influence the entire TMDL development process, but to provide some ideas on how TMDLs can provide clearer direction for trading. TMDLs that include different scenarios, different scales or timeframes for applying load reduction targets, and nonpoint source models that are sensitive enough to capture reach or group-of-landowner level changes can help provide the technical basis for establishing trading baseline requirements. As an agency develops or revises a TMDL, consideration of the following questions may make it easier to derive trading baseline from TMDLs:

- How are LAs modeled and completed? Can a trading framework or plan incorporate the models easily to move from a sector-wide LA to a LA for an individual source? If individual-level LAs cannot be identified in the TMDL, does the TMDL provide some mechanism for translating TMDL nonpoint source goals to the individual landowner level needed to implement trading?

[75] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

[76] *See* 2007 U.S. EPA Trading Toolkit, at 29.

- Are WLAs, LAs and excess pollutant loads expressed in the same type and unit of pollution?
- Does the TMDL make it clear whether a LA equals an expected amount of pollution from nonpoint sources, or whether it is referring to LAs as a targeted reduction of excess loading?
- Does the water quality agency provide sufficient direction in the TMDL as to what reductions or types of actions, timing, and sequencing it expects? In particular, does the TMDL clearly define the trading-related expectations of nonpoint sources (e.g., minimum BMPs, amount of reduction)?

2) TMDL Implementation

In terms of implementation, the CWA only requires that TMDLs "shall be established at a level necessary to implement the applicable water quality standards[,]"[77] but it does not require that TMDLs be completely implemented within a specific timeframe (unlike technology-based effluent limits).[78] Therefore, TMDL implementation plans can provide important direction as to the timing and sequencing of TMDL implementation—including trading. Currently, many TMDL implementation plans lack clarity as to when desired future conditions will be attained, and what sequence of actions (and when) will be necessary to reasonably assure progress toward water quality standards over the longer-term. Some TMDL implementation plans also may not define explicit requirements applicable to individual landowners. This often leads to difficulty in TMDL implementation, and confusion as to which entity is going to address what amount of the problem, and by when (e.g., whether LAs need to be met in 5 years or 75 years). This difficulty in translation can complicate trading baseline at the landowner level.

To address these issues, states may choose to articulate implementation timelines in TMDLs or in TMDL implementation plans. "Phased baseline" requirements for trading that become more stringent over time are one way that these timelines can be used to set baseline requirements for trading. If a state pursues a phased baseline approach in a TMDL, it should appropriately tailor its definition of "credit life" to correspond with these phases (*see* Section 5.1).

---

[77] 33 U.S.C. § 1313(d)(1)(C).

[78] *See* 33 U.S.C. § 1311(b). TMDL-based targets are not constrained by the shorter timeframes associated with meeting the technological goals of the CWA. Longview Fibre Co. v. Rasmussen, 980 F.2d 1307, 1312 (9th Cir. 1992) (noting that "the 'timetable for achievement of objectives' limitations of section 1311 do not apply to section 1313 TMDL effluent limitations"); Nw. Envtl. Def. Ctr. v. Oregon DEQ, No. 9905-05144, 2000 WL 35562955, at *17 (D. Or. Oct. 19, 2000) ("section 1311 compliance deadlines do not apply to section 1313 TMDL's").

Draft Recommendation – Establishing phased nonpoint source load reduction targets in TMDL implementation plans: *Where a TMDL exists, TMDL LAs and/or TMDL implementation plans can help inform trading baseline by specifying expected pollution reductions or types of BMPs with clear timing and sequencing. When considering interim targets, a TMDL implementation plan can incorporate the timing needed to finance, implement, report, and adapt strategies to meet LAs (including trading strategies).*

Commentary: To our knowledge, no trading guidance, frameworks or plans have yet implemented phased baseline approaches, but several states provide the opportunity to phase in TMDL reductions over time as part of implementation (e.g., the Chesapeake Bay TMDL,[79] Florida law,[80] and the Shelter Island TMDL in San Diego[81]). A phased approach may not be desirable in some watersheds (e.g., where point sources are the major contributors of pollutants).

One challenge with phased implementation is determining what happens if nonpoint sources do not meet their interim reduction goals. Another challenge is that setting reasonably achievable milestones at specific time intervals will take time and could add complexity to writing TMDL implementation plans. Moreover, LAs and WLAs in the TMDL would possibly need to be adjusted in the future based on actual achievement of reduction milestones (which also might raise questions of equity from point sources if they are forced to carry more of the excess load problem should nonpoint sources fail to perform[82]). These revisions could impact the

---

[79] *See* U.S. EPA, Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment § 7 (2010), *available at* http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html (noting the possibility that point source allocations could be reduced if nonpoint sources do not obtain reduction goals).

[80] FLA. STAT. § 403.067(7)(a)(1) (2013) ("In developing and implementing the [TMDL] for a water body, the department … may develop a basin management action plan that addresses some or all of the watersheds and basins tributary to the water body. Such plan … *may provide for phased implementation of these management strategies to promote timely, cost-effective actions as provided for in s. 403.151*") (emphasis added).

[81] California Reg'l Water Quality Control Bd., San Diego Region, Resolution No. R9-2005-0019, 3–4 (Feb. 9, 2005), *available at* http://www.waterboards.ca.gov/sandiego/water_issues/programs/watershed/docs/swu/shelter_island/2005_0019.pdf.

[82] The CWA and its implementing regulations do not discuss equitable considerations, but recent case law discussing TMDL implementation has noted this as an important consideration. *See* Am. Farm Bureau Fed'n v. U.S. EPA, No. 1:11–CV–0067, 2013 WL 5177530, at *35 (M.D. Pa. Sept. 13, 2013) (discussing the equitable distribution of the burden of reducing pollutant loads and questioning the practicality of "pin[ning] the hopes of attaining the

amount of trading that a source would be able to engage in, and could impact the value of the trades already under way. Further, if credit availability can decline over time, point sources may prefer a fixed-price "grey technology option"[83] over trading because of the certainty in financial commitment (price) that the grey technology option provides. Finally, under a phased approach, there is still the possibility that point sources would need to install technology in the future if TMDL goals have not been met. Importantly however, installing grey technology may not alleviate the risk of additional reductions being required. On the other hand, a phased approach could incentivize early action where more credits are available earlier than in later phases.

Ultimately, in order to use a phased implementation approach, states would need to develop and use systems that track progress and allow EPA to review progress toward TMDL goals in quantifiable terms throughout a watershed. Regulators would need a robust set of data to identify appropriate adaptive management actions. Thus, this approach requires development of systems to track and account for the reductions that nonpoint sources achieve over time. These systems are not a unique need for trading, but may not exist for all states or TMDLs.

2.1.3. Using a State's General Nonpoint Source Control Authority to Inform Baseline

Whether or not a TMDL has been established, states may look to general nonpoint source control authority, if it exists for that state, as a source for establishing site-specific baseline requirements.

***Draft Recommendation – State's general authority**: Whether or not a TMDL has been established, and if states have general nonpoint source control authority, this authority may be used as the basis for establishing specific baseline requirements for landowners.*

Commentary: Some states possess general, broad authority to control nonpoint source pollution.[84] This authority is not necessarily translated into clear BMP or management requirements, thus making it a very flexible tool for the state agency. This flexibility may also create some uncertainty for what the trading baseline should be. To the extent states can

---

statutorily-mandated goal of achieving water quality standards on the three tidal states [and not recognizing the impacts of upstream states] would not only be inequitable, but also impractical and likely impossible.").

[83] Grey technology includes the traditional treatment technology (i.e., filtration, chiller, treatment pond, etc.) installed at a treatment facility discharge point, or in the immediate vicinity of the facility, to remove a pollutant prior to the facility discharge to a waterway.

[84] *See, e.g.*, *supra* note 72.

translate broad, general authority to control nonpoint source pollution into specific BMPs, expected reductions, etc., it will be easier to incorporate these requirements into known and predictable trading baseline at the landowner level.

2.2 Detailing Trading Baseline at Individual Project Sites

This section discusses: (i) setting "base year" for establishing pre-project site conditions, (ii) how baseline can be expressed, (iii) individual vs. group-level attainment of baseline requirements, (iv) sequencing of baseline and credit generating activities, and (v) use of cost-share and conservation funding toward meeting baseline requirements. These principles generally apply in all baseline contexts.

2.2.1 Establishing Base Year for Calculating the Water Quality Benefit at Project Sites

Trading programs vary as to the date after which implemented BMPs become eligible to generate credits (i.e., the base year).

***Draft Best Practice – Trading framework or trading plan base year**: The trading base year may be set as the date on which a seller completes a project consistent with the requirements of an applicable trading framework or trading plan. However, if regulators seek to reward early action, regulators may approve a "look back period" that establishes the base year as the date the state issues the TMDL, or the date state approves a trading framework or trading plan. If the base year is a point in the past, projects completed between the base year and the inception of the trading framework or plan must demonstrate conformity with trading guidance, framework, or plan requirements in order to be eligible to sell credits.*

Commentary: The easiest and most straightforward approach to base year is to establish pre-project site conditions at the time an individual project is completed in accordance with the requirements of an applicable trading framework or plan. This approach may disincentivize early adoption of BMPs (e.g., farmers may choose not to implement or continue BMPs leading up to a new TMDL or renewed NPDES permit with trading included, hoping instead to implement those practices once the trading framework or plan is in place, and credits can be sold).

To address this disincentive, regulators may consider looking back to a date prior to the approval of the applicable trading framework or trading plan. A look-back period can maintain the incentive for early BMP adoption by allowing documented improvements in practices to generate credits when they are implemented within a fixed number of years of a trading program's establishment. Under this approach, credits from these already-installed BMPs would be calculated using the same methods, and the same baseline requirements and approved ratios would still apply.

There are multiple approaches available to set the look-back period. One approach is to look back over a short period prior to the beginning of trading. For example, the Ohio Basin framework allows a three-year look-back period.[85] Another approach is to look back to the year a state began implementing a TMDL, and set that as the base year. This approach is simple if the agency recently published the TMDL, but is less desirable if the agency approved the TMDL a number of years prior. A third approach is to allow all BMPs to qualify, regardless of when they were installed. Maryland allows credit generation for any non-structural BMP implemented on an annual cycle (e.g., cover crops), even if that BMP was used prior to signing a TMDL.[86] These last two approaches are intended to prevent landowners from stopping beneficial practices as a way to generate more credits, but on the other hand, these last two look-back approaches may create the appearance that credit purchasers are simply buying water quality benefits that already occurred (especially if the benefit occurred a number of years in the past).

2.2.2 Expressing Baseline Requirements

Draft Recommendation – Expressing baseline requirements*: Baseline requirements can be expressed as A) an extra amount of load that must be reduced by a nonpoint source at a site (expressed as a percentage of the total overall load, or as a numeric amount); B) a minimum set of BMPs or actions that must be installed at a site. To the extent possible, the expression of baseline should be outlined in trading guidance, a trading framework, a trading plan, the TMDL, and/or TMDL implementation plans.*

Commentary: Baseline is expressed in a variety of ways because it draws from a variety of sources. Some trading contexts require the adoption of a minimum set of BMPs (e.g., covered manure storage or filter strips) prior to allowing a nonpoint source project to generate credits,

---

[85] *See* ELEC. POWER RESEARCH INST., PILOT TRADING PLAN 1.0 FOR THE OHIO RIVER BASIN INTERSTATE WATER QUALITY TRADING PROJECT, at E-4.B (2009), *available at* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf (noting 3-year look-back period for establishing baseline conditions for agricultural nonpoint source credit generators).

[86] *See* Maryland Dep't of Agric., Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed: Phase II – A Guidelines for the Generation of Agricultural Nonpoint Nutrient Credits, at 11 (draft 2008), *available at* http://www.mdnutrienttrading.com/docs/Phase%20II-A_Crdt%20Generation.pdf ("Credits can be generated from agronomic nutrient reduction practices, that do not count towards the baseline requirements, [sic] Agronomic practices reduce or minimize surface, groundwater or air emissions, such as; manure injection, reductions in nitrogen fertilizer application, precision agriculture, cover crops, no-till, etc. These are considered an annual practice for the year they are generated, regardless of what year the practices were first initiated.").

whereas other trading contexts require nonpoint sources to generate a percentage of pollution reduction (e.g., 20% reduction in nutrient loading) prior to allowing that nonpoint source to sell credits. Following are the pros (+) and cons (-) associated with different expressions of baseline.

- *Technology-Based (Minimum BMPs as Baseline)*: Virginia,[87] Pennsylvania,[88] and Colorado[89] express baseline this way:
    - \+ BMPs are implemented at all sites where trading is to take place. This works well when required BMPs are defined in TMDL implementation plans and/or state law or regulations, where BMP efficiency is consistent throughout the watershed, and BMP adoption is likely;
    - \+ Rewards landowners who have already implemented required BMPs early and have already met baseline;
    - \+ Ensures that important, but otherwise costly, BMPs are implemented rather than just the cheapest or easiest-to-implement BMPs;
    - − Required installation of standard BMPs at all project sites can reduce flexibility for farmers to design BMPs that maximize pollutant reductions and meet the needs of their site and operations; and

[87] Virginia Dep't of Envtl. Quality, Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners, 3–5, *available at* http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VANPSTradingManual_2-5-08.pdf ("You are presumed to meet the baseline level of nutrient reduction if you implement all the following BMPs that are applicable to your operation" including soil conservation, nutrient management, cover cropping, livestock stream exclusion, and riparian buffer installation).

[88] PA. CODE § 96.8(d)(3)(i)(A)-(B) (2014) ("To generate credits, an agricultural operation must meet one of the following threshold requirements at the location where the credits are generated. (A) Manure is not mechanically applied within 100 feet of a perennial or intermittent stream with a defined bed or bank, a lake or a pond. … (B) A minimum of 35 feet of permanent vegetation is established and maintained between the field and any perennial or intermittent stream with a defined bed or bank, a lake or a pond.").

[89] Among other options, the Colorado policy lists implementation of BMPs as a mechanism for satisfying nonpoint source baseline. *See* Colorado Dep't of Pub. Health & Env't, Water Quality Control Div., Colorado Pollutant Trading Policy, § VIII (Oct. 2004), *available at* http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Policy.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251949264999&ssbinary=true.

- Tracking minimum BMP installation could require extra site visits to confirm those BMPs are performing as expected, which may be time-consuming and subjective.

- *Performance-Based at the Nonpoint Source Site Level (Numeric or Percent Load Reduction Target as Baseline)*: Maryland[90] and Pennsylvania[91] express baseline as site-specific reductions in guidance and regulations, respectively.
  + Since reduction targets can be set in the same units as TMDLs, it is easier to track progress from trading in the same metrics and targets used to develop TMDLs;
  + When quantifying credits from a site, it is more time- and cost-efficient to separate a baseline amount of credits from the total amount of credits (otherwise, the analysis must include calculating/modeling impacts of each baseline BMP at each site—which can increase the cost of quantifying credits);
  + Provides more flexibility to project developers in how they achieve pollution reductions (i.e., no one-size-fits-all BMP irrespective of individual conditions);
  + Expression at the nonpoint source site level suggests that individual nonpoint source project developers are making contributions to baseline requirements (thus reinforcing the notion that nonpoint sources are carrying their fair share of the burden);
  - High priority BMPs may not be implemented in favor of BMPs with a lower cost-per-unit of the target pollutant removed (i.e., landowners might select BMPs based on the relative cost of meeting baseline requirements); and
- Performance-Based at the watershed level (percent program-level load reduction target as baseline):
  + More simple to quantify baseline obligation for purchasing point source entities (e.g., express as an extra percentage or amount of the overall reduction amount being purchased) because point sources already calculate exceedance in these units;
  - Using absolute load amounts for a watershed may introduce issues of equity because it may be far easier for "late adopters" to meet the required percent reduction than "early adopters" who have already taken actions. The

[90] 2008 Maryland Policy for Nutrient Cap Management & Trading, at § 4.1 ("The Department will require a 5% retirement ratio applied to each point-source generated credit. This ratio may be adjusted over time.").

[91] PA. CODE § 96.8(d)(3)(i)(C) (2014) (nonpoint sources can either install the minimum BMPs described in subsection (d)(3)(i)(A)-(B), or create an additional 20% reduction prior to being able to sell credits).

Chesapeake TMDL is somewhat unique in that it sets specific load reduction targets by reach, supporting a percent reduction approach to baseline;[92] and

- Expression of baseline requirements at the nonpoint source site level suggests that individual nonpoint sources are making contributions to water quality improvements, but if baseline obligations are expressed as an additional obligation of the buyer of credits (via a multiplier of the permittee's exceedance, for example), it may appear as if the nonpoint sources are not meeting obligations.

2.2.3 Individual vs. Group-Level Attainment of Baseline Requirements

Draft Recommendation – Use of individual or group-level baseline requirements*: States should decide whether an individual project developer may generate credits upon meeting its own baseline requirements, independent of the actions of neighboring landowners in the relevant watershed. There are advantages and disadvantages to doing this. Where possible, trading guidance and frameworks should incentivize grouped implementation of BMPs in a watershed (e.g., through reduced ratios for collective action, increased availability of "cost share" to meet baseline, etc.).*

Commentary: Several states allow individual landowners to sell credits when their individual baseline requirements have been met.[93] It may not be fair to predicate credit-generation eligibility (i.e., baseline requirements) on the willingness of all proximate landowners to participate in a program.[94] Nonetheless, although required group action may create barriers to entry, it may make sense to incentivize group action as much as possible via mechanisms such as reduced trading ratios and baseline requirements, and/or additional access to cost share funding.

---

[92] U.S. EPA Chesapeake Bay TMDL, at § 9.1 (noting load reduction targets for all 92 Chesapeake Bay segments); *id.* at App. Q (providing detailed annual WLAs and LAs).

[93] *See* E. BRANOSKY, ET AL., WORLD RES. INST., COMPARISON TABLES OF STATE NUTRIENT TRADING PROGRAMS IN THE CHESAPEAKE BAY WATERSHED, at 10 (2011), *available at* 11 http://pdf.wri.org/factsheets/comparison_tables_of_state_chesapeake_bay_nutrient_trading_programs.pdf.

[94] *See* Montana Dep't of Envtl. Quality, Response to Comments on Montana's Draft Policy on Nutrient Trading, Comment 2 Response (Oct. 28, 2011), *available at* http://deq.mt.gov/wqinfo/NutrientWorkGroup/PDFs/DraftTradingPolicyRespComm10_11.pdf ("Defining 'baseline' so that all nonpoint source contributors need to achieve (collectively) the watershed load allocation before a credit may be generated would eliminate the majority of trading opportunities and greatly reduce the effectiveness of this policy.").

2.2.4 Sequencing of Baseline & Credit Generating Activities

Draft Recommendation – Sequencing of meeting baseline requirements*: Project developers can meet their baseline requirements simultaneous to generating credits.*

Commentary: Project developers can meet their baseline requirements simultaneously with the actions needed to generate credits (as opposed to first implementing the BMPs to meet baseline and then later implementing the BMPs to generate credits). For example, this would allow a project developer to implement a set of BMPs that both meet and go beyond baseline to generate credits. This concept refers to actions taken after a base year (*see* Section 2.2.1).

2.2.5 Use of Public Dollars Dedicated to Conservation to Satisfy Baseline Requirements

Draft Recommendation – Allowable funding sources to meet baseline requirement: *Project developers may use "public dollars dedicated to conservation" or any other source of funding to help meet baseline requirements or other watershed-wide nonpoint source reduction goals in the TMDL. Where public dollars dedicated to conservation are used, the amount and purpose of those funds need to be disclosed as part of the credit issuance process. Actions funded with public dollars dedicated to conservation should not be used to generate credits for compliance (see Section 5 for more complete discussion of "payment stacking").*

Commentary: Currently, most trading frameworks and plans allow for the use of public dollars dedicated to conservation (defined in Section 5.3) to meet baseline requirements.[95] "Cost share" funds such as federal Farm Bill programs, EPA section 319 grants, and state sources are routinely used to help nonpoint sources reduce pollution and meet conservation goals, including those outlined in TMDLs. USDA regulations do not restrict the use of its funds for meeting baseline requirements.[96] Cost share funds can be used to meet baseline requirements. If public cost share is used to meet baseline, that information should be available so that credit buyers, agencies, and the public may verify that public dollars dedicated to conservation are being used to meet baseline

[95] WRI COMPARISON TABLES, at 11, Tbl. 7 (May 1, 2011) (noting that Maryland, Pennsylvania, Virginia and West Virginia allow cost-share funds to meet baseline).

[96] *See, e.g.,* 7 C.F.R. § 1410.63 (2013); 7 C.F.R. § 1466.36 (2013); 7 C.F.R. § 1467.20 (2013).

3. Quantifying Water Quality Benefits at the Project Site

In this section:

- What makes a good credit quantification method?
- What kinds of quantification methods are available?
- At what scale should quantification methods operate?
- How are credit quantification methods documented?

Credit quantification relies on the best available science to predict and/or measure the pollution reduction from implemented BMPs (i.e., "water quality benefits"). A project's water quality benefit is the environmental improvement directly attributable to the credit-generating actions.

Quantifying the water quality benefits provided at the project site ("edge-of-field water quality benefit") is the first step in determining the amount of credits available to sell. As discussed in Section 4, however, the edge-of-field water quality benefit is not always equal to the credit quantity that may be sold. The water quality benefits that can be sold as credits may be adjusted through additional quantification exercises (e.g., estimating delivery of a pollutant reduction from the edge of the field where it is generated into the waterway, or estimating "attenuation" during transport instream) or through application of policy or risk management mechanisms (baseline or eligibility requirements, trading ratios, reserve pool requirement, etc.). This section discusses the steps necessary to quantify water quality benefits at the edge-of-field. Section 4 discusses the adjustments to edge-of-field water quality benefits that may be made to account for quantification of delivery and attenuation, policy, and risk management.

The first step in the process to quantify edge-of-field water quality benefit is to measure "pre-project conditions" at the base year in a way that can be verified. Pre-project conditions could be documented in terms of the presence or absence of minimum BMPs, or as the pre-project pollution load from the site. After the action is complete, a seller may then document or estimate the site's actual or anticipated "post-project conditions." Post-project conditions can also be documented as the presence or absence of BMPs, or as a post-project pollution load.

The next step is to calculate the net water quality benefit at a project site based on the pre- and post-project conditions. If the pre- and post- conditions were documented as the presence or absence of BMPs, it will be necessary to translate that qualitative information into a net "pollutant reduction" in order to calculate the net water quality benefit in units consistent with a NPDES permit or TMDL. Represented as an equation:

Water quality benefit (edge-of-field) = anticipated post-project performance – pre-project performance [which may include baseline reductions]†

†Note: Where the site does not meet applicable requirements, the pre-project condition (and thus pre-project performance) may be adjusted to reflect the trading baseline requirements (expressed either as actions or load reductions) so that these actions or load reductions are not included as part of the edge-of-field water quality benefits. Baseline may also be accounted for in conjunction with the adjustments discussed in Section 4 (attenuation, trading ratios, etc.).

This calculation typically occurs using one or more of the following types of water quality benefit quantification methods: modeling, pre-determined rates/ratios, and "direct monitoring."

The recommendations in Section 3 discuss: 1) the general desirable characteristics of quantification methods in a trading program (i.e., repeatable, sensitive, accurate, practical, and transparent); 2) the methods available for quantifying water quality benefits at the project site (i.e., pre-determined rates, modeling, or direct monitoring) and a discussion on when each type of quantification method may be most appropriate; 3) the need to identify field-scale quantification methods; and 4) how to perform a "project site assessment" (i.e., how to measure pre-project conditions and anticipated post-project conditions).

3.1 Characteristics of a Credit Quantification Method

***Draft Recommendation – Quantification methods**: Methods for quantifying water quality benefits from BMPs should be repeatable, sensitive, accurate, practical, and transparent, especially when used for trading. Methods that have a longer history of usage and application and a documented track record are preferred where available. These methods are often developed as part of a TMDL or comparable process. Documentation of approved methods should include a thorough technical review, 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*.[97] 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;

[97] WILLAMETTE PARTNERSHIP, ET AL., PART II—IN IT TOGETHER: A HOW-TO REFERENCE FOR BUILDING POINT-NONPOINT WATER QUALITY TRADING PROGRAMS, at 20–21 (2012), *available at* http://willamettepartnership.org/in-it-together.

- *Repeatable*: if different people apply the method using the same data, location, and factors, the model will deliver a similar result (i.e., is 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 and 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.

Quantification tools can always be improved, and sometimes the best way to improve them is through use (*see* Section 11 for more on adaptive management of quantification methods). In addition to confirming that projects are in place and conforming to quality and performance standards, trading frameworks or plans should seek to monitor a representative subset of projects and to collect the data needed to improve quantification tools over time. 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 (e.g., for tributary flow augmentation). Importantly, this data would not be used to determine compliance for the permittee that is purchasing credits within the current permit cycle, but would be used to improve the models/quantification tools (in terms of how many credits that model/tool should calculate for BMPs in the future) included within trading frameworks or plans.

3.2 Standard Methods Quantifying Water Quality Improvements for Trading

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

A. Pre-determined rates: This approach involves setting standard values for water quality improvement based on the best available science. These values are often expressed as ratios or 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 loaded into a waterbody using mathematical simulation procedures. Many water quality trading programs use modeling to estimate water quality benefit 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., stream bank erosion or shade from riparian vegetation). This method 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. For most credit-generating practices, it is difficult to causally link BMPs to measurable improvements at a single site due to variation in weather, watershed hydrology, and other inputs to the systems (e.g., a discharge, diversion, or practice implemented upstream). For this reason, direct monitoring is typically used to quantify credits only in those cases where environmental and other variables can be highly controlled.

Draft Recommendation – Use of standard approaches to quantifying water quality benefits: *Trading programs should have standard methods or models for quantifying water quality benefit, 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 similar watershed analysis) or should be consistent with the approaches used in the relevant TMDL or similar watershed analysis. Methods should also be well-referenced and well-documented. Where a permittee commits to using an approved method and version, the "regulator" overseeing the permittee's trading plan should continue to support that version (e.g., provide guidance on data collection, troubleshooting for calculations, etc.) for a set period of time (e.g., one permit cycle).*

Draft Recommendation – Types of quantification methods: *Trading programs should use the most appropriate method to quantify credits. Methods might be different for different BMPs. The types of available methods to choose from include: A) pre-determined pollution reduction rates; B) "water quality models"; and C) direct monitoring.*

A. Pre-determined pollution reduction rates are the most appropriate method for quantifying credits where sufficient data exists 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 and/or are transferable to the proposed trading geography and conditions, and some guidance and 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 formally approve the rates in a manner 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(s), before being approved by state agencies for use in trading frameworks or plans.*

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, regulators should require that project developers have a clear "monitoring/sampling/quality assurance protocol" approved by the state agency. 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 benefit/load reduction. Project-specific methods will need to demonstrate adherence to the same standards (e.g., repeatable, sensitive, transparent, and ideally vetted through a public- and peer-reviewed process) that are applied to trading framework- or trading plan-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 guidance, framework, or plan-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 discussed below.

A. Pre-determined Rates:

BMP effectiveness rates provide a high level of repeatability and predictability in a trading framework or plan 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 accurate within the region or watershed of use. Rates should not be automatically transferred beyond their region of development (i.e., it should not be assumed that rates developed for nutrient trading in the Chesapeake Bay will be applicable 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. Trading frameworks or plans should use existing review and selection processes where applicable. For example, models are often developed as part of a TMDL or a comparable process.

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 concentrations or load (e.g., pounds), 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 300–3000 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, regulators 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 should 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 integration 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 should 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 are particularly important—*see* Section 11 (discussing adapative management). An analysis of uncertainty in model estimates (including uncertainty stemming from variability in accuracy of estimates or measurement) provides important information when validating accuracy. Modeling uncertainty, should be accounted for in credit quantification or as a trading ratio (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 when possible (i.e., publishing of results in peer-reviewed scientific literature).

4. *Formal Approval*: if deemed necessary, approval might come in the form of inclusion of the tool within state guidance, an approval letter from the state water quality agency, 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 formally approve the project developer's monitoring/sampling/quality control protocol.

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 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 Quantifying Conditions at the Field-Scale

Draft Recommendation – Field-scale quantification*: Each trading framework and/or plan 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. The following list includes some field-scale quantification methods that might be applicable for particular watersheds or pollutants, but is not an exhaustive list:

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

3.4 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. The "project site assessment" includes the data collection and documentation necessary to establish pre-project conditions on a credit project site, and the anticipated post-project site conditions that will generate water quality benefits.

3.4.1 Pre-Project Site Conditions Assessment

To quantify credits, a project developer first needs to understand a project site's conditions and operations within the recent past, referred to as the "pre-project site conditions." Pre-project conditions can be documented in terms of the presence or absence of minimum BMPs, or as quantified pre-project pollution load. This information is used to show that project activities meet eligibility and baseline requirements, and informs the "pre-project site performance" value that is quantified 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 guidance, frameworks, and plans should also consider how best to ensure that pre-project site condition information is accurate. One approach is to require that project developers attest that the information is accurate; another is to require the use of specific monitoring techniques for a given type of information (e.g., document existing vegetation with photo points).

***Draft Recommendation – Pre-project site conditions assessment**: Pre-project site conditions, which are used to calculate edge-of-field water quality benefits, are established in the base year for a framework or plan. Pre-project conditions should be established prior to implementation of practices that will generate credits and/or practices that will meet baseline requirements. Pre-project site conditions may be assessed during a site visit by a verification entity, but this may be costly and unnecessary. Whether a pre-project site visit is conducted by a verification entity or not, 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 used 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 may be reviewed for completeness.*

***Draft Recommendation – Documenting pre-project conditions**: At the outset of a trading framework or plan, the content, consistency, and quality of information that landowners have available is likely to vary widely. Thus, in the first 1–2 years after establishing a trading framework or plan, some flexibility as to the rigor of required documentation may be appropriate because it may take time to establish and disseminate regulator 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 credit being targeted. Some samples of information and documentation that may be required for specific BMPs are shown in Table 3.4.1 below.

There is a tradeoff between program costs, the level of confidence in documentation of pre-project site conditions, and the ability to independently verify those conditions. Comprehensive documentation of site conditions can better inform calculation of a site's pre-project site performance, from which water quality benefit calculations are developed, and may simplify verification. In many cases, documentation is straightforward to obtain. In other cases, comprehensive documentation can be more complex to gather, and could thus impose significant transaction costs on project developers, and ultimately, credit buyers.

Table 3.4.1. Example documentation for assessment of project site conditions.

BMP	Information/Documentation Required
Nutrient management for nutrient credit	Three years of farm practice history, including fertilizer application quantities and rate/acre, fertilizer brand and mixture, and other information required to quantify nutrient delivery to the edge-of-field.[98]
Riparian forest restoration for temperature credit	Current canopy cover, buffer width, aspect, stem density, species composition, invasive cover, channel characteristics (e.g., wetted width), and other required information. A map with location and extent of BMPs.[99,100]
Cover crop or crop rotation for nutrient credits	Previous crop rotations documented through available geospatial data or landowner records, and other required information. A map with location and extent of BMPs.
Change in irrigation for nutrient credits	Last three years of irrigation type, sources of irrigation water (e.g., water diversions, groundwater wells), application rate, documentation of application, and other required information. A map with location and extent of BMPs.

3.4.2 Open Enrollment

[98] ELEC. POWER RESEARCH INST., PILOT TRADING PLAN 1.0 FOR THE OHIO RIVER BASIN INTERSTATE WATER QUALITY TRADING PROJECT, at E-4.B (2009), *available at* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf.

[99] WILLAMETTE PARTNERSHIP, DRAFT GENERAL CREDITING PROTOCOL ADDENDUM: RIPARIAN PLANTING STANDARDS, at 1–2 (2011), *available at* http://willamettepartnership.org/tools-templates/Draft%20Addendum%20Riparian%20Planting_2011.pdf.

[100] WILLAMETTE PARTNERSHIP, GCP 2.0, at App. F Water Quality Protocol

In some cases, the trading base year (discussed in Section 2.1.2) may be linked to a date prior to the development of a trading framework or plan. For example, assume regulators set the base year as 2008—the year the TMDL was issued—and a trading plan was approved in 2013. Project developers seeking credit for projects completed in the trading area after the base year but prior to the approval of a trading plan should demonstrate that all trading plan requirements later identified have been met (e.g., baseline requirements, BMP "quality standards," documentation of pre-project site conditions, etc.). An "open enrollment" period provides an opportunity to involve early actors that may have implemented positive practices after the base year, but who do not yet have the trading plan-defined documentation necessary to sell credits. This mechanism allows a trading program to avoid penalizing and thereby inhibiting early action to restore water quality. On the other hand, there are risks in crediting projects implemented prior to trading guidance, framework, or plan approval. Projects that would have been implemented in the absence of trading may not be additional. Also, even if all projects must meet trading guidance, framework, or plan requirements, landowners or project developers may have expectations about the value and number of available credits that do not materialize.

Draft Recommendation – Open enrollment*: If open enrollment is deemed appropriate in trading guidance, a trading framework, or in a trading plan, landowners should provide sufficient documentation of pre-project site conditions to create valid inputs into credit calculations. 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 frameworks or plans, 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 guidance, frameworks, or plans. However, these landowners may not currently possess sufficient information to prove their eligibility. In an effort to allow these landowners to participate in trading, 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. In addition, even if the enrollee successfully gathers the necessary information, the installed BMPs would still need to reduce pollutants during the "critical period" and years identified in a permit in order to qualify for sale.

3.4.3 Initial Estimate of Post-project Site Conditions

To complete a water quality benefit calculation, project developers will also need to measure or estimate "post-project site conditions" after a BMP is installed. Similar to pre-project conditions, post-project conditions can be documented as the presence or absence of BMPs, or

as a post-project pollution load. Where a modeling approach is used to quantify credits, the anticipated post-project site conditions are then used as inputs to model "post-project site performance" (i.e., the pollutant load reduced from the site), and are therefore particularly important. The difference between post-project site performance and pre-project site performance is the net "water quality benefit."

***Draft Recommendation – Estimating post-project conditions**: For each eligible BMP, regulators should identify the characteristics that should be present in the post-project site condition. This condition should be captured in a form that can be readily translated into post-project site performance, and thus be used to calculate the total anticipated water quality benefit from a site. 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, provided that it is constructed to required standards and is installed at the correct location. For BMPs that take longer to mature (e.g., wetlands to reduce nutrients, or riparian reforestation), project developers may need to forecast anticipated post-project site conditions in order to calculate the final anticipated post-project site performance and therefore estimate the full anticipated water quality benefit.*

The modeling assumptions used to translate post-project conditions into post-project site performance should be documented in a way that can be independently verified. State trading guidance, a watershed trading framework, and/or a permit trading plan may provide direction on allowable modeling assumptions.

Commentary: Trading guidance, frameworks and/or plans should provide direction to project developers as to how to estimate and verify post-project site conditions and how to translate those conditions into post-project performance. 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. A project developer intends to install a 25-foot wide grassed filter strip in the required location and reduce application of fertilizer by one-third, which will be immediately installed and effective. The post-project site condition therefore includes all the implemented BMPs.

With BMPs that take longer to mature and provide their full functional value, forecasting the final anticipated 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 regenerate and stabilize. Thus, after translating anticipated post-project site conditions into post-project site performance for the purposes of calculating water quality benefit (and adjusting that benefit via trading ratios, baseline, attenuation, etc.) agencies may release all credits upon verification or release those credits in phases (*see* Section 5.1 for a deeper discussion on the timing of credit release for BMPs that take time to mature).

4. Translating Water Quality Benefits into Water Quality Credits

In this section:

- How should delivery and attenuation be accounted for?
- How should trading ratios be documented?
- Should there be a minimum ratio?
- Which factors go into a trading ratio?
- When is a reserve of credits appropriate?

This section discusses various adjustments that may be made to edge-of-field water quality benefits, particularly those that account for delivery to and attenuation in the waterbody (quantification side), and those that account for risk and uncertainty. In many cases, after the edge-of-field water quality benefits have been quantified, additional calculations are then used to estimate how much of the pollutant is transported from the point at which it enters into the waterbody to the point of concern downstream. The physical and biological processes by which pollutant load is reduced as it travels between two points is known as "attenuation." The ways in which water quality benefit can be impacted by attenuation are discussed in Section 4.1.

Water quality benefit can also be adjusted by applying a number of risk and uncertainty management adjustments, including application of a trading ratio, reserve pool, or other factors to determine the amount of water quality benefit available to be sold as credits (Sections 4.2 and 4.3).

Ultimately, the number of credits that can be sold is equal to:

Credits Available to Sell = Water Quality Benefit (edge-of field) ∗ Attenuation and/or Delivery ∗ Ratios and/or Reserve Pool†

†Note: Baseline may be accounted for in calculating water quality benefit (*see* Section 3). Alternately, it may be accounted for at this point, as an adjustment after the edge-of-field benefits are calculated.

4.1 Delivery & Attenuation of Water Quality Benefits

Attenuation of pollutants can occur as runoff travels overland and is delivered into the waterbody, and as it is transported instream. The following are quick descriptions of these two types of attenuation:

- **Delivery from the field to the waterbody:** In some cases, it is 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 land cover type). Where a trading framework or plan may cover these scenarios, it may be wise for regulators to use a quantification method that can estimate the dynamics of run-off across multiple land cover types.

- **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 can quantify instream attenuation. 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.

Accounting for delivery into the waterbody and instream attenuation may not be necessary for every trade. For example, where fields are directly adjacent to a stream, 100% delivery to a 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 these methods to calculate water quality benefit. In developing trading guidance, frameworks, and plans, regulators should balance these practical considerations with the extent to which each component of the water quality benefit calculation impacts overall accuracy.

4.1.1 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 frameworks have assumed that 100% of pollutants leaving the edge of a field adjacent to stream reach the water column.[101] Other trading frameworks have used "delivery ratios" to determine the percentage of pollutant that reaches a waterbody.[102] A growing number of programs are now using models to quantify the delivery of pollutants from the field into a waterbody.[103]

---

[101] *See* WILLAMETTE PARTNERSHIP, ECOSYSTEM CREDIT ACCOUNTING SYSTEM: GENERAL CREDITING PROTOCOL V. 2.0, at 77 (2013), *available at* http://willamettepartnership.org/news-and-publications/General%20Crediting%20Protocol%20v2.0_2013%2011%2001_Final.pdf [hereinafter "WILLAMETTE PARTNERSHIP, GCP 2.0"].

[102] Virginia Dep't of Envtl. Quality, Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners, 2–4, *available at*

Draft Recommendation – Accounting for pollutant delivery to the waterbody*: When calculating water quality benefit for trades, 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. It may not be necessary to account for delivery to the waterbody for irrigation system BMPs where the hydrologic connection between the discharge water and receiving waterbody 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.[104] The use of trading ratios is discussed in Section 4.2.

4.1.2 Attenuating Pollutants Downstream

Instream attenuation is almost always based on models, often using 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 Recommendation – Accounting for pollutant attenuation*: Where the TMDL model is sensitive enough to model the attenuation of pollutants through the reach between a credit-generating BMP and a point source credit user, 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 between the project site and the point of compliance, or point of concern, is often included in the TMDL models (e.g., the Chesapeake Bay Watershed Model),[105]

---

http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VANPSTradingManual_2-5-08.pdf.

[103] *See, e.g.*, ELEC. POWER RESEARCH INST., PILOT TRADING PLAN 1.0 FOR THE OHIO RIVER BASIN INTERSTATE WATER QUALITY TRADING PROJECT, at E-4 (2009), *available at* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf (Section 8 on credit calculation methodologies).

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

and reflected in the water quality benefit calculations themselves (e.g., Nutrient Net as applied in the Chesapeake).[106] Attenuation may also be accounted for through a trading ratio (discussed in Section 4.2), as suggested by the 2007 U.S. EPA Trading Toolkit.[107]

Incorporating instream attenuation, through modeling or ratios, usually incentivizes action closer to the point of discharge, which may not always be appropriate or consistent with protecting beneficial uses. For example, Idaho's Lower Boise River Framework defined the mouth of the river near Parma, Idaho as the point of concern in the TMDL[108] because the highest value nutrient reductions came from irrigation canals downstream from many point source dischargers but upstream from Parma.[109] To more accurately reflect the ecological impact of reductions, the Lower Boise River Framework utilized drainage delivery and site location attenuation ratios, which assumed that credit-generating activities closer to Parma, even if they were downstream of the buyer, would generate the greatest pollutant reductions.[110]

Attenuation of the buyer's pollutant load may also be relevant where the point of concern is geographically removed from the point of discharge. For example, in Idaho's Lower Boise River Framework for water quality trading, attenuation between the point source discharge and the point of concern (near Parma) is considered when determining how many credits that point source would need in order to satisfy their obligation.[111]

Below is a pollutant-specific, non-exhaustive 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:

---

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

[106] E. BRANOSKY, ET AL., WORLD RES. INST., COMPARISON TABLES OF STATE NUTRIENT TRADING PROGRAMS IN THE CHESAPEAKE BAY WATERSHED, at 8 (2011), *available at* http://pdf.wri.org/factsheets/comparison_tables_of_state_chesapeake_bay_nutrient_trading_programs.pdf.

[107] *See* 2007 U.S. EPA Trading Toolkit, at 30–31.

[108] ROSS & ASSOCS. ENVTL. CONSULTING, LTD., LOWER BOISE RIVER EFFLUENT TRADING DEMONSTRATION PROJECT: SUMMARY OF PARTICIPANT RECOMMENDATIONS FOR A TRADING FRAMEWORK 12 (2000), *available at* http://www.deq.idaho.gov/media/489512-boise_river_lower_effluent_report.pdf.

[109] *See id.* at 13.

[110] *See id.* at 13, App. B-2.

[111] *See id.* at 12–13, App. B.

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 unclear. Other watershed models used or considered for quantifying nutrient dynamics in trading include: Watershed Analysis Risk Management Framework (WARMF), Better Assessment Science Integrating point & Nonpoint Sources (BASINS), and Soil and Water Assessment Tool (SWAT).
2. *Sediment:* Sediment mobilization and transport can be quantified using BASINS, Spatially Referenced Regressions On Watershed attributes (SPARROW), Watershed Erosion Predition Project (WEPP), and SWAT model suite.
3. *Temperature*: Thermal load can be quantified using Heat Source, HEC-RAS, CE-QUAL-W2; the Water Temperature Transaction Tool (W3T) can be used to quantify temperature benefits of in-stream flow for small reaches (in development by National Fish and Wildlife Foundation).

4.2 Developing Trading Ratios

Many programs multiply water quality benefits by "trading ratios" to account for various factors, such as risk and uncertainty (in terms of measurement error and project performance, ensuring net environmental benefit, and/or ensuring equivalency across types of pollutants). Trading ratios may also be used to account for watershed processes, such as delivery and/or attenuation, if not already addressed in the water quality benefit quantification process (*see* Section 3).

***Draft Recommendation – Development of trading ratios**: Ratios should be based in science when trying to achieve scientific objectives. Where specific policy objectives, including watershed goals, economic feasibility, and appropriate levels of risk or uncertainty need to be considered, they should be included in trading ratio decisions. The assumptions underlying the chosen ratio should be carefully documented in a transparent manner in trading guidance, frameworks, and plans. 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 ratio factor. In either case, the technical or narrative reasoning behind treatment of delivery/location, equivalency, uncertainty, and retirement should be clearly documented.*

Commentary: Trading ratios can be applied either to the buyer or seller. If applied to the seller, a ratio would affect the number of credits available for sale. Consider a situation in which 200 lbs/year of phosphorus are reduced at project site A and will be applied toward the obligation of a point source at point B. As noted in the introduction to Section 4:

Credits Available to Sell = Water Quality Benefit (edge-of field) ∗ Attenuation and/or Delivery of Benefits to Point of Concern ∗ Trading Ratios and/or Reserve Pool

If points A and B are 10 kilometers apart along the waterway, and phosphorus is anticipated to attenuate at a rate of 1% per kilometer, the water quality benefits would be reduced by 10% (90% remaining of calculated water quality benefit). If the trading framework or plan called for an additional 10% of credits to be applied to a reserve pool, the net water quality benefits would be reduced by an additional 10% (81% remaining of the calculated water quality benefit). Applying these numbers to the above formula:

Credits Available to Sell = 200lbs/year ∗ 90% ∗ 90% = 162 lbs/year

On the other hand, where the ratios apply to the buyer, that buyer will need to acquire a larger number of credits in order to satisfy the terms of permits (effluent limits and any conditions in the trading plan). Expressed as an equation, the formula is nearly identical:

Credits Needed to Satisfy Permit Conditions = Part of Exceedance to be met with Credits ∗ Attenuation/Delivery of Point Source Load to Point of Concern ∗ Trading Ratios and/or Reserve Pool

Consider a facility with a 250,000,000 kilocalorie/day exceedance above its permit limit. That facility anticipates using credits to cover the full exceedance. If the trading framework calls for a 2:1 ratio to account for uncertainty in project performance (and that requirement is incorporated into the relevant permit) and the point of concern is located at the facility "discharge point" (i.e., no attenuation of discharge, 100% remains), the number of credits needed to satisfy the obligation would be:

Credits Needed by Point Source to Satisfy Permit Conditions = 250,000,000 ∗ 100% ∗ 2 = 500,000,000 kilocalories

The middle term would be adjusted in the case where the point of concern is downstream of the facility's discharge.

4.2.1 Minimum Trading Ratio

***Draft Recommendation – Minimum trading ratio**: In combination, the various ratios applied to a point source's credit obligation (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 frameworks and plans 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.[112] In combination, setting ratios too high reduces potential cost savings for point sources (because they have to purchase more credits) and may limit their participation in trading, but setting ratios too low may not adequately account for risks to the environment and uncertainty. By providing an environmental benefit ratio, trading will be seen as providing both an economic and environmental benefit to the watershed and its stakeholders.

4.2.2 Specific Types of Ratios

This discussion draws heavily from the 2007 U.S. EPA Trading Toolkit, which defines ratios for uncertainty or reserve and retirement. The 2007 U.S. EPA Trading Toolkit also provides detail on delivery or location, and "equivalency ratios."[113] This document treats those factors as part of quantification, discussed in Section 4.1.

The following definitions of ratio types are adapted from the 2007 U.S. EPA 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 that pollutant. The risk and uncertainty represented in each of these categories can be accounted for as ratios or through other mechanisms (e.g., margin of safety and conservativeness in water quality benefit calculations, or through delivery/location and/or equivalency factors in modeling, instead of through the application of an uncertainty ratio). The draft recommendation in Section 4.2 suggests documenting the type of ratio considered, whether it is 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.

a. Delivery or Location Ratios

Delivery ratios account for attenuation of pollution from one point in a stream down to another, such as where a tributary or canal meets the mainstem or where a point source's facility discharges into the river. Accounting for location and delivery relies heavily on quantifying attenuation within the waterbody, and is therefore discussed in Section 4.1 of this

[112] Recognizing the importance of this point, Wisconsin codified this concept. *See* WISC. STAT. § 283.84(1m) (2014).

[113] *See* 2007 U.S. EPA Trading Toolkit, at 30–31.

document. Accounting for pollutant delivery or location is also sometimes discussed in the context of trading ratios based in science.[114]

b. Equivalency Ratios

Equivalency ratios adjust for trading of different species of the same pollutant.[115] For example, some forms of nitrogen or phosphorus are more biologically available than others, meaning that they can be readily 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 water quality benefit from one species of pollutant into another. Incorporating equivalency in quantification methods is also discussed in Section 3.

c. Uncertainty 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 the calculation of water quality benefit. 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 flooding or fires. Different BMPs may have different uncertainty ratios.[116] If a trading framework or plan is already accounting for uncertainty in other places (e.g., through margins of safety in TMDL assumptions or via conservative model assumptions), uncertainty ratios may not need to be as large, or may not be necessary.

---

[114] *See id.*

[115] *See id.* at 31–32.

[116] Wisconsin Dep't of Natural Res., A Water Quality Trading How To Manual, App. A (Sept. 9, 2013), *available at* http://dnr.wi.gov/topic/surfacewater/documents/wqt_howto_9_9_2013signed.pdf.

Some trading guidance or frameworks may choose to assign a lower uncertainty ratio to incentivize BMPs for which multiple benefits are well understood, or those that are ecologically preferred. For example, where watershed analyses indicate that buffers are particularly important to reduce phosphorus and will also reduce nitrogen loading, regulators may be justified in providing a lower retirement ratio. This is often a policy decision, but needs to be documented appropriately.

d. Reserve Ratios

In some states or watersheds, some credits are held in "reserve" to account for potential BMP failures. For example, the Ohio River trading framework requires that all projects reserve 10% of all credits sold to account for uncertainty and project failures.[117] If a trading framework or plan is already accounting for potential risk of loss in other places, reserve ratios may not need to be as large, or may not be necessary.

e. Retirement Ratios

Some trading guidance, frameworks, or plans may require the permanent removal of some credit amount from what is available for sale. The use of the term in various trading contexts shows it has at least two distinct purposes. If more than one purpose is to be used in a single trading framework or plan, each should be calculated and labeled separately and then recombined:

1. *To ensure that the trade generates a net water quality improvement*. For example, a ratio can ensure that for every pound of sediment discharged into a stream, at least two to four pounds of sediment are removed, and "retired" for environmental benefit; and
2. *To fulfill 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 or other state nonpoint source requirements. It is not necessary if Baseline requirements are built into the inputs for quantifying water quality benefits, as described in Section 3.

Some trading frameworks or plans may assign a lower retirement ratio to incentivize BMPs that have multiple benefits, or that are ecologically preferred. For example, a BMP may create phosphorous benefit, but if it can also control "toxics" and temperature, and provide wildlife

[117] EPRI PILOT TRADING PLAN 1.0, at 8.

habitat. If this occurs, regulators may be justified in providing a lower retirement ratio. This is often a policy decision, but needs to be documented and appropriately justified.

f. Other Ratios

In unique circumstances, trading guidance, frameworks, or plans may define ratios to cover other factors. One such factor might be the 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 shade. If credits can be sold as soon as the forests are planted and verified, there must be some way to account for this time lag. There are several ways to do this; some trading guidance, frameworks, or plans may choose to apply a trading ratio[118] (*see* Section 5.1.2. for other options to deal with time lags in BMP maturity).

4.2.3 Documenting Trading Ratios

Draft Recommendation – Documenting ratios*: The different types of ratios discussed above can be merged together into a single ratio, or kept separate. Regardless of whether ratios are separated or combined, there should be clear documentation of how each factor was considered and included/not included in trading guidance, frameworks, and/or plans.*

Commentary: A single trading ratio applied across the state, watershed or trading area works well where pollution reductions anywhere in the watershed will produce similar benefits to overall water quality. This approach is straightforward and provides a high level of predictability for buyers and sellers. However, combined ratios reduce the ability to account for site-specific factors and variation in delivery/attenuation (unless these factors are included in quantifying water quality benefit). 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 this approach 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 frameworks have built models and software to ease this analysis. For example,

[118] *See, e.g.,* Oregon Dep't of Envtl. Quality, Internal Management Directive: Water Quality Trading in NPDES Permits, A-6 (Dec. 2010, updated Aug. 2012), *available at* http://www.deq.state.or.us/wq/pubs/imds/wqtrading.pdf.

the Ohio River Basin has generated delivery factors using the WARMF model and they are displayed to the buyer through the credit purchase and sale website.[119]

4.3 Reserve Pool

Several recent trading frameworks have established a reserve pool of credits to programmatically manage the risks stemming from uncertainty and project failure. As noted above, the Ohio River Basin framework calls for 10% of all credits from the pilot phase to be set aside to manage risk of BMP failure.[120] The Great Miami framework also has a provision to set aside credits in what they refer to as an "insurance pool."[121] Some programs still allow purchasers to self-insure, or do not explicitly address the issue.[122] Typically, a reserve pool is built by applying a reserve 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 administrator (e.g., a state agency or its "designee"). The reserve pool manager controls access to the pool based on rules set forth in trading guidance or a trading framework.

Draft Recommendation – Use of reserve pool*: Trading guidance and/or trading frameworks may provide a reserve pool option, but need not require its use. If a reserve pool is going to be used, the trading guidance or framework needs to define a manager, how the pool will be populated over time, the circumstances under which a point source may access credits from the pool, the rules regarding when credits should be permanently purchased versus temporarily loaned from the pool, and a mechanism for dealing with the accumulation of credit surpluses in the pool.*

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

---

[119] EPRI, CREDIT TRADING REGISTRY, http://mer.markit.com/br-reg/public/orb/index.jsp?s=cp (Retrieved Oct. 2, 2013).The Ohio River Basin Trading Framework considers the delivery factor to be part of credit quantification, as opposed to a trading ratio. *See* EPRI PILOT TRADING PLAN, at 5–7.

[120] EPRI, PILOT TRADING PLAN 1.0, at 8.

[121] Miami Conservancy Dist., Water Conservation Subdist., Great Miami River Watershed Water Quality Credit Trading Program: Operations Manual, 9–10 (Feb. 8, 2005), *available at* http://www.miamiconservancy.org/water/documents/TradingProgramOperationManualFeb8b2005secondversion.pdf.

[122] Oregon Dep't of Envtl. Quality, Permit No. 100985: City of Medford NPDES Waste Discharge Permit (issued Dec. 13, 2011), a*vailable at* http://www.deq.state.or.us/wqpr/4066_A1201110745419334052.PDF.

unanticipated shortfalls in the quantity of credits that are actually generated."[123] In water quality trading programs in the Pacific Northwest, reserve pools have thus far garnered less interest than anticipated.[124] As such, this draft recommendation merely highlights the various considerations to account for if and when implementing a reserve pool. The biggest advantage of a reserve pool is that it provides a mechanism for pooling and addressing risk of project performance across an entire program. Reserve pools may make the most sense in trading areas where several point sources are participating in a trading framework. Not all trading guidance or frameworks require the use of a reserve pool. However, NPDES permit holders are individually responsible for remedying any project failure that affects the credits they hold for permit compliance.[125] As such, these entities would rather "self-insure" either by 1) developing extra credit generating projects, 2) accelerating implementation (thus providing more time to re-build if sites fail early on), or 3) maintaining contingency funds or insurance. 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.

[123] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1612.

[124] The interagency Counting on the Environment working group predicted that the reserve pool concept would be widely used. *See* WILLAMETTE PARTNERSHIP, ECOSYSTEM CREDIT ACCOUNTING—PILOT GENERAL CREDIT PROTOCOL: WILLAMETTE BASIN V. 1.1, at 19 (2009), *available at* http://willamettepartnership.org/General%20Crediting%20Protocol%201.1.pdf. Thus far, however, reserve pools have not been used in the Northwest.

[125] Oregon DEQ, Medford NPDES Permit.

5. Credit Characteristics

In this section:

- ❖ When do credits begin and end?
- ❖ Can a credit-generating project be renewed?
- ❖ Are credits property rights?
- ❖ How are credits treated from a financial perspective?
- ❖ Can public conservation funding be used to finance credit generation?
- ❖ Can multiple credits be sold from the same BMP?

Trading guidance, frameworks, and plans 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"). Several terms describing different time periods important to trading and credit characteristics are used throughout this section:

- **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).
- **Project Life:** the period of time over which a given BMP project is anticipated to generate credits. Typically, the project life is also the minimum "project protection period." The project life and credit life will overlap, although a credit life may be shorter than the project life of the underlying BMP.
- **Project Protection Agreement**: the enforceable agreements to protect BMPs at the project site, which may include leases, contracts, easements, or other agreements. This agreement should run with the land to ensure the project will not be affected if ownership changes.
- **Project Protection Period**: the duration of the project protection agreement, which must cover, at a minimum, the credit life.
- **Credit Contract Period:** the duration of a contract between a "regulated entity" and a project developer/landowner.

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 credit life may differ from the project life or the duration of the project protection agreement with a landowner to generate the credits. For example, the credit life of nutrient credits from a grassed buffer will likely be one year or less (e.g., the credit can only be used by the regulated entity to comply during a particular seasonal or monthly window), even if the

landowner has entered a five-year lease protecting project activities in the riparian area. In this instance, so long as the site still has a project protection agreement in place, during the next year, credits generated from the site will have a new credit life that lasts until the end of the relevant period(s) in that particular year.

5.1.1 Determining Credit Life Span – Tie to Critical Period

Each year, the credit life may extend for only a particular period of time. Pollution reductions eligible to generate credits (i.e., the timing of the credit life) for trading should address loading issues at the appropriate periods of time during a year.

***Draft Recommendation – 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," trading framework, or a permit. In some cases, that critical period is a year, a season, a month, or even a period of days.*

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 or similar analysis appears to be a straightforward approach. For example, temperature credits may be calculated based on days or weeks of exceedance. The permittee needs to have enough credits on-hand to cover those critical periods, even if BMPs (e.g., shade or instream flow) provide temperature benefits throughout the season or year.

Many trading frameworks or plans use annual averages[126] (meaning that there is an annual credit life). This is appropriate where analyses show that reductions in pollutant load from any point in the year are effective at improving water quality during the critical period (e.g., when reductions in phosphorus loading at any point in the year contribute equally to improving dissolved oxygen during the critical period). Regardless of whether seasonal or 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.

---

[126] E. BRANOSKY, ET AL., WORLD RES. INST., COMPARISON TABLES OF STATE NUTRIENT TRADING PROGRAMS IN THE CHESAPEAKE BAY WATERSHED, at 8 (2011), *available at* http://pdf.wri.org/factsheets/comparison_tables_of_state_chesapeake_bay_nutrient_trading_programs.pdf; ELEC. POWER RESEARCH INST., PILOT TRADING PLAN 1.0 FOR THE OHIO RIVER BASIN INTERSTATE WATER QUALITY TRADING PROJECT, at 3 (2009), *available at* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf.

Limiting the duration of credit life may also be one policy tool for incorporating improved quantification methods (*see* Section 11.2), or a different baseline (*see* Section 2.1.1b). In many cases, so long as the BMP continues to function, credits can be renewed (*see* Section 5.1.4.).

5.1.2 When Does a Credit Become Effective (i.e., When Does the Credit Life Start)?

***Draft Recommendation – Effective date for credit use**: In all cases, credits should not be deemed effective prior to the period that defines the credit life. In cases where specific BMPs help a watershed move more quickly toward water quality standards and/or are identified as supportive of beneficial uses (e.g., riparian forest restoration for water temperature), credits may be issued upon BMP installation and verification, even if that BMP is not yet providing its full functional value, provided there is appropriate accounting for any time lag (e.g., via trading ratios and/or reference to a compliance schedule in a permit). Issuing credits prior to their full functional value has risks, which are discussed in the commentary below.*

Commentary: Many BMPs begin reducing water pollutant loading 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 effective as soon as the installed BMP is verified as meeting its full functional performance, and in conjunction with the credit life.

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 pollutant reductions, but are closely linked to providing ecological benefits supportive of "designated uses" in an impaired watershed and may help to accelerate progress toward attaining water quality standards. In situations in which these extra benefits could be achieved, regulators could consider designating these credits as effective after verifying that the BMP has been properly installed. If a state or program chooses to allow for credit issuance upon verification of a time-lagged BMP, it should be aware that there are greater potential risks associated with issuing credits for BMPs prior to them providing their full water quality benefits. First, there may be limited water quality benefit when the BMP is initially installed, and a permittee will continue to discharge pollutants. Second, this action can undermine the notion that pollutants offset via trading credits are being reduced at equivalent time, location, and quantities as would occur if the point source installed a technologial solution at its point of discharge (although many technological solutions also require time to design and fully install). Third, there is risk that the BMPs will not perform as expected, increasing uncertainty for point source buyers.

Yet, if the credits generated from these practices are not deemed effective until they provide full functional value, purchasers will encounter several disincentives to investing in these types of BMPs. First, some time-lagged BMPs help to fundamentally improve the ecological processes that drive water quality (e.g., stream geomorphology, or wetland hydrology), and might also better address beneficial uses and be of higher priority in some watersheds. Thus, early

investment in these BMPs may accelerate the attainment of larger water quality improvements. Second, 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 years later—this delay in investment realization is likely prohibitive for many credit buyers, especially where a buyer is a governmental entity answerable to ratepayers, and timeframes are short. Third, some permittees may need BMPs that help obtain 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 may expose permittees to potential liability for noncompliance unless a permit includes an appropriate compliance schedule.

5.1.3 When Does a Credit Expire (i.e., When Does the Credit Life End)?

***Draft Recommendation – Expiration date for credit use**: At the end of the credit life, a credit expires and cannot be used by the purchaser unless appropriately renewed.*

Commentary: The credits generated from a BMP can be renewed for additional periods if the project site is subject to ongoing project review and verification, the project sites are covered by adequate project protection agreements, and that trading guidance, frameworks or plans still allows for the type of BMP being renewed (*see* Section 5.1.4).

5.1.4 After the End of the Credit Life, Can Credits be Renewed?

***Draft Recommendation – Project and credit renewal**: After the end of the credit life, credits can be renewed for subsequent periods so long as the BMP continues to function at a site, a "project design and management plan" is developed or renewed, and funds are obtained to maintain the BMP and confirm project performance, a new/renewed project protection agreement is in place at a site, and the BMP remains eligible under the applicable trading guidance, framework and/or plan.*

Commentary: Allowing for the renewal of credits from ongoing BMPs may help to keep effective BMPs in place for longer periods of time, and therefore further solidify the ecological gains achieved in the first crediting cycle. When the water quality benefit generated from a site is no longer creditable, the credit buyer will no longer pay for continued monitoring and maintenance or landowner lease payments. However, many BMPs require ongoing investment and maintenance to sustain their water quality benefit (e.g., manure management or riparian forest buffers). Landowners may also require ongoing incentives to maintain BMPs 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 guarantee that their positive functions will continue to

accrue. Another benefit to credit renewal is that some BMPs are more effective the longer they remain installed.[127] A new BMP may not generate as much benefit for water quality as one that has been installed and maintained for enough time to allow for the full benefit of the BMPs to accrue. 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, and credit calculation costs). Maintenance of BMPs over time can make improvements to water quality more cost effective than continual investment in new BMP installations. Therefore, it may be important to renew some or all types of credits in subsequent years. In Oregon, for example, the City of Medford's credits are renewed every year for 20 years (because BMPs are regularly verified and the City's project developer secures sites via 20-year project protection agreements). Regulators may determine that credit renewal is not allowable because, in certain localities, the BMPs may become part of baseline after fully establishing, as part of a state's phased baseline approach (mentioned in Section 2.1.2) or for other state policy reasons to strengthen the baseline.

5.2 Are Credits Property Rights? Are Credits Capital Assets?

As trading is a new alternative form of compliance for many entities, it may be unclear how to treat credits from an accounting standpoint

Draft Recommendation – Credits are not property rights, but they may be thought of as capital assets*: Credits are not property rights. They can be issued, approved, and/or taken away by regulatory agencies because their use is specifically tied to a permitted source's authorization to discharge and have no value (in a legal sense) without that authorization. Yet, certified credits are tradable goods with an ascertainable value. To the extent a credit buyer can add credit assets to its capital asset ledger, as allowed under commonly accepted accounting principles and federal, state, and local law, it increases their ability to: A) leverage capital asset funding mechanisms; and B) provide a mechanism to more easily fund ongoing maintenance and monitoring.*

Commentary: Permits—which include effluent limits and enable credits to be used for compliance—cannot convey a property right or create a privilege.[128] Of the states that have

[127] M. D. Tomer & 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 SCI. & TECH. 300, 306–-7 (2011), *available at* http://naldc.nal.usda.gov/download/49869/PDF.

[128] *See, e.g.,* 40 C.F.R. § 122.41(g) (2013) ("This [NPDES] permit does not convey any property rights of any sort, or any exclusive privilege.").

taken a public position on the issue, all have determined that credits are not property rights.[129] Analogously, California and Congress have respectively deemed carbon credits and federal acid rain program sulfur dioxide allowances not to be property rights.[130]

States should also be cognizant that it is preferable for many point sources to treat credits, or the underlying BMPs that generate them, as capital assets for the purposes of accounting, and acquiring debt to fund trading investments. Many point source credit buyers are government entities, and being able to capitalize credit costs allows them the flexibility they may need to finance their purchase of credits through bonds, state revolving fund (SRF) loans and other similar investment mechanisms that have traditionally viewed treatment technology as primarily a capital asset (whereas many trading-related investments require extensive ongoing monitoring and maintenance costs that may not currently be covered by some SRF loans, and are therefore subject to the budgetary process and realities of local governing bodies). 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.

Lastly, states and/or trading programs may wish to obtain an interpretation of the nature of credits—as securities or non-securities—from relevant federal and state trade bodies. This consideration is likely to become more relevant if and when more robust trading markets develop, and credit speculation or secondary transactions become more common.

---

[129] Colorado Dep't of Pub. Health & Env't, Water Quality Control Div., Colorado Pollutant Trading Policy, 20 (Oct. 2004), *available at* http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Policy.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251949264999&ssbinary=true("Pollutant credits resulting from an approved trade do not constitute property rights."); Maryland Dep't of the Env't, Water Mgmt. Admin., Maryland Policy for Nutrient Cap Management & Trading in Maryland's Chesapeake Bay Watershed, 2 (Apr. 17, 2008), *available at* http://www.mde.maryland.gov/programs/Water/Documents/www.mde.state.md.us/assets/document/NutrientCap_Trading_Policy.pdf ("Neither the load allocations nor the credits generated or purchased under this policy are a property right."); Florida Dep't of Envtl. Prot., Water Quality Credit Trading: A Report to the Governor and Legislature, 5 (Dec. 2006), *available at* http://www.dep.state.fl.us/water/Watersheds/docs/WQ_CreditTradingReport_final_December2006.pdf ("[W]ater quality trading in Florida does not involve—and does not imply—the trading of pollution 'rights.'"). No state appears to have published attorney general opinions on the matter.

[130] CAL. CODE REGS., tit. 17, § 95820(c) (2013) (stating that a compliance instrument "does not constitute property or a property right"); 42 U.S.C. § 7651b(f) (2013) (an emission allowance used in the Acid Rain Program "does not constitute property right").

5.3 Relation of Water Quality Trading to Other Programs – Proportional Accounting, Credit Stacking, & Payment Stacking

When BMPs are installed, they may produce a number of ecosystem service benefits. With the emergence of a number of ecosystem service credit markets in the United States,[131] trading guidance, frameworks, and plans need to address the potential to sell and use multiple benefits from the same parcel of land ("credit stacking"), and the potential to use multiple sources of funding to generate credits ("payment stacking"). In order to answer questions about additionality, trading frameworks, and plans need to be clear about where credits are sold, how credits are used, and how money is used to develop credits. For the purposes of this Draft Recommendations document, the following terminology is used:

A) *Credit Stacking*: the term used to describe the sale of multiple types of environmental credits (e.g., salmon and nutrient credits) from the same BMP on the same piece of land at the same time.

B) *Payment Stacking:* the use of multiple funding sources to support a credit-generating BMP or activity. Payment stacking is most often discussed in the context of water quality trading when one or more funding sources used to fund credit-generating BMPs or activities are public dollars dedicated to conservation (*see* D, below).

C) *Proportional Accounting*: where a site produces more than one distinct environmental benefit, but credits are deducted proportionally as other types of credits are sold from the same area and/or the money used to fund the project is accounted for separately.

D) *Public Dollars Dedicated to Conservation*: funds targeted to support voluntary natural resource protection and/or restoration, with a primary purpose of creating, restoring, enhancing, or preserving habitats. Some examples include Farm Bill Conservation Title cost share and easement programs, U.S. EPA 319 funds, U.S. Fish and Wildlife Service Partners for Wildlife Program, state wildlife grants, and other sources. Green infrastructure investments, such as public loans intended to be used for capital improvements of public wastewater or drinking water systems (e.g., State Clean Water Revolving Funds and USDA Rural Development funds), utility stormwater and surface

[131] In the United States alone, there are already markets for wetland and stream credits, endangered species credits, water quality credits, and carbon credits. *See* Jessica Fox & Royal C. Gardner, *The Legal Status of Environmental Credit Stacking*, 40 ECOLOGY L.Q. 101, 120 (2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2375858.

water management fees, and public funds raised from ratepayers are not public dollars dedicated to conservation.

The debate around stacking in ecosystem markets is robust, and several sources have discussed stacking in great detail.[132] Creating multiple credits from one project can complicate how a project demonstrates it is additional—going above and beyond what is required or what would have happened anyway without trading. On one hand, there is concern that the same portion of the same project could be sold to more than one buyer to offset different types of impacts. On the other, there is interest in encouraging landowners to invest in projects that provide multiple, reinforcing ecological benefits. This section provides some ideas on how trading frameworks and plans can deal with or simplify the issue of stacking.

5.3.1 Accounting for Multiple Types of Credits & Funding Sources

***Draft Recommendation – Accounting for multiple credits and funds**: In order to address questions about an investment being used more than once, trading guidance, frameworks, and plans need to provide clear and transparent direction regarding how to track credits and where different types of credits are sold and used for compliance, and how to track which sources of funding are used to develop credits.*

Commentary: Trading frameworks and plans can make it easier to demonstrate additionality for projects with multiple benefits and funding sources if they provide clear direction on how to track which types of credits are coming from which parts of a project, and which funds are being used to fund different parts of a project. "Proportional accounting" is one straightforward method to ensure a project's benefits are additional by demonstrating that those benefits are not sold more than once from a spatially overlapping area. Proportional accounting can be applied by percentage. For example, a 60-foot riparian buffer may produce both temperature and nutrient benefits at the same time. If a project developer wants to sell 20% of its temperature credits to one buyer, then it would deduct 20% of its nutrient credits from that buffer, leaving 80% of either temperature or nutrient credits available to sell to a second buyer for a separate impact (*see* Figure 5.3.1). Alternatively, the project site can be spatially separated so that different portions of the project site are used to generate different benefits. For

[132] *See, e.g., Id.*; David Cooley & Lydia Olander, *Stacking Ecosystem Service Payments: Risks and Solutions*, 42 ENVTL. L. REP. NEWS & ANALYSIS 10150 (2012), *available at* http://nicholasinstitute.duke.edu/sites/default/files/publications/stacking-ecosystem-services-payments-paper.pdf; Jessica Fox, Royal Gardner & Todd Maki, *Stacking Opportunities and Risks in Environmental Credit Markets*, 41 ENVTL. L. REP. 10122 (2011), *available at* http://wqt.epri.com/pdf/credit-stacking-environmental-opportunities-and-risks.pdf.

example, if a cover crop will be applied across four fields of 25 acres each, a project developer can designate two of those fields (50 acres) for nitrogen credits and the remaining two fields for phosphorus credits.

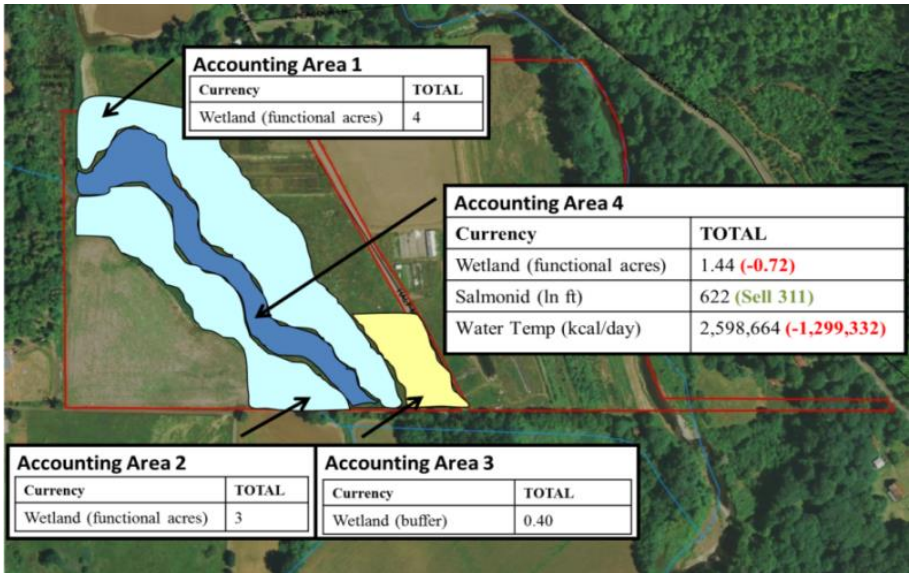


Figure 5.3.1. Example of multi-credit accounting

In addition to accounting for different credit types within a project site, trading frameworks and plans should also clearly account for the various sources of funds used to develop a project site (*see* Section 5.3.3). For example, the trading framework or plan might allocate credits to different entities based on the proportion of the funding provided (e.g., private investors that finance 50% of the project costs should receive 50% of resulting credits). Or, the trading framework or plan might allow a project developer to use public funds dedicated to conservation to install those BMPs required by the trading baseline so long as those funding sources are documented and shown not to be used to fund credit generation.

5.3.2 Credit Stacking

***Draft Recommendation – Credit stacking**: Stacking and selling credits generated from the same land area, at the same time, is generally disfavored. The burden is on the proponent(s) of stacking to demonstrate to regulators that the concerns typically associated with credit stacking are not present in a particular trading plan.*

Commentary: New credit quantification methods make it easier to articulate water quality, habitat, carbon sequestration, and other simultaneous environmental benefits from BMPs. Nonetheless, the concept of selling or stacking multiple credits from the same area of land at the same time is controversial. This controversy stems from concerns about a seller profiting

multiple times from one investment, and from concerns that selling multiple credits from one action may result in less restoration work being completed.

Arguments in favor of stacking include:

- If an action generates multiple benefits, then a project developer should be able to sell multiple credits—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 regulated entities with multiple compliance requirements to design mitigation alternatives that have reinforcing environmental functions and values, as opposed to projects that maximize credit outcomes instead of holistic restoration;
- If a regulated entity is faced with multiple compliance obligations, and it is able to invest in one piece of grey technology capable of addressing multiple issues, then it should be able to invest in a single credit-generating project that will generate multiple ("bundled") environmental benefits and use them toward multiple compliance obligations;
- Stacking may make investments in green infrastructure more attractive and thus lead to more green solutions.

Arguments against stacking include:

- Stacking may limit net environmental gain because buyers may be investing in less conservation, and thus less environmental benefit may accrue than might otherwise occur if buyers invested in separate projects at different locations;
- Stacking may create challenges for consistent accounting, especially if the different benefits derived from one site are "unbundled" and sold to different buyers, or if the different credits have a range of credit lives;
- There may be concerns that a permitted impact is not truly being offset where stacking allows for the sale and use of credits from a project that already occurred or would have occurred in the absence of the trading plan or framework, because in this case, the credit sale has not resulted in any *new* environmental benefit.

Ultimately, whether stacking is allowable depends on whether the project will still result in net environmental gain and generate new, additional benefits. This is a fact-dependent exercise.[133]

---

[133] The joint U.S. Army Corps-EPA regulations on wetland mitigation banking prohibit the use of one credit to offset multiple permitted activities, 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

To date, most programs have disallowed credit stacking. Some frameworks, such as North Carolina's Ecosystem Enhancement Program, did not explicitly preclude stacking initially but later reversed course (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 issue a moratorium on the practice.[134] In this case, environmental groups believed that because there were no new benefits being generated through the transaction of the second credit type, that the later impact (which the second set of credits were purchased to offset) was not actually being offset, thus resulting in a negative overall ecological impact.[135] Two Minnesota trading permits have explicitly prohibited stacking,[136] whereas at least one water quality trading plan in Ohio has explicitly endorsed stacking.[137] In carbon trading—which faces similar questions

---

programs and authorities for the same activity." 30 C.F.R. § 332.3(j)(1)(ii) (2013) and 40 C.F.R. § 230.93(j)(1)(ii) (2013) (emphasis added). Stacking may be less appropriate for on-land projects because of the complications related to baseline and payment stacking, and because money is often being paid to a nonpoint source to install a better management practice. On the other hand, stacking may be more appropriate where a permittee uses infrastructure that it already owns to more cost-effectively address multiple compliance obligations. For example, where a permittee increases instream flows using water that it already owns, which in turn lessens the impact of several pollutants on the system, the flow utilized by the permittee acts more like a piece of technology that is capable of removing multiple pollutants from a discharge.

[134] Jessica Fox, Royal Gardner & Todd Maki, *Stacking Opportunities and Risks in Environmental Credit Markets*, 41 ENVTL. L. REP. 10122 (2011), *available at* http://wqt.epri.com/pdf/credit-stacking-environmental-opportunities-and-risks.pdf; 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; North Carolina Program Evaluation Div., Department of Environment and Natural Resources Mitigation Determinations: Special Report to the General Assembly, Rep. No. 2009-3 (Dec . 16, 2009), *available at* http://www.ncleg.net/PED/Reports/documents/Wetlands/Wetland_Report.pdf.

[135] Dan Kane, *EBX is Paid Twice for Wetlands Work*, NEWS OBSERVER (2009), *available at* http://www.newsobserver.com/2009/12/08/230607/ebx-is-paid-twice-for-wetlands.html.

[136] Minnesota Pollution Control Agency, Permit No. MN003191: Rahr Malting Company NPDES Permit, § 1.18 (Draft 2012), *available at* http://www.pca.state.mn.us/index.php?option=com_k2&id=715_1248a1315a91e0ead67f851640883724&task=download&view=item ("Trade credits shall not be proposed or approved for sites which simultaneously track benefits for other environmental programs, including but not limited to wetland mitigation under the Wetland Conservation Act"); Minnesota Pollution Control Agency, Permit No. MN0040665: Southern Minnesota Beet Sugar Cooperative NPDES Permit (expired 2004) (stating the same).

[137] *See, e.g.,* Ohio Alpine Cheese Co., et al., Alpine Cheese Phosphorous Nutrient Trading Plan, 16–17 (Jan. 1, 2006, expired 2011), *available at* http://www.epa.ohio.gov/Portals/35/wq_trading/alpine%20cheese%20trading%20plan%201%201%2006.pdf

related to stacking—The Climate Action Reserve does not currently allow for credit stacking, but does allow for the proportional accounting approach to payment stacking (described in Section 5.3.2).[138]

5.3.3 Public Funds to Pay for Generating Credits

***Draft Recommendation – Use of public funds to pay for credit generation**: Using public dollars dedicated to conservation to pay for the generation of credits is generally not allowed.*

Commentary: Leveraging multiple funding sources is an important way to generate larger water quality benefits or connect other environmental benefits to the BMPs being implemented to generate water quality credits. The payment stacking debate seeks to balance the fact that some BMPs need multiple funding sources to become viable against the reality that less conservation may be completed with payment stacking (in addition to the fact that payment stacking might lower credit prices).

At this juncture, the participating states believe that public dollars dedicated to conservation cannot be used to fund credit generation. Examples of public dollars dedicated to conservation include Farm Bill Conservation Title cost share and easement programs, EPA section 319 grant funds, U.S. Fish and Wildlife Service Partners for Wildlife Program, and state wildlife grants. Public loans intended to be used for capital improvements of public wastewater or drinking water systems (e.g., State Clean Water Revolving Funds and USDA Rural Development funds), bond-backed public financing and utility stormwater and surface water management fees from ratepayers, are *not* public dollars dedicated to conservation,[139] and so can be used to fund the generation of credits.

This is not to say that public dollars dedicated to conservation cannot be used to fund expanded restoration activity at the project site. If regulated entities wish to leverage multiple funding types, simple proportional accounting can demonstrate which benefits are attributable to public dollars dedicated to conservation, and which benefits are attributable to other sources of money (and thus can be sold as credits). In addition, the participating states acknowledge that

---

("The broker also has the right to gain carbon, sediment, and nitrogen credits from the same conservation measures being installed if a buyer and documentation can be arranged").

[138] CLIMATE ACTION RESERVE, NITROGEN MANAGEMENT: PROJECT PROTOCOL V. 1.1, at § 3.5.3 (2013), *available at* http://www.climateactionreserve.org/how/protocols/nitrogen-management.

[139] WILLAMETTE PARTNERSHIP, GCP 2.0, at App. B Glossary.

it is appropriate to use public dollars dedicated to conservation to address baseline obligations (*see* Section 2.3.6)—as many other states have allowed.[140]

If in the future, the participating states decide that credits can be generated with public dollars dedicated to conservation, the USDA regulations currently provide that flexibility.[141]

[140] WRI COMPARISON TABLES, at 11 (noting that Maryland, Pennsylvania, Virginia and West Virginia state guidance all allow for cost share funds to meet baseline obligations).

[141] *See* 7 C.F.R. § 1466.36 (2013) ("[E]nvironmental credits may be gained as a result of implementing activities compatible with the purposes of an EQIP contract. NRCS asserts no direct or indirect interest on these credits."); 7 C.F.R. § 1467.20(b) (2013) (similar provision for WRP program). A similar provision exists for CRP. 7 C.F.R. § 1410.63(c)(8) (2013) ("The following activities may be permitted, as determined by CCC, on CRP enrolled land … The sale of carbon, water quality, or other environmental credits, as determined appropriate by CCC.").

6. Project Implementation & Quality Assurance Standards

In this section:

- What mechanisms ensure that a project has been implemented correctly?
- What mechanisms ensure that a project will be adequately maintained?
- How long does a project need to be legally protected?

This section describes the standards needed to ensure that credit-generating trading projects are appropriate, are implemented to a high standard, are maintained so that the credited water quality benefits remain in place for as long as the credits are used by a buyer, and are consistent with other laws.

6.1 Initial Project "Site Screening" (or "Validation")

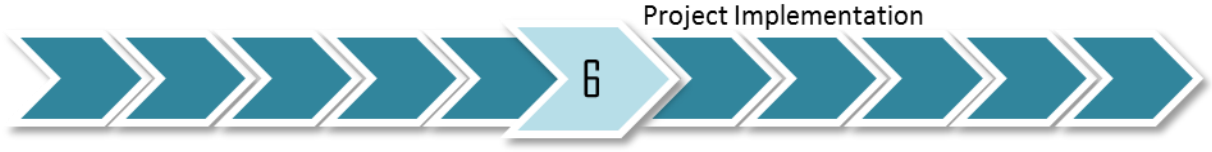
Project screening is the process of vetting projects for program eligibility. Such screening can give the project developer, regulatory agency, and NPDES permittee a quick idea of whether the proposed project will meet established eligibility criteria. Not all trading situations include this kind of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

***Draft Recommendation – Initial site screening**: A state agency, permittee, 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 should notify the project developer. If the project might become eligible once changes are made to the proposal, the screener should provide recommendations for revision and instructions for resubmission of the proposed project. If the project meets relevant eligibility criteria, the screener can provide the project developer a written notice of eligibility.*

Commentary: An initial site or proposal screening can identify ineligible projects before anyone spends too much time or money implementing BMPs that may not be able to generate credits. Screening is generally a good idea before project implementation begins. The considerations as to which entity (e.g., state agency, third party, permittee, or project developer) can and should perform this function, if required, are discussed in Section 10.

6.2 Consistency with Other Laws

***Draft Recommendation – Consistency with other laws:** Because the purchase of credits does not absolve a buyer and/or its agents from compliance with other existing laws, prior to undertaking credit-generating restoration work, a project developer should 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 should also comply with all applicable federal, state, and local laws/regulations, including those that may form the basis of baseline requirements (which are described separately in Section 2 of this document).

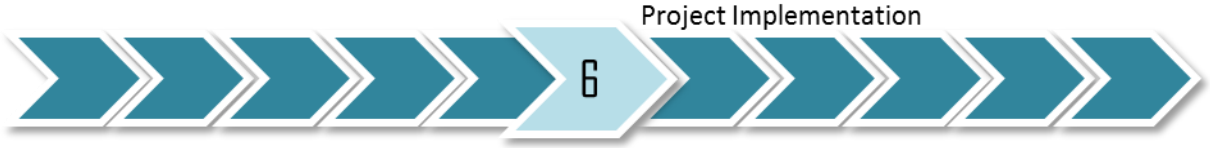
Commentary: It is unclear which entity is responsible for determining consistency with other laws, and how much proof of that consistency a project developer would need to provide. Trading guidance, frameworks and/or plans may therefore need to provide direction on this point. On the one hand, project developers should be able to demonstrate their knowledge of applicable laws and provide details on how they are in compliance. On the other hand, it may 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, where the legality of a project is 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 a 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

Trading guidance, frameworks, and/or plans should provide direction on BMP design and performance standards ("BMP guidelines"). These guidelines help ensure that a BMP is operating in a way that is consistent with the assumptions modeled in the credit calculation process, and that the BMP is being maintained appropriately. BMP guidelines are also an avenue for ensuring that the actions taken on the ground are consistent with water quality laws and regulations, and help to enhance ecosystem function in a way that is ecologically responsible and contributes to watershed health and resiliency (e.g., using native species in riparian forests instead of non-native hybrids).

Draft Recommendation – Project quality standards: *In order to ensure that BMPs produce credits that appropriately capture the water quality benefit they represent, each eligible BMP should be designed, constructed, and maintained using a BMP guideline defined and approved by the relevant state agency. These guidelines may be approved in trading guidance or frameworks, and incorporated into a permittee's trading plan. In cases where state- or watershed-level BMP guidelines do not yet exist, or where site-specific considerations necessitate a different design or maintenance standard, the project developer and the permittee 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 strive to balance flexibility in how projects are implemented (allowing project developers to be responsive to changing business 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 & Management Plans

For structural and practice-based BMPs, it makes sense to detail project site design and management requirements in the trading guidance or framework, and if necessary, in the trading plan.

Draft Recommendation – Project design and management plans: *Project developers should build an ecologically appropriate "project design and management plan" for each project site that conforms with approved BMP quality standards, outlines specific improvement and restoration goals, includes a plan for reporting on project performance as compared to those quality standards and maintenance actions, and performance milestones for ensuring that these goals are achieved in the future. Minimum components of these project design and management plans should be referenced in a trading plan, but more detail may be developed for individual project sites.*

Commentary: The project design component of the plan should describe the proposed BMPs, 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). The term "ecologically appropriate" is intended to capture the idea that BMPs designed to reduce one type of pollution do not unintentionally create a negative impact for another part of the ecosystem (e.g., it would not be appropriate to build a manure storage lagoon to generate phosphorous credits on top of a vernal pool that contains sensitive species). The term is also intended to provide room to promote the ancillary benefits of BMPs (e.g., in addition to providing temperature benefits, riparian shade also generates fish and wildlife benefits).

6.5 Project Stewardship – Adequate Legal Protections & Stewardship Funds

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

Draft Recommendation – Ensure project site has adequate legal protections and "stewardship funds" for duration of credit life: *Project sites should be adequately protected by legal instruments, where appropriate. These protections should remain in place for the duration of the credit life, be legally enforceable under relevant state laws, and should run with the land (e.g., leases, conservation easements). Ideally, these protections should also mitigate against proximate disturbing land use activities. Project sites may have pre-existing protections (e.g., easements, public land designations for conservation use) that obviate the need for additional protections. Project developers should 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, financial certification, etc.*

Commentary: none

Draft Recommendation – Minimum BMP/project protection period: *A minimum project protection period can help reduce transaction costs and increase certainty of BMP performance over time. For structural BMPs (e.g., fencing, riparian restoration), the minimum BMP/project protection period should be 20 years. For practice-based BMPs (e.g., cover crops and tillage), the minimum BMP/project protection period should be five years. Any other irregular term may be applied at the discretion of the regulatory agency. Site protection of structural and non-structural BMPs 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. Moreover, many wastewater utilities—who are likely buyers in many trading scenarios—often rely on 20-year planning periods, and so it is logical that project protection periods ensure that a project remains valid until the utility's next planning cycle. Standard contract lengths are preferable, but should 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 may also be 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 five-year period becomes a barrier to project developers bringing credits for sale, then that minimum period can be revisited.

7. Project Verification & Certification

In this section:

- What gets verified and by whom?
- How often does verification occur?
- Who certifies credits?

Verification is the process of confirming that a credit-generating BMP has been implemented properly, that credits have been quantified accurately at the site, and that the BMP is continuing to function over time. Verification can be performed by an agency, permittee, or third party (collectively "verification entities"). The verification entity should understand the quality and performance metrics associated with the BMPs being verified, as well as the tools used to quantify credits. Verification is not the confirmation that a trading plan is achieving its overall goals, but is a confirmation that the BMPs installed at credit-generating sites are designed, implemented and performing in accord with relevant quality standards (as detailed in trading guidance, frameworks, and/or plans).

Verification is a separate and additional step apart from the discharge monitoring conducted at wastewater facilities. Because point-nonpoint trades often involve various types of BMPs (each with its own unique requirements), installed at numerous and disperse nonpoint source locations, it is important to provide additional opportunities to review and approve water quality trades, and/or project developers. Similar to the confidence engendered through point source DMRs, project verification is intended to provide regulators and the public confidence that the anticipated water quality benefits from BMPs will accrue over time. Verification and "certification" are just two parts of a project's review process. The other phases are site screening (*see* Section 6), and registration (*see* Section 8).

There are different verification methodologies, which may be combined in various ways. One approach is to inspect every BMP project or a sample of projects (at particular intervals); another involves qualification of a project developer to implement projects; yet another might be to approve an overall trading framework or plan 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 attempts to balance the need to ensure that BMPs are creating real water quality benefits with the associated costs of inspecting numerous and widely distributed BMPs.

Once verification is complete, formal "certification" is a final administrative review 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 should be uploaded, or "registered," to a ledger (*see* Section 8). 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 or program may choose the appropriate frequency, scope and nature of verification, certification, and registration.

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

7.1 Verification of Project Sites & Credits

Draft Recommendation – Verification: *Completed projects should be verified by a state water quality agency, the permitted point source, or an independent third party to determine compliance with appropriate implementation and performance standards. Any point source or third party performing verification should develop a "verification plan" as part of its trading plan. The verification plan should describe the proposed methods of verification, qualification requirements for verifiers, and the verifier's protections against conflicts of interest. The verification plan should also clarify whether and when on-site inspection should occur. Even where a state water quality agency does not perform verification, it may choose to inspect a credit-generating project at any time according to the relevant procedures outlined in its 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 to comply with permit limits or operating licenses. Verification also presents several challenges, including the interest and willingness of states to require the function; the question as to which entity will conduct verification (and if not done by states, how to qualify permittees or 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 self-monitor their discharges, they should monitor BMP projects as their permit requires. Permittees should think about the qualifications of staff performing verification, what kinds of review and quality assurance are needed, and if any considerations for the independence of staff doing verification are needed.

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 Recommendation – Qualifications of project site verifiers: *To ensure the integrity of the verification process, all project verifiers should be qualified to perform the task (i.e., be qualified to inspect lands for particular credit-generating BMPs in a particular geography, or be qualified to assess credit transactions). To ensure that verifiers are sufficiently qualified, states should consider outlining minimum qualifications for all verifiers, which may include training and accreditation.*

Commentary: Minimum qualifications ensure that regardless of who performs verification, verifiers are similarly and properly suited to analyze a particular project. Consistent training and accreditation programs can help ensure verifiers are qualified.[142] It may be helpful for state water quality agencies to define minimum qualifications and outline how verifiers should be trained to meet those qualifications.

7.3 Content of Initial Verification

Draft Recommendation – Content and frequency of initial verification*: After BMP installation, the project verifier should confirm that credit generating BMPs are eligible, that estimated credit quantities are accurate, that BMP design is consistent with approved guidelines, and that the project developer has an adequate project design and management plan and legal protection for the duration of the credit life. In some cases, on-site visits might be conducted.*

Commentary: none

7.4 Frequency & Content of Ongoing Verification

Project site performance should be confirmed frequently to ensure that the sites are producing credits as planned.

Draft Recommendation – Frequency and content of ongoing verification**:** *Ongoing credit verification should occur frequently. The appropriate frequency may differ by circumstance and BMP (e.g., irrigation and farm management BMPs may need to be verified monthly or seasonally, whereas structural BMPs may need to be verified periodically). As part of verification, an on-site site performance monitoring visit may be required after completion of the BMP and at other defined intervals thereafter. For years in which no on-site monitoring*

[142] *See e.g.,* OR. ADMIN. R. § 340-071-0650 (2013) (Oregon DEQ provides training and certification requirements for third party on-site wastewater treatment system installers and maintenance providers).

occurs, verifiers should review site performance reports produced by project developers.

***Draft Recommendation – 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 by verifiers (and by the agency, if they are not the verifier) based on requirements for applicable BMPs. In some cases, site performance reporting might occur more or less frequently. For some BMPs (e.g., altering flow regimes, or where the BMP may be prone to failure), confirmation of project performance may need to occur continuously or at frequent intervals. 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 Recommendation – Site performance reporting from project developers to credit buyers**: Project developers should provide credit buyers with annual site performance reports of each project site. This report confirms the project is still functioning/is on-track to function as planned. Site performance reports should at least 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 "material" problems. Parts or all of these annual site performance reports may be used in the permittee's trading plan report that summarizes the status of all projects active under the permit (if required as a permit condition associated with trading).*

Annual site performance reports for individual project sites should be made available for review through a publicly-available website. The information in these reports should balance access to information against privacy and security concerns. Both the project developer and the permittee should retain copies of all site performance and annual trading plan reports and records for the duration required of them by federal and state water quality regulations.

Commentary: Trading guidance, frameworks, and/or plans should provide direction as to how BMP implementation should be confirmed and maintained at project sites after they are installed and credits are verified and issued. For trading guidance, frameworks, and/or plans that cover hundreds of distributed BMPs (e.g., nutrient BMPs across an irrigation district), it may not be reasonable to monitor and verify every BMP annually or more frequently. It may make sense to sample and inspect a rotating subset of BMPs each year (e.g., 50% of all BMPs are monitored each year), and to inspect sites at regular intervals (e.g., every five years). 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, in conjunction with a permittee's trading plan report, it may make sense to make annual site performance reports available to the public through the credit registry/ledger

and/or upon request. Annual site performance reports should be careful to balance landowner privacy against access to information and public disclosure concerns.

7.5 Certification

Draft Recommendation – Certification: *The relevant water quality agency, permittee, or an approved third party should provide a formal written certification of credits from individual projects or of project developers, including confirmation that verification has occurred, that all necessary documentation is in place, and that credits are ready for registration.*

Commentary: Certification includes a confirmation that all necessary paperwork and documentation is in place to support the quantity of credits registered. Certification 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, and defer to the permittee or an approved third party, unless a compelling reason to do so arises.

8. Registration

In this section:

- What information is publicly reported?
- Where is trading information reported and to whom is it available?

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 should also be available to the public for similar purposes. Credit registration is a transparent way to provide this information because it allows for disclosure and provides an easily searchable version of a permittee's ledger of credits. A registry thus allows agencies, the public, and permittees themselves to be sure that trades are helping to meet WQBELs, and that credits are not being used for more than one purpose.

8.1 Public Disclosure & Serialization of Credits

Draft Recommendation – Public disclosure and serialization of credits: *States should provide or designate a publically available registry or website for all credits so as to provide easy and timely access to information for regulators and the public. Each credit should be assigned a unique identifier or serial number through the registration process that links credit reported on a facility's DMR to credit values and project documentation supplied via the registry. The registry should allow the public to search for a particular permittee or trading program at no cost, and should display credits sold and used for permit compliance. Registration provides transparency and ensures that credits are not sold more than once to different buyers.*

Commentary: As noted in the 2003 U.S. EPA Trading Policy, "[e]asy and timely public access to information is necessary for markets to function efficiently and for the public to monitor trading activity."[143] 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. States may use their existing NPDES tracking databases to post trading plans, and other relevant trading information. Even if the registry is not a dynamic website (e.g., Mark-It Environmental Registry), registration information should be posted online even if just posted as a .PDF or .XLS file. Using common infrastructure in a region or state may reduce the resource burdens on water quality agencies.

[143] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1612 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf.

A registry serves several functions. First, it provides a framework-level or plan-level accounting of credits generated and used. A registry can prevent credits from being sold more than once and ensure that a credit generating action is not sold twice as credits in separate environmental markets. A central registry can support the information reported on a DMR by providing a current accounting of credits purchased and held by permittees and linking those credits to supporting documents (e.g., verification reports, credit quantification results) ensuring that credits are performing as promised. Finally, registries that are web-enabled can increase public transparency for trading programs and make searching for information easier.

Registration is a balance between providing full access to information and ensuring that not all of the information collected by the agency and provided to the public is considered "reviewed" by the agency. A central registry is also only as good as the completeness of information that is in it. If a registry only has 75% of all credit information, then it is not providing its full use. In addition, for many current trading frameworks and plans, transaction volumes are small and there may only be one or two permittees in a trading area. At that scale, the costs of registration may appear high relative to the transparency value provided to permittees and agencies.

8.2 Information for Public Disclosure

Draft Recommendation – Information for public disclosure: *As noted in the 2003 U.S. EPA Trading Policy, "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."[144] In addition to EPA's statements on making information available in the 2003 U.S. EPA Trading Policy, each credit registry should 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 documentation; (2) annual site performance reports (with appropriate photo points) and the management portion of the project design and management plan; 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.*

[144] *Id.*

Commentary: Many of the materials included in the Draft Recommendations document may exceed what is currently required of regulated entities under NPDES permit monitoring reporting obligations. Proactively and transparently posting project and trading plan information provides assurance to stakeholders that credits come from eligible restoration projects that are accurately quantified and independently verified. This approach is consistent with statements in the 2003 U.S. EPA Trading Policy, which notes that "[t]his [type of] information is necessary to identify potential trading opportunities, allow easy aggregation of credits, reduce transaction costs and establish public credibility."[145]

Some documents used by a verifier to approve credit transactions may contain sensitive or proprietary information. The registration process should balance protection of sensitive or proprietary information with the need to be transparent. Agencies may consider drafting guidelines that detail 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.

[145] *Id.*

9. Compliance Determination & Enforcement Actions

In this section:

- How is permit compliance determined?

Compliance and enforcement of trades will depend on the rules and statues governing the water quality trading and NPDES programs in each state. If a state has statues and rules covering the development and implementation of a trading plan, then these statutes and rules must be followed with respect to trading. If the trading plan is implemented through the NPDES permit, then the permittee must also be in compliance with the specific permit conditions of its permit related to trading and be in compliance with its trading plan.

The regulatory agency will identify in the permit how it wants the permittee to document compliance with its specific permit conditions. In particular, the agency may require that a permittee include specific numeric information and/or trading-related comments in the DMR, and/or that a permittee submit required reports. Failure to provide the agreed upon information in the manner and schedule specified in the permit would be considered a permit violation. Enforcement of these violations would follow the rules and guidance documents governing the specific state or federal agency's enforcement program.

Draft Recommendation – Compliance determination & appropriate enforcement actions: *Compliance is determined as the permittee demonstrates, via its DMRs and other reporting requirements, which it has secured and continues to hold an adequate credit balance to offset its exceedance above established WQBEL(s). In addition, just like any other strategy for meeting a permit limit, a permittee must comply with all special condition provisions included within its permit, and all enforceable aspects of its trading plan (if not included in the permit).*

Commentary: A permittee has either provided the required information and is therefore in compliance with its permit, or it has not, and is therefore not in compliance with its permit. The most likely permit violations linked to trading will stem from insufficient credit balances or failure to meet special conditions related to reporting (e.g., incomplete or missing NPDES permit monitoring reports).

If a state has separate statues or rules regarding water quality trading, those participating in trading will need to be in compliance with these statues and laws in addition to their permits. The consequences of a failure to comply with permit conditions and/or statutes or rules will be determined under the compliance/enforcement rules and guidance developed and implemented by the state or federal agency with enforcement authority.

Not all deviations from the trading plan or permit conditions will rise to the level of non-compliance enforcement. States should note the trading plan elements, including

implementation and performance conditions at credit generating sites and verification/registration procedures, for which they would consider taking an enforcement action.

10. Roles & Responsibilities in Program Administration

In this section:

- ❖ What are the functional roles in administering trading?
- ❖ What should be considered in assigning responsibilities for trading administration?

10.1 Roles & Responsibilities in Trading Framework or Plan Administration

There are four phases of the credit issuance process that may provide agencies with an opportunity to review and approve trading project documentation: validation/site screening (Section 6.1), verification (Section 7), certification (Section 7.4), and registration (Section 8). In addition, a fifth element—"standards development"—underlies each of these processes and is the direction needed by permittees and others to understand and participate in trading. For each of these phases of trading administration, agencies and trading participants need to consider the following when determining whether the state agency, permittee, or a third party is the best entity to perform each function:

A) Skills/Expertise Required to Perform Each Function: One question to address is the type of expertise and skill involved in performing these functions. Some functions are largely "administrative" (such as paperwork review), whereas others might require familiarity with specific ecology and land management practices (e.g., identification and evaluation of on-the-ground actions).

B) Administrative Time & Costs: A second factor in determining the appropriate entity to perform each function is the amount of administrative time and effort involved in the work. There may be efficiencies gained by grouping functions under one entity (e.g., verification and certification).

C) Requirements versus Recommendations: A third matter for a regulatory agency to consider is which of these enumerated phases it will require of permittees in written trading plans, versus which phases it will only recommend. Resource constraints and/or opportunities for potential conflicts of interest on the part of the permittee or third party may be factors in agency decision making.

D) Reliance on Third Parties to Execute Trading Functions: As regulatory agencies explore whether they may wish to use third parties to execute any of these trading program functions on their behalf, each agency should consider whether it needs to provide some form of written authorization, or formally delegate, designate, or assign functions to those third parties. Under each of these options and scenarios, the relevant agency would retain oversight and final decision-making authority. Neither the CWA nor relevant law in states in the Pacific Northwest currently prescribe the aspects of trading that can be delegated or what type of arrangement would be required between the

permitting agency and third party to enable this shift of responsibility. However, there are a number of examples where agencies have relied on third parties to help execute state programs.[146] In keeping with those examples, reliance on third parties for programmatic functions may be most appropriate where: specific expertise is required; demand is unpredictable and requires flexibility of resources; and/or a high volume of transactions might require agencies to spend more time and money to perform tasks than is available in state budgets.

Generally, a state agency should consider the following in electing to rely on a third party to execute one or more functions:

i. The more extensive the third party responsibilities, the more formal and extensive the state-to-third-party mechanism might be (potentially necessitating some form of official contractual arrangement or delegation mechanism);

---

[146] *See, e.g.,* Amended & Restated Delegation Agreement Between North American Electric Reliability Corporation & Western Electricity Coordinating Council, at § 4 (2011, FERC approved Mar. 1, 2012), *available at* https://www.wecc.biz/compliance/United_States/Documents/Complete%20Revised%20WECC%20Delegation%20Agreement%20with%20Exhibits.pdf (North American Electric Reliability Corporation (NERC) delegation to the Western Electricity Coordinating Council (WECC) to develop reliability standards, and to monitor/enforce); Letter from Pam Inmann, Exec. Director of Western Governors' Association, to Ronald Nunnally, Chairman of the Western Electricity Coordinating Council (July 19, 2004), *available at* http://www.wecc.biz/committees/BOD/072904/Lists/Agendas/1/0704_WREGIS_Agenda_Item_VII.pdf; WESTERN ELECTRIC OPERATING COUNCIL, WREGIS OPERATING RULES, at § 1 (2013), *available at* http://www.wecc.biz/WREGIS/Documents/WREGIS%20Operating%20Rules.pdf (Western Governors' Association delegation of authority to the Western Renewable Energy Generation and Information System (WREGIS) to develop and manage online renewable energy credit verification & registration); ELEC. POWER RESEARCH INST., PILOT TRADING PLAN 1.0 FOR THE OHIO RIVER BASIN INTERSTATE WATER QUALITY TRADING PROJECT, at E-4.B (2009), *available at* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf (Indiana, Kentucky and Ohio, and Ohio River Valley Water Sanitation Commission (ORSANCO) delegation of authority to the Electric Power Research Institute (EPRI)); OR. ADMIN. R. §§ 340-071-0100, 0650 (2013) (Oregon DEQ delegation of on-site wastewater treatment system monitoring & inspection authority to certified maintenance providers); CAL. CODE REGS., tit. 17, §§ 95802(21), 95802(148), 95986 (2013) (The California Air Resources Board allows for independent third parties to implement offset projects, and to perform registration and verification services in its new greenhouse gas trading program); 42 U.S.C. §§ 9601(35)(B)(i)(I), 9607(b)(3) (2012); 40 C.F.R. § 230.93(j)(1)(ii) (2013) (EPA delegation to ASTM of "All Appropriate Inquiry" standard development for hazardous waste pre-purchase assessment requirements); Columbia River Gorge National Scenic Area Act, 16 U.S.C. §§ 544–544p (2012) (Congressional delegation of management, monitoring, enforcement, and standard development authority to the Columbia River Gorge National Scenic Area Commission); Nat'l Park & Conservation Ass'n v. Stanton, 54 F.Supp.2d 7, 10 (D.D.C. 1999) (Congressional delegation of private land management responsibilities in congressionally-designated Wild & Scenic River corridor to a local management council).

ii. The agency should retain decision-making, approval, and oversight authority (authority to cancel the delegation is not sufficient control);
iii. The state agency should retain dispute resolution authority; and
iv. Designees or agents of the agency should also be screened for conflicts of interest.

E) ***Access to Information & Privacy***: Water quality trading brings private landowners, federal and state agencies, and businesses to the table in a way that has not typically occurred in the past in order to improve watershed health. As these entities conduct business together in a new water quality trading arena, federal and state agencies will need to consider how and what types of information will be generated and shared among these parties. In addition, these parties may have traditionally been subject to different regulations, laws, and federal agency authority, and may not be as familiar with CWA regulations. If third parties are also gathering, reviewing, and maintaining information on behalf of a state agency as part of a trading framework or plan, public access to generated records will need to be specified. Agencies will need to evaluate these factors, relevant public disclosure requirements as well as exemptions, and any physical location constraints in ascertaining how the public will have access to trading-related documents.

Though rules or guidelines regarding public access to trading records may be less detailed than states' existing general public records guidelines, an inference may be made that the same guidelines would apply to trading information and records collected and maintained by the relevant state agency. In Oregon, the 2009 Water Quality Trading Internal Management Directive states that "information on individual trades, trading programs, trading results, and compliance and inspection reports for specific permittees are available for the public review from DEQ upon request."[147] In Idaho, Washington, and other states where existing trading programs are in similar early stages, agencies have recognized the importance of transparency and public access, but are likewise in the process of refining these frameworks to balance disclosure and landowner confidentiality concerns. Idaho DEQ has developed a trade notification form and reduction credit certificate that must be submitted to Idaho DEQ as part of the process. Such information would be kept on file at Idaho DEQ offices and would be subject to

[147] Oregon Dep't of Envtl. Quality, Internal Management Directive: Water Quality Trading in NPDES Permits, 8 (Dec. 2010, updated Aug. 2012), *available at* http://www.deq.state.or.us/wq/pubs/imds/wqtrading.pdf.

public inspection.[148] Washington Department of Ecology's draft trading guidance also notes disclosure as an important element of credible water quality trades,[149] but the state does not yet articulate what information should be disclosed. As trading frameworks and plans are developed, agencies may elect to stipulate disclosure requirements in permits, and if needed, to distinguish types of document content that may be exempt from public release under Freedom of Information Act commercial information exemption categories to avoid later misunderstandings.[150]

Importantly, agencies will need to consider whether other documents created or maintained by third parties in trading frameworks or plans (i.e., those not required by, or submitted to, the relevant agency) qualify as public "records."[151] For example, in Oregon, the NPDES permit held by the City of Medford states that "DEQ approval and public review is not required for trading agreements, specific project sites, or minor amendments to the program provided they are consistent with the overall direction and objectives of the permittee's DEQ-approved credit trading program."[152] As a component of the permit, Medford must make certain information (e.g., project names and addresses, general project descriptions, and site monitoring and planting information) available to DEQ within fourteen days of request. Some of this information may be exempt from public disclosure under existing Oregon laws.[153] However, absent clear direction from regulatory authorities or specified third party contractual/delegated obligations, it may not be readily apparent to trading participants and the public

---

[148] Idaho Dep't of Envtl. Quality, Water Quality Pollutant Trading Guidance, 18–19 (July 2010), *available at* http://www.deq.idaho.gov/media/488798-water_quality_pollutant_trading_guidance_0710.pdf.

[149] Washington Dep't of Ecology, Draft Trading Framework Paper for Review & Comment, 4 (Sept. 20, 2010), *available at* http://www.ecy.wa.gov/programs/wq/swqs/WQTradingGuidance_1010064.pdf.

[150] 5 U.S.C. § 552(b)(4) (2012); 40 C.F.R. § 2.208 (2013) more specifically outlines the substantive criteria to be used in determining matters of confidentiality: a business must assert a claim, take reasonable measures to protect confidentiality, and the information must be generally unavailable elsewhere. In addition, disclosure of the information must not be compulsory elsewhere under statute, and the business must also show that disclosure of the voluntarily-provided information would hinder an agency's ability to obtain information in the future, or that disclosure of such information would cause substantial competitive harm.

[151] *See* 5 U.S.C. § 552(f)(2)(A)-(B).

[152] Oregon Dep't of Envtl. Quality, Permit No. 100985: City of Medford NPDES Waste Discharge Permit (issued Dec. 13, 2011), a*vailable at* http://www.deq.state.or.us/wqpr/4066_A1201110745419334052.PDF.

[153] *See* OR. REV. STAT. § 192.502 (2013).

whether some trading-related information privately gathered or kept by third parties would qualify as a public record. This matter may be of particular importance to stakeholders and participants in nascent trading situations.

10.2 Roles for Initial Screening

Draft Recommendation – Initial screening (or validation): *Initial screening is an optional, but recommended, early review of potential projects' eligibility, design, and associated credit calculation inputs. The task requires comprehensive knowledge of the relevant trading plan and BMP quality standards, an understanding of the proposed credit generating action, and the protocols for applying the appropriate credit quantification method. If required, the entity conducting this screening needs to have knowledge of these specific technical tasks and be able to quickly respond to requests for validation. Even if not required by a state, project developers should develop and implement internal validation procedures.*

Commentary: In trading frameworks or plans with clearly defined eligibility criteria, this phase could be optional at the regulatory agency's discretion. In nascent programs where there is significant room for interpretation or misunderstanding of eligibility criteria, it may be more difficult for permittees or project developers hired by permittees to independently make an accurate assessment. Accordingly, greater time and assistance may be expected from trading administrators. This phase also has other benefits that lead to more efficient and effective operations. For example, initial check-ins on projects let "market administrators" know how many projects are likely to move through the credit issuance process, and creates information on the types and number of sites that do not meet eligibility criteria.

10.3 Roles for Verification

Draft Recommendation – Verification: *Verification is the recommended, detailed review of credit calculation amounts, confirmation of proper implementation and/or performance of credit generating actions, and review of stewardship documentation.*

As verification is a deep and complete review of the credit process, it provides agencies and the public with a level of assurance analogous to DMRs that the promised water quality benefits will be realized. As part of its trading plan, the permittee should have a detailed verification plan describing who conducts verification, what information is reviewed and when, and how the verification entity will avoid conflicts of interest. Where agencies do not have available resources or expertise to conduct verification themselves, they must review and approve the verification plan, and they may designate an appropriate third party administrator or the permittee in the permittee's trading plan.

Commentary: Verification requires the most time, skill, and independence of all steps discussed in this section. Verifiers need the same ability to understand, interpret, and make decisions

about eligibility standards as does the entity validating projects. Verification requires familiarity with quantification methods and tools, and may be required to confirm the credit calculation process. This may require access and the capacity to use GIS and water quality models, and professional expertise in risk management. Because verification, if performed on-site, requires visual assessment of BMPs for proper implementation and/or performance in accordance with quality standards, on-site verifiers will need to be intimate with the specific BMPs being verified. Stakeholders participating in and observing trading also need to have a high level of trust in a verifier's credibility and transparency. The combination of technical skills and perception can thus limit the pool of possible verifiers.

Directly managing verification does give agencies more direct control over the credit issuance process at the project level. If agencies choose to conduct verification themselves, they may need to grow or shrink staff capacity to manage the ebb and flows of trading over time. Some permittees or agencies choose to work with an approved third party to verify projects. In other cases, the permittee conducts verification, consistent with the traditional "self-verification" approach of the NPDES program.

No matter who performs the verification function, the trading plan must document who will conduct verification, what gets verified and when, and what happens when a verifier discovers a problem. This verification process can be described in a verification plan, which itself can be included in a permittee's trading plan. Avoiding conflicts of interest is also an important consideration with verification. If third parties or permittees conduct verification, there must be a clear process for identifying, avoiding, and mitigating any conflicts of interest.

The potential frequency and intensity of verification can also have significant cost implications. There is a balance between high transaction costs and being sure projects perform according to necessary quality standards. As agencies and trading participants strike this balance within trading plans, they may choose to verify credits annually or less regularly, verify all credit generating actions or a representative sample, or verify a project developer. If agencies allow permittees to self-verify their own BMPs, agencies may choose to audit a portion of credits to ensure consistent application of verification requirements in the trading plan. Third parties may have more flexibility to grow and shrink rapidly in response to fluctuating transaction volumes. If trading participants elect to use a third party, the relevant agency may need to formally designate responsibility to the third party.

10.4 Roles for Certification

Draft Recommendation – Certification: *If verification and certification are performed by the same entity, certification can be easily folded into the verification process. Certification by an agency or market administrator may be more important where verification is conducted by the permittee or a third party.*

Commentary: Certification provides an opportunity to review documentation at the final stage before credit issuance, giving a complete picture of the project and its assessment through the verification process. Certification often requires less time and capacity than verification or validation. Performing certification can be a good way to keep agency staff in the loop as projects are used to meet a trading plan. However, separating certification from verification can lead to redundant processes—increasing transaction costs and creating more opportunity for disputes. On the other hand, redundancy could be important for increasing confidence in the validity of trades. For example, if a permittee conducts verification and an agency certifies each project, both organizations are likely to repeat much of the same work—reviewing eligibility documentation, credit calculations, project design and management plan, etc. Similar to verification, stakeholders need to trust the certifier. If there is no entity that has the technical skills to do both verification and certification, it may make sense to split these roles.

10.5 Roles for Registration

Draft Recommendation – Registration: *Registration is the public act of creating the official record of credit issuance and ownership, and how the credit is being used.*

A central registry database may come in several forms: a state- or regionally-maintained central registry; a market administrator-maintained ledger; or a permittee-posted database. There are thus several entities that may manage the registration function. Regardless of which entity manages the registry, any sensitive information should be securely managed.

Commentary: The operator of the registry is not critical so long as the credit-related information can be found in a consistent and reliable way.

10.6 Roles for Standards Development

Draft Recommendation – Managing standards development**:** *Quality standards development is essential for consistently and legitimately translating ecological benefit into a credit that can legally offset an impact. These quality standards are used in validation, verification, certification, and registration to predictably and fairly operate across watersheds as applied to different permittees. Standards development also includes adaptive management to improve the elements of trading guidance, frameworks, or plans with new information over time.*

Managing standard development is a process-oriented task that requires the ability to manage multi-stakeholder processes and interests. Entities facilitating development of these standards need to understand the science, policy, and economics behind trading. For ongoing adaptive management, there also needs to be some capacity to process new information, critiques, and requests for clarification in a timely and structured way.

Commentary: Every year of trading implementation will yield enormous learning. Experience drives improvements in how credits are quantified, understanding of which processes provide value and which are costly, and a clearer idea of what additional regulatory direction is needed. Some entity needs to be responsible for developing and issuing version iterations of quantification methods and protocols (i.e., versions 2 and 3 of a particular method). In some cases, this might be a permittee, but a permittee may not be able to lead broader processes that develop tools and standards for the entire state or for multiple permittees. Agencies can more easily manage standard processes and methods linked to law, rule, and policy. However, agencies may not have the capacity to lead the regular adaptive management cycles needed to constantly improve trading, but they need to be intimately involved.

Third parties may have more flexibility to coordinate the adaptive management process, but they may not have the dedicated funding streams to support those efforts over time. If authority to develop and/or adaptively manage standard processes and methods is delegated to a third party, the delegating government agency should retain oversight and final decision-making/approval authority over final approval/release. Specific to building new processes and methods, the delegating government body should provide a process for approving/modifying those elements of trading guidance, frameworks, or plans. The processes and methods third parties develop may also not be as effective if agencies do not have some process in place to approve new versions and processes developed through a third party adaptive management process.

11. Adaptive Management & Tracking Effectiveness

In this section:

- Does trading need adaptive management?
- What are the components of an adaptive management framework for a trading framework or plan?

Current challenges in water quality make critical the exploration of innovative approaches in fairly rapid timeframes. 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 available. This process is broadly referred to as adaptive management. More specifically, adaptive management is a "systematic approach for improving [natural] resource management by learning from management outcomes."[154] In the case of trading, an adaptive management framework would focus on: 1) improving quality standards, protocols, and process; 2) generating and incorporating new information on quantification methods used to estimate water quality benefits associated with individual BMPs[155]; and 3) evaluating whether BMP actions are effectively providing their anticipated water quality benefits. An adaptive management framework would not be used as a mechanism for assessing individual permit compliance, although adaptive management findings could inform future permit iterations. Changes resulting from the adaptive management process might occur as part of a TMDL or watershed analysis update, or as part of a permit renewal, but would not generally occur within a permit cycle.

[154] U.S. Dep't of Interior, Adaptive Management: The U.S. Department of the Interior Technical Guide, 1 (2007, updated 2009), *available at* http://www.usgs.gov/sdc/doc/DOI-%20Adaptive%20ManagementTechGuide.pdf. ("Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.").

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

11.1 Improving Trading Program Standards, Protocols, & Process

The benefit of tracking and utilizing user feedback is a system that works more smoothly and efficiently for everyone over time. Updates may need to occur more frequently in early years, and less frequently as a trading framework or plan improves operations over time.

Draft Recommendation – Improving trading management: *Each trading framework or plan should include an "adaptive management plan" describing how regulators, the permittees and third parties will track and gather the information needed to improve administration (e.g., protocols, operational processes, etc.) and note the interval for updating programmatic documents (e.g., biennial or as needed). The trading framework or plan 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 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

As they become available, agencies need mechanisms for incorporating new versions of models and other quantification methods into trading guidance, frameworks, and plans. 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, and permitting), and provide more certainty for permittees and other market participants.

Draft Recommendation – 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 frameworks and plans should use the new quantification method. Where acceptable to the permittee and the regulatory agency, existing trading frameworks and plans may adopt the new version for subsequent project sites. While effort to incorporate new versions into existing trading frameworks and plans should be made, all previously quantified projects will continue to use the water quality benefit estimates derived from the model version that was in effect at the time trading began, unless the*

permittee and state agency choose to amend the relevant regulatory requirements applicable to a site, a material error or limitation is discovered in the originally used model version, or the trading plan approved by the agency anticipated using new knowledge as it became available or as NPDES permits were renewed.

Where there is a third party proponent for a quantification method, an adaptive management plan, including protocols for version control and a monitoring strategy that can support ongoing improvements to the method (e.g., calibration and validation), should be submitted and approved by the state agency before the method is accepted for use in the trading framework or plan. Agencies may choose to discontinue acceptance of a method where the monitoring strategy was not followed, technical analysis is 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 water quality benefit 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 regulators should consider which entity or entities will be responsible for setting up and conducting monitoring, and how improvements should be incorporated into trading guidance, frameworks, and plans.

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 associated with this approach, quantification methods are not likely to improve on their own. Some entity needs to take ownership of the management and improvement of quantification methods. 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 reveals severe flaws in a credit quantification methodology, agencies may need 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 know whether trading is fulfilling the obligations of point sources and whether water quality is improving as a result of trading. However, detecting changes in ambient water quality that are 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 wrapped into an overall TMDL effectiveness monitoring effort.

Draft Recommendation – Effectiveness monitoring: *If not already part of a watershed or TMDL monitoring strategy, trading participants may consider developing a multi-tiered, long-term effectiveness monitoring strategy that identifies and prioritizes the types of information needed to evaluate effectiveness at different stages of trading plan 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, and should address increasingly more complex questions over time (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:

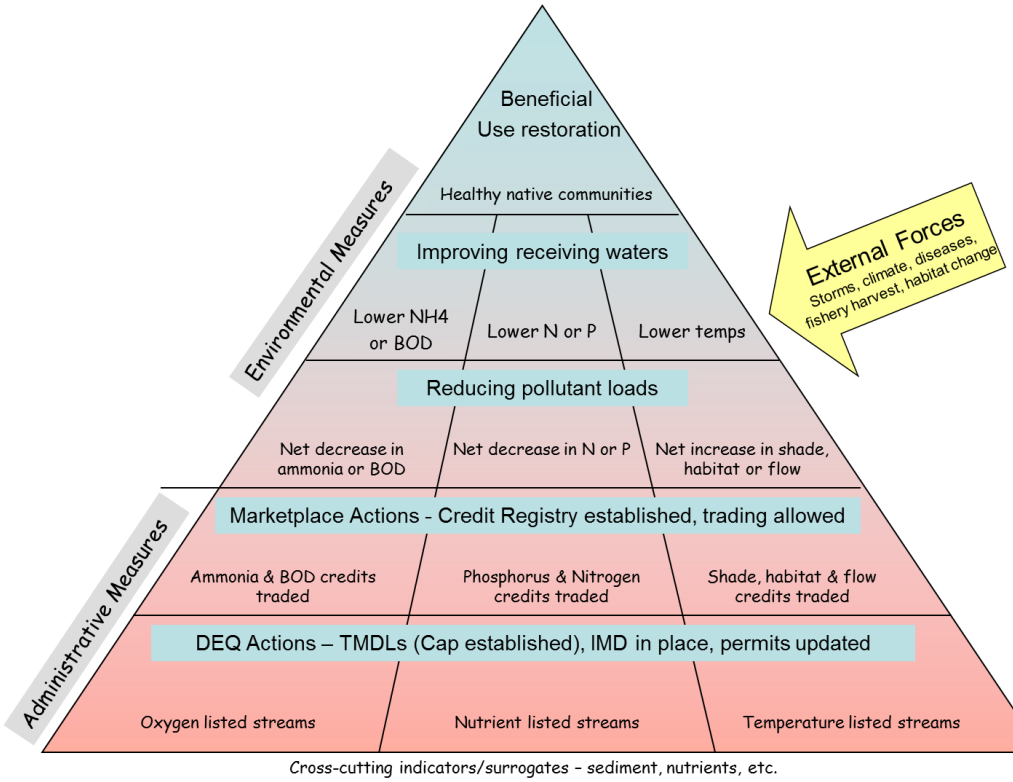
- *Identification of the evaluation questions that need to be answered for the overall watershed, and for a trading framework or plan (i.e., is water quality being protected, and what role is trading playing in that equation?);*
- *Identification of the different tiers of effectiveness monitoring, as 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 improving beneficial uses.

Figure 11.3 (provided by Oregon DEQ) is 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 framework or plan may not be able to achieve this ultimate goal, nor may it be possible to measure the impact of a trading framework or plan 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 in a single trading framework or plan, but increasingly removed from an understanding of whether the trading framework or plan is helping to achieve the beneficial uses 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 (measured or anticipated) after full implementation of the trading framework or plan. This information may help to demonstrate progress throughout the watershed. In addition to measuring reductions in loading and regulatory compliance, effectiveness monitoring should endeavor to track metrics related to marketplace actions, and beneficial uses.

Figure 11.3. Hierarchy of monitoring metrics. Source: Oregon DEQ



Effectiveness monitoring is most likely to occur as part of a TMDL update or other watershed monitoring system. Where states are not already undertaking TMDL or watershed effectiveness monitoring, the additional study design, data collection, and analysis necessary to evaluate the impact of trading alone may be infeasible. Until the responsibility for this task is clearly delineated, effectiveness monitoring is unlikely to occur. Nonetheless, even though there are challenges and costs associated with effectiveness monitoring, it is essential for tracking progress toward water quality goals.

IV. Conclusion

The draft recommendations described in this document are intended to spark conversations about how trading guidance, frameworks, and plans can be built and operated to best achieve water quality goals and strike a fine balance between cost effectiveness, usability, and transparency. As this draft is completed, each of the participating states will work with stakeholders to test, discuss, and better refine these draft recommendations in a way that will best meet the needs of locales throughout the Northwest.

Along with the state agencies and U.S. EPA Region 10, Willamette Partnership and The Freshwater Trust plan to revisit these draft recommendations over the coming year and refine them to produce a proposed set of final recommendations by the end of the project in September 2015.

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

Carrie Sanneman
Ecosystem Service Project Manager
Willamette Partnership
sanneman@willamettepartnership.org
(503) 894-8426

V. Glossary

- **303(d) List**: the list of impaired and threatened waters (stream/river segments, lakes) that the Clean Water Act requires all states to submit for EPA approval every two years on even-numbered years.
- **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.[156] Adaptive management in water quality trading programs may focus on improving program operations, quantification methods, and overall program effectiveness.
- **Adaptive Management Plan**: a plan, included in either the trading framework or plan, describing how regulators, the permittees, and third parties will track and gather the information needed to improve trading administration (e.g., protocols, operational processes, etc.) and noting the interval for updating programmatic documents.
- **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.[157]
- **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.[158]
- **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 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. Anti-degradation also includes special protection of waters designated as outstanding national resource waters. Anti-degradation policies are adopted by each state to minimize adverse effects on water.[159]
- **Attenuation (pollutant)**: the change in pollutant quantity as it moves between two points, such as from a point upstream to a point downstream.
- **Baseline (General Nonpoint Source Control Authority)**: the level of pollutant reductions a state expects nonpoint source landowners to achieve, as derived from general nonpoint source control authority, prior to trading. Some states may have general, broad authority to control nonpoint

---

[156] *See* U.S. Dep't of Interior, Adaptive Management: The U.S. Department of the Interior Technical Guide, 1 (2007, updated 2009), *available at* http://www.usgs.gov/sdc/doc/DOI-%20Adaptive%20ManagementTechGuide.pdf.

[157] WILLAMETTE PARTNERSHIP, ECOSYSTEM CREDIT ACCOUNTING SYSTEM: GENERAL CREDITING PROTOCOL V. 2.0, at 48 (2013), *available at* http://willamettepartnership.org/news-and-publications/General%20Crediting%20Protocol%20v2.0_2013%2011%2001_Final.pdf.

[158] *See* U.S. EPA, Water Quality Trading Toolkit for Permit Writers, Glossary-1, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.

[159] *See id.*

source pollution,[160] which can be used to establish trading baseline levels for state trading guidance, or a particular watershed or trading plan.

- **Baseline (Regulatory Requirements)**: the level of pollutant load associated with specific land uses and management practices that comply with stated requirements in applicable, state, local, or tribal regulations.[161] These regulations are typically affirmative obligations or non-disturbance regulations (e.g., all farms must have nutrient management plans in place, or riparian vegetation may not be actively disturbed).
- **Baseline (TMDLs)**: the level of pollutant reductions a TMDL and/or a TMDL implementation plan expects specific nonpoint sources to achieve. A single nonpoint source's baseline requirement from a TMDL "would be derived from the nonpoint source's LA."[162]
- **Baseline (Trading)**: the combined pollutant load and/or BMP installation requirements that must be met prior to trading. At a minimum, all individual nonpoint sources must meet existing state, local, and tribal regulatory requirements. Where a TMDL exists and it establishes, through the TMDL and/or the TMDL implementation plans, requirements that differ from existing state, local, and tribal requirements, then the requirements stemming from TMDL LAs and/or TMDL implementation plans will supplement the existing regulatory requirements. Where general nonpoint source control authority exists in a state, a state can rely on this authority to set or supplement its trading baseline level.
- **Base Year**: the date after which implemented BMPs become eligible to generate credits.
- **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.[163] BMPs can consist of land management practices, and in-stream improvements (e.g., in-stream restoration actions, in-stream flow augmentation, etc.).
- **BMP Guidelines**: a document that defines: A) an approved quantification method, B) the method to use for calculating the water quality benefit generated by a BMP, C) installation and maintenance quality standards, and D) ongoing performance standards to ensure that each BMP is consistently achieving the desired water quality improvements.
- **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 purchase credits to meet a regulatory obligation. Eligibility criteria for buyers are described in Section 1 of the Draft Recommendations document.

---

[160] *See, e.g.,* WASH. REV. CODE § 90.48.080 (2014) ("It shall be unlawful for any person to throw, drain, run, or otherwise discharge into *any of the waters of this state*) (emphasis added). Washington Dep't of Ecology authority to regulate nonpoint sources under this law was recently upheld by the Washington Supreme Court. Lemire v. Washington, 178 Wash.2d 227 (Wash. 2013). Likewise, all dischargers are subject to regulation under California state law. CAL. WATER CODE § 13260(a)(1) (2014). On the other hand, the federal CWA definition of "point source" specifically excludes "agricultural stormwater discharges and return flows from irrigated agriculture." 33 U.S.C. § 1362(14) (2012).

[161] *See* 2007 U.S. EPA Trading Toolkit, at 5.

[162] *See id.* at 29.

[163] 2007 U.S. EPA Trading Toolkit, at Glossary-2.

- **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. §§ 1251–1387.
- **Certification**: the formal application and approval process of the credits generated from a BMP. Certification occurs after verification.
- **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 trading ratio(s) (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.[164]
- **Cost Share**: *See* Public Dollars Dedicated to Conservation.
- **Credit**: a measured or estimated unit of pollutant reduction per unit of time at a specified location,[165] as adjusted by attenuation/delivery factors, trading ratios, reserve requirements, and baseline requirements.
- **Credit Contract Period**: the duration of a contract between a regulated entity and a project developer (this is relevant where a regulated entity enlists an outside party to fulfill trading plan obligations).
- **Credit Generating Activity/Action**: any action taken that will result in water quality benefit. Inclusive of BMPs.
- **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).
- **Credit Registry**: *See* Registry (Credit). **Credit Stacking**: *See* Stacking (Credit).
- **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 (such as a TMDL and/or a TMDL implementation plan) and designated by a state to implement specific control recommendations.
- **Designated Uses**: as defined in 40 C.F.R. § 131.3(f) and § 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.
- **Designee**: a person or entity who has been officially chosen to do something or serve a particular role.
- **Direct Monitoring:** *See* Quantification Method (Direct Monitoring)

---

[164] *Id.*

[165] *See id.*

- **Discharge Monitoring Report (DMR)**: a periodic water pollution report prepared by point sources discharging to surface waters of the United States and the various states. Point sources collect wastewater samples, conduct chemical and/or biological tests of the samples, and submit reports to a state agency or the U.S. EPA.
- **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 (as 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 plan or framework toward the achievement of water quality standards or other program goals. Effectiveness monitoring provides the basis for adaptive management.
- **Effluent Limit**: as defined in 33 U.S.C. § 1362(11), an effluent limit means any restriction established by a state or U.S. EPA 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).
- **Exceedance**: the difference between a facility's load discharge and its effluent limit.
- **General Crediting Protocol (GCP)**: trading framework developed by Willamette Partnership. The General Crediting Protocol describes the processes through which to generate, buy, sell, transfer, and track credits for water quality, upland habitat, and aquatic habitat.
- **Grey technology:** Grey technology includes the traditional treatment technology installed at a treatment facility discharge point, or in the immediate vicinity of the facility (i.e., filtration, chiller, treatment pond, etc.) to remove a pollutant prior to the facility discharge to a waterway.
- **Hydrologic Unit Code (HUC)**: the United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged or nested within each other, from the largest geographic area (regions) to the smallest geographic area (cataloging units). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.
- **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 background 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 plan 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.
- **Market Administrator:** the organization responsible for the operation and maintenance of a water quality trading framework or plan, or an ecosystem credit accounting system. Specific

responsibilities of a market administrator may include: defining credit calculation methodologies, protocols, and quality standards; project site verification; and credit registration.[166]

- **Matching Funds**: *See* Public Dollars Dedicated to Conservation.
- **Material**: a significant occurrence, change, omission, or piece of information that would be dispositive or highly influential for regulators when determining whether the modeled benefits of trading are substantially likely to occur at a project site, or for a general trading plan.
- **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.
- **Model Validation**: the process through which results from credit quantification methods are assessed relative to evaluation criteria. Often, model validation includes the comparison of model results with measured data, sensitivity analyses, and uncertainty analyses. Model validation may also include a comparision with other model outputs, literature values, and/or expert judgement.
- **Monitoring/Sampling/Quality Control Protocol (Water Quality)**: document describing A) the objectives of a project developer's water quality monitoring and data collection efforts (sampling location, methodology, devices, etc.), sample storage and analysis, and a summary of the statistical methods employed; and B) the planning, implementation, and assessment procedures for a particular project, as well as any specific quality assurance and quality control activities (such a protocol should integrate all the technical and quality aspects of the project in order to provide a "blueprint" for obtaining the type and quality of environmental data and information needed for a specific decision or use[167]).
- **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.
- **Nonpoint Source**: 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."[168]
- **Nutrient Management Plan**: plan developed for a specific agricultural operation that outlines principles and practices for managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.[169]**Offset**: 1) *(noun)* offsite treatment

---

[166] WILLAMETTE PARTNERSHIP, GCP 2.0, at 8.

[167] U.S. EPA, Quality Management Tools – QA Project Plans (Apr. 29, 2011), *available at* http://www.epa.gov/QUALITY/qapps.html.

[168] U.S. EPA, Nonpoint Source Program and& Grants Guidelines for States and& Territories, at 7 n. 2 (Apr. 12, 2013), *available at* http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf.

[169] Nat'l Resources Conservation Serv., Conservation Practice Standard: Nutrient Management, Code 590, at 6–7 (Jan. 2012), *available at* http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046896.pdf.

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.[170]

- **Open Enrollment Period**: the 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).
- **Permit Evaluation Report/Permit Fact Sheet**: a supplementary document where additional rationale and discussion may be included in support of a NPDES permit.
- **Photo Point Monitoring**: the practice of taking and collecting photos from the same locations within a project site to document changes in project site conditions over time, and assist in ongoing verification efforts.
- **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 (usually in a TMDL).
- **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 water quality benefit quantification methods. This may include a site visit and/or interpretation of remote data. A project site assessment includes, at the least, an assessment of pre-project conditions and an assessment of actual or anticipated post-project conditions.
- **Project Design and Management Plan**: the document that details A) how the proposed credit-generating action will be designed and installed to meet BMP guidelines, including a description of the proposed actions, installation practices, anticipated timelines, restoration goals, and anticipated threats to project performance; and B) how the project developer plans to maintain/steward the practice or action for the duration of the project life, keep the practice or action consistent with BMP guidelines, and report on that progress**.**
- **Project Developer**: any entity that develops credits, whether that entity is the permittee, a contractor of the permittee that develops or aggregates credits, or a landowner developing credits on a permittee's behalf.
- **Project Life**: the period of time over which a given BMP is expected to generate credits. Typically, the project life is also the minimum project protection period.
- **Project Protection Agreements**: the enforceable agreements to protect BMPs at the project site, which may include leases, contracts, easements, or other agreements. 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.

---

[170] 2007 U.S. EPA Trading Toolkit, at Glossary-4.

- **Project Protection Period**: the duration of the project protection agreement, which at a minimum must cover the credit life.
- **Project Site (Project or Site)**: the location at which BMPs are undertaken or installed.
- **Proportional Accounting**: the generation of multiple credit types where a project site performs more than one distinct environmental benefit on non-spatially overlapping areas.[171] Although multiple credit values are produced, the sale of one credit has a corresponding reduction in the proportion of all other credits.
- **Protocols**: step-by-step manuals and guidelines for achieving particular environmental outcomes. Protocols include the actions, sequencing, and documentation that project developers should follow in order to generate credits from eligible BMPs.
- **Public Dollars 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.[172] Examples include Farm Bill Conservation Title cost share and easement programs, EPA section 319 grant funds, U.S. Fish and Wildlife Service Partners for Wildlife Program, and state wildlife grants. Public loans intended to be used for capital improvements of public wastewater and drinking water systems (e.g., State Clean Water Revolving Funds and USDA Rural Development Funds), bond-backed public financing, and utility stormwater and surface water management fees from ratepayers, are not public dollars dedicated to conservation.[173] Public dollars dedicated to conservation are often referred to as "cost share" and/or "matching funds."
- **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.
- **Quantification Method**: scientifically-based method for determining the net load reduction, or water quality benefit, 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 water quality benefits 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

---

[171] WILLAMETTE PARTNERSHIP, GCP 2.0, at 23.

[172] *See* U.S. Fish & Wildlife Service, et al., 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 (Jan. 4, 2008), *available at* http://www.fws.gov/oregonfwo/LandAndWater/Documents/PublicFunding-final.pdf.

[173] WILLAMETTE PARTNERSHIP, GCP 2.0, at 15.

from riparian vegetation) used to measure the realized water quality benefits 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 (HUC-5), and are based on historical conditions, literature, local knowledge, and/or the best professional judgment.
- **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.
- **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.
- **Regulated Entities**: entities regulated under the Clean Water Act. Typically, these entities are regulated via permits, but may also be regulated under operating licenses or judicial/administrative consent decrees.
- **Regulator**: the state and federal agencies responsible for protecting environmental quality/permit issuance.
- **Regulatory Requirements (Baseline)**: *See* Baseline (Regulatory Requirements)**Report (Trading Plan Report)**: *See* Trading Plan Report.
- **Report (Site Performance Report)**: *See* Site Performance Report.
- **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.[174]
- **Retirement Ratio**: *See* Trading Ratio (Retirement).
- **Site Screening (Site Validation)**: 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.
- **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).*
- **Site Conditions (Post-Project)**: the characteristics and conditions of the project site that are measured or 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 or measurement 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.[175]
- **Site Performance (Post-Project)**: the pollutant load (measured or anticipated) that will enter a waterway, as calculated by the relevant quantification method's interpretation of post-project conditions.

---

[174] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1612.

[175] Willamette Partnership, GCP 2.0, at 50.

- **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.
- **Site Performance Report**: reports detailing the performance of installed BMPs at individual project sites. These reports are not usually required as special conditions in permits.
- **Stacking (Credit):** the generation and sale of more than one kind of credit from the same action on the same area of land, at the same time.[176]
- **Stacking (Payments)**: the use of multiple funding sources to support a credit-generating BMP or activity. Payment stacking is most often discussed in the context of water quality trading when one or more funding sources used to fund BMPs or credit-generating activities are public dollars 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 Limit (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 C.F.R. pt. 133) or state treatment standards. TBELs for non-POTWs are derived from national effluent limit guidelines, state treatment standards, or on a case-by-case basis from the best professional judgment of the permit writer.[177]
- **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).[178]
- **TMDL Implementation Plans**: the management plans designed to implement the wasteload and load allocations assigned to entities in the TMDL. In some states, a TMDL implementation plan is required in order to translate LAs into baseline requirements.
- **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 ecosystems and human health. 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.[179]
- **Trading Baseline**: *See* Baseline (Trading).

---

[176] WILLAMETTE PARTNERSHIP, PILOT GCP, at 34.

[177] 2007 U.S. EPA Toolkit, at Glossary-5

[178] *See id.*

[179] 2003 U.S. 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* U.S. EPA, Multimedia Strategy for Priority Persistent, Bioaccumulative & Toxic (PBT) Chemicals (Apr. 18, 2011), *available at* http://www.epa.gov/pbt/pubs/fact.htm.

- **Trading Guidance**: overarching state-level agency rules, policy, and guidance that set the broad sideboards for trading in a state.
- **Trading Framework**: watershed-level rules, policies, and guidance, which, if they exist, provide more specificity on how trading should be implemented in a particular watershed; these documents may be developed by watershed stakeholder groups, but are vetted and endorsed by agencies.
- **Trading Plan**: permittee-level plans, either included in or attached to permits, that detail how a particular trading solution will be designed, implemented, verified, and tracked so as to meet effluent limits.
- **Trading Plan Report**: annual reports, drafted by or on behalf of regulated entities, that aggregate the details of individual site performance into a comprehensive summary of overall trading plan performance. These reports may be required as special conditions in permits.
- **Trading Program**: *See* Trading Guidance, Trading Framework, Trading Plan.
- **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 water quality benefits 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.
- **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.[180]
- **Trading Ratio (Equivalency)**: the factor applied to pollutant reduction credits to adjust for trading different pollutants or different forms of the same pollutant.[181]
- **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**.**[182]
- **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 measurement, implementation, and performance.[183]
- **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).
- **Validation**: *See* Site Screening and Model Validation.

---

[180] 2007 U.S. EPA Trading Toolkit, at Glossary-3.

[181] *Id*.

[182] *Id.* at Glossary-5.

[183] *Id.* at Glossary-6.

- **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-year 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 market administrator or regulator. This process can include a combination of the following: (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, documentation, 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 projects are performing to the applicable standards.
- **Verification Entities**: a state regulatory body, a qualified third party, or a permittee that performs the verification function.
- **Verification Plan**: a portion of a permittee's trading plan that describes the proposed methods of verification, what information is reviewed and when, who conducts verification, qualification requirements for verifiers, and the verifier's protections against conflicts of interest. The verification plan should also clarify whether and when on-site inspection should occur.
- **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).
- **Wasteload 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 limit (WQBEL).
- **Water Quality Benefit**: the environmental improvement directly attributable to BMPs installed at a site. Determining water quality benefit is the first step in for determining the credits available for sale (it must be reduced by applicable attenuation or modeling factors, baseline factors, ratios, etc.). One way water quality benefit may be calculated is by subtracting the modeled post-project performance from the modeled pre-project performance.
- **Water Quality Criteria**: as defined in 40 C.F.R. § 131.3, water quality criteria 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**: as defined in 40 C.F.R. § 131.3(i), water quality standards 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 limit 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.[184] A watershed usually conforms to the boundaries of a fourth- or fifth-field hydrologic unit code.
- **Watershed Plan**: a TMDL-like regulatory strategy for managing and improving an impaired waterbody established by regulators before a TMDL is promulgated, or if a TMDL is not otherwise pursued for a watershed.

[184] Wisconsin Dep't of Natural Res., Guidance for Implementing Water Quality Trading in WPDES Permits, Glossary (Aug. 21, 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
		  ○ Technical documentation of quantification approach/tool, including assumptions and estimates of uncertainty
		  ○ 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:
		  ○ Quantitative criteria (e.g., 2600 stems/acre planting density, 100 foot minimum buffer width, 30% residual residue, two hour inflow water capacity, etc.)
		  ○ Qualitative criteria for installation (e.g. watering hole outside riparian zone, fence/pipe material type, etc.)
		• Management instructions/guidance (e.g., seeding rate,

		tillage plan, crop list, water application rates and methods, 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 six inches, stem density of 1600 stems/acre or greater, no more than 20% cover invasive species, at least ten inches crop stubble height)
Credit Issuance Procedures	Project Protection Agreement 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
	Site Screening	• 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 water quality benefits
	Verification	• Procedures for documenting pre- and post-project conditions (e.g., farm records for three 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. Discussion Summary of a Draft Federal Legal Framework for Water Quality Trading

As part of a "Conservation Innovation Grant" from USDA-NRCS, Idaho DEQ, Oregon DEQ, Washington Ecology, and U.S. EPA Region 10 engaged with Willamette Partnership and The Freshwater Trust in a discussion meant to identify a set of regional recommendations for water quality trading programs. This legal framework appendix document reflects some of those discussions, and attempts to describe the legal framework (primarily federal) within which trading must fit. This appendix document does not reflect official state or federal agency interpretations of their own laws, does not create a binding obligation on the participating agencies or third parties, and is meant to be informational only.

In 1972, Congress amended the Clean Water Act ("CWA") and declared a national goal "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters[,]" with the elimination of pollutant discharges to occur by 1985.[185] To attain these goals, the CWA addresses point source and nonpoint source pollution through control measures, and requires states to establish water quality standards. Though significant recovery has occurred, nearly thirty years have passed since the 1985 "pollution elimination" deadline and a considerable percentage of the nation's waterways remain impaired.[186]

In 2003, the United States Environmental Protection Agency ("EPA") published a final Water Quality Trading Policy describing how point and nonpoint sources can participate in market-based approaches to meeting water quality standards at a reduced cost ("2003 U.S. EPA Trading Policy").[187] The 2003 U.S. EPA Trading Policy reinforces point and nonpoint source obligations to comply with CWA provisions and provides a framework for pollutant credit trading consistent with the anti-backsliding policy, compliance and enforcement provisions, and public notice and comment, as required by law. Though the 2003 U.S. EPA Trading Policy discusses several contexts in which trading may occur—to maintain high water quality, pre- or outside-of-total maximum daily load ("TMDL") trading in impaired waters, TMDL trading, technology-based trading, pre-treatment trading, and intra-plant trading—to date, trading has most commonly been used by point sources with National Pollutant Discharge Elimination System ("NPDES") permit obligations. Where TMDLs exist for impaired waters, and a point source is using trading to meet its compliance obligation, trading is typically incorporated into NPDES permits.

---

[185] Federal Water Pollution Control Act, 33 U.S.C. § 1251(a) (2012).

[186] U.S. EPA, Water Trading Policy, 68 Fed. Reg. 1608, 1609 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf.

[187] *Id.* at 1610. The CWA does not explicitly approve or disapprove of trading.

I. General Federal CWA Framework

The CWA pursues two tracks for maintaining and restoring the nation's waterbodies: 1) controlling point sources through technology-based "limitations,"[188] and 2) establishing ambient water quality standards that are the basis for additional water quality-based controls that may be imposed when technologically-based controls are inadequate to assure standard attainment and maintenance.[189] The CWA makes the discharge of a pollutant into a waterbody illegal unless done so in compliance with one of the section 302, 306, 307, 318, 402 or 404 programs.[190] The CWA regulates pollutant discharges from "point sources"[191] and "nonpoint sources,"[192] although in different ways. All point sources must apply some sort of effluent limitation.[193] Such effluent limitations can be technologically-based effluent limitations ("TBELs"), where they exist,[194] or other more stringent limitations—including water quality based effluent limitations ("WQBELs") and other "alternative effluent control strategies"[195]—where necessary to meet water quality standards.[196]

---

[188] Effluent limitations include "*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 …." 33 U.S.C. § 1362(11) (emphasis added). Effluent limitations therefore, need not be numeric. Moreover, they can include schedules of compliance. *See id.* A schedules of compliance is a "schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an effluent limitation ...." *Id.* § 1362(17).

[189] 33 U.S.C. §§ 1312, 1313.

[190] 33 U.S.C. § 1311(a).

[191] 33 U.S.C. § 1362(14) (A point source is "any discernible, confined and discrete conveyance … from which pollutants are or may be discharged" into a waterbody, including releases from pipes or ditches).

[192] 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 (2013). 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." U.S. EPA, Nonpoint Source Program and Grants Guidelines for States and Territories, at 7 n.2 (Apr. 12, 2013), *available at* http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf.

[193] 33 U.S.C. § 1311(e).

[194] 33 U.S.C. § 1311(b)(1)(A)–(B). Permits must include TBELs, when applicable. 40 C.F.R. § 122.44(a) (2013).

[195] 33 U.S.C. § 1312(a). "Alternative effluent control strategies" is not defined in the statute or regulations. Such strategies could include BMPs, other non-numeric limitations, or water quality trading.

[196] 33 U.S.C. § 1311(b)(1)(A)–(B) ("In order to carry out the objective of this chapter[,] there shall be achieved— … effluent limitations for point sources, other than publicly owned treatment works, (i) which shall require the application of the best practicable control technology currently available … *or*, … *any more stringent limitation*, including those necessary to meet water quality standards….") (emphasis added).

In addition to technology-based permits, the CWA also requires States to develop water quality standards that establish, and then protect, the desired conditions of each waterbody.[197] State water quality standards consist of "designated uses"[198] for a waterbody, and establish water quality criteria designed to protect those uses.[199] State water quality standards must also be sufficient to maintain existing beneficial uses (i.e., prevent degradation).[200] Nonpoint sources regulations are typically developed in the context of water quality standard implementation.[201] The CWA also requires states to have section 319 plans to address nonpoint source pollution.[202] Attainment of water quality standards typically occurs on a reach- or watershed-wide basis, although point sources must also meet specific "near-field" discharge requirements.[203] In

[197] 33 U.S.C. § 1313(a).

[198] Designated uses in a waterbody include, but are not limited to, public water supply, fish and wildlife protection and propagation, recreation, agriculture, industry, and navigation. *See* 33 U.S.C. § 1313(c)(2)(A); 40 C.F.R. § 131.10(a) (2013).

[199] 33 U.S.C. § 1313(c)(2)(A). Water quality standards can be either numeric (a quantitative discharge limit) or narrative (prohibiting discharges in harmful amounts). 40 C.F.R. § 131.3(b) (2013).

[200] 33 U.S.C. § 1313(d)(4)(B); 40 C.F.R. § 131.12 (2013).

[201] Water quality standard implementation typically occurs through best management practices ("BMPs"). *See* 40 C.F.R. § 130.2(m) (2013) (defining BMPs as the "[m]ethods, measures or practices selected by an agency to meet its nonpoint source control needs. 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 activities to reduce or eliminate the introduction of pollutants into receiving waters."). Implementation of nonpoint source controls can also be motivated by state law, where such a law exists, the Coastal Zone Act Reauthorization Amendments, and CWA section 319 grant programs.

[202] Section 319 helps states address nonpoint pollution through the development of assessment reports, adoption of management programs to control nonpoint source pollution, implementation of those management programs, technical assistance, and a grants program. *See* 33 U.S.C. § 1329.

[203] Water quality standards set goals for an overall waterbody. 40 C.F.R. § 131.2 (2013) ("A water quality standard defines the water quality goals of a waterbody, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses."); *see* 40 C.F.R. § 131.3(h) (defining water quality non-attainment in terms of "water quality limited segments"). With EPA approval, states may include "mixing zones" in their state water quality standards. 40 C.F.R. § 131.13 (2013). Where a state has developed mixing zone regulations, the point of compliance may be the end of the mixing zone, and not the point of discharge. Although water quality standards are meant to attain designated uses in a waterbody as a whole, individual point sources must satisfy pollutant-specific "near-field" mixing zone regulations created by states. *See, e.g.,* IDAHO ADMIN. C. r. 58.01.02.060 (2013); OR. ADMIN. R. 340-041-0053 (2013); WASH. ADMIN. C. § 173-201A-400 (2013). In the temperature context, even if an overall river satisfies a "fishable" designated use, an individual point source cannot discharge heat at levels that would cause fish lethality, impair spawning, or create thermal shock or a migration barrier at a particular outfall point. *See, e.g.,* OR. ADMIN. R. 340-041-0053(2)(d); *see also* IDAHO ADMIN. C. r. 58.01.02.060.01(b); WASH. ADMIN. C. § 173-201A-400(4).

addition to establishing water quality goals for a waterbody, water quality standards also serve as a basis for establishing effluent limitations in NPDES permits.[204]

II. Water Quality Trading under TMDLs or 303(d) Alternatives/Substitutes

When a waterbody fails to meet water quality standards, despite controls on point sources and BMPs applicable to nonpoint sources, the relevant water quality agency—a state agency or EPA—must develop a strategy for addressing the waterbody's impairment.[205] Usually, the agency develops a TMDL or some other watershed strategy for addressing that impaired waterbody.[206] TMDL documents may include references to water quality trading. For the purposes of the discussion, this section assumes that water quality trading occurs under TMDLs written by state agencies.

A. TMDL or 303(d) Alternative/Substitute Development

When technological controls (set as TBELs in permits) do not bring a particular waterbody into attainment with applicable water quality standards, a state must identify and rank these unhealthy waters.[207] Unhealthy waters are known as "water quality limited segments," and are listed on "303(d) lists" for each state.[208] For these 303(d) "impaired waters," the states or EPA must identify each assessed water as falling within a particular category. States have typically listed impaired waters as "Category 5" waters in need of a TMDL. Assuming the state pursues the TMDL course, it then establishes the absolute amount of a particular pollutant—the total maximum daily load—that the waterbody can take on while still satisfying water quality

---

[204] 40 C.F.R. § 131.2 (2013).

[205] States list these waters, and depending on the listing category, must take a particular action. *See* 33 U.S.C. §§ 1313(d)(1)(A), 1315(b); 40 C.F.R. § 130.7(b)(1) (2013). Beginning in 2002, EPA began recommending that states use five reporting categories in their 1315(b) biennial reports on impaired waters. Memorandum from Robert H. Wayland, Director, EPA Office of Wetlands, Oceans and Watersheds, to EPA Regional Directors, *2002 Integrated Water Quality Monitoring and Assessment Report Guidance* (Nov. 19, 2001), *available at* http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/2002wqma.cfm.

[206] Typically, EPA reviews and approves TMDLs developed by the states. However, EPA may also prepare a TMDL for a waterbody if it disapproves of a state-drafted TMDL, 33 U.S.C. § 1313(d)(2), or for waterbodies that span multiple jurisdictions. The scope and implementation of TMDLs varies depending on whether a state agency or EPA is responsible. TMDLs are "primarily informational tools" that "serve as a link in an implementation chain that includes federally regulated point source controls, state or local plans for point and nonpoint source pollutant reduction, and assessment of the impact of such measures on water quality, all to the end of attaining water quality goals for the nation's waters." Pronsolino v. Nastri, 291 F.3d 1123, 1129 (9th Cir. 2002). Therefore, if EPA develops a TMDL, it cannot implement the TMDL, except to the extent EPA is responsible for issuing NPDES permits in the state. States, on the other hand, can and do write TMDL implementation plans.

[207] 33 U.S.C. § 1313(d)(1)(A), (C).

[208] 40 C.F.R. § 130.7(b) (2013).

standards.[209] EPA typically reviews and approves or disapproves TMDLs developed by the states. Alternatively, if a state is unable to develop a TMDL or EPA disapproves a state-submitted TMDL, EPA may also prepare a TMDL for a waterbody.[210]

The CWA employs different approaches to control point and nonpoint sources to achieve water quality, but when a waterbody is impaired, TMDLs tie together point and non-point source pollution issues to address the health of the whole waterbody.[211] Because the focus of a TMDL is on the health of the overall waterbody, TMDLs establish an aggregate pollutant "load"[212] amount for the impaired waterbody equal to "[t]he greatest amount of loading that a water can receive without violating water quality standards."[213]

The loading capacity in the impaired waterbody or waterbody segment is then allocated between multiple point and nonpoint sources (which includes natural background), and margin of safety. If each source discharges at or below its TMDL allocation, the waterbody should achieve its water quality standards. Point sources receive a wasteload allocation ("WLA") that represents "[t]he portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution[.]"[214] Nonpoint sources receive a load allocation ("LA") that represents "[t]he 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[.]"[215] The TMDL must also account for seasonal variations and include a "margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality."[216] Along with the statutorily-mandated margin of safety, the TMDL is "[t]he sum of the individual WLAs for point sources and LAs for nonpoint sources and natural background."[217] The components of a TMDL are illustrated by this equation:

TMDL = Σ (WLAs [Point] + LAs [Nonpoint, including Natural Background]) + Margin of Safety

The left side of the equation is the total loading capacity of the waterbody for a particular pollutant. The allocations on the right side of the equation represent the loading components, which, when summed, equal the TMDL. Recognizing that the water quality drivers in each

---

[209] 33 U.S.C. § 1313(d)(1)(C).

[210] 33 U.S.C. § 1313(d)(2).

[211] 33 U.S.C. § 1313.

[212] Load is "an *amount of matter or thermal energy* that is introduced into a receiving water." 40 C.F.R. § 130.2(e) (2013) (emphasis added).

[213] 40 C.F.R. § 130.2(f) (2013).

[214] *Id.* § 130.2(h).

[215] *Id.* § 130.2(g).

[216] 33 U.S.C. § 1313(d)(1)(C); *see also* § 1313(d)(1)(D).

[217] 40 C.F.R. § 130.2(i).

waterbody are unique, the CWA allows regulators to make tradeoffs in how to meet the left side of the equation within a TMDL basin: so long as LAs to nonpoint sources are "practicable," such as where supported by BMPs and other reasonable assurances, more load can be allocated to point sources.[218]

Once set, however, trading does not change TMDL allocations; rather it simply provides sources with the ability to more cost-effectively meet their load limits through the purchase of pollution control credits and/or offsets.

B. NPDES Permits Can Incorporate WQT in TMDL Environment

All point sources that have the potential to discharge are required to have an individual permit or be covered under a general NPDES permit.[219] If there is a TMDL covering a watershed, NPDES permits must be drafted (or for existing permits, renewed/reissued) to be consistent with the assumptions and requirements of any available TMDL wasteload allocations for point sources.[220] The states—or EPA where a state has not been authorized to issue permits[221]—will issue a NPDES permit to all point sources with the potential to discharge within the geographic scope of the TMDL. NPDES permits limit the amount of pollutants that can be discharged by a point source into a waterbody.[222] To determine this load limit, regulators establish effluent limits, which cannot "cause, have the reasonable potential to cause, or contribute" to violations of water quality standards or criteria.[223] To meet these limits, NPDES permits include controls that reflect the stricter of two different kinds of effluent limitations: those based on the technology available to treat a pollutant,[224] and those necessary to meet the applicable water quality standard(s) of the receiving waterbody.[225] TBELs "represent the minimum level of control that must be imposed in a permit,"[226] and are "developed independently of the

---

[218] *Id.* § 130.2(i) states in pertinent part: "If Best Management Practices (BMPs) or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs."

[219] 33 U.S.C. § 1311(a); 40 C.F.R. § 122.28 (2013) (general permits).

[220] 40 C.F.R. § 122.44(d)(1)(vii)(B) (2013).

[221] The CWA authorizes states to adopt programs issuing NPDES permits. 33 U.S.C. § 1342(b). The following do not have authority to issue federal Clean Water Act permits: Idaho, Massachusetts, New Hampshire, New Mexico, and District of Columbia. U.S. EPA, State Program Status (Apr. 14, 2003), *available at* http://cfpub2.epa.gov/npdes/statestats.cfm. States may enforce more stringent effluent limitations than required by the federal CWA. 33 U.S.C. § 1370.

[222] 33 U.S.C. §§ 1311(a), 1342.

[223] 40 C.F.R. § 122.44(d)(1) (2013).

[224] *See* 33 U.S.C. §§ 1311(b)(1)(A)–(B).

[225] *See id.* §§ 1311(b)(1)(C), 1312(a).

[226] 40 C.F.R. § 125.3(a) (2013).

potential impact of a discharge on the receiving water."[227] Unless a specific regulatory exception applies, EPA policy provides that trading cannot be used to comply with an existing TBEL.[228] But where a point source's TBEL is insufficient to meet the water quality standards that apply in a waterbody, or where no TBEL exists for a particular pollutant from a particular type of source,[229] the permit will instead include more stringent WQBELs—including "alternative effluent control strategies" such as BMPs and other non-numeric limitations—to ensure that water quality standards are met.[230] If the permittee is located within a water quality limited segment or has a wasteload allocation under a TMDL, the permittee will automatically get a WQBEL. Additional considerations for effluent limits may apply where potential water quality impairment is associated with thermal discharges.[231]

Where WQBELs are included in NPDES permits, these limits must be "consistent" with the assumptions and requirements of any available WLAs for point sources.[232] While the law prescribes minimum requirements for developing WQBELs consistent with the TMDL, it does not dictate how permittees meet them. This arrangement provides the permitting authority the flexibility to determine the appropriate procedures for developing WQBELs, and affords permittees the flexibility in meeting them through a number of vehicles, including water quality trading. Trading does not change TMDL WLAs for point sources; rather, it is a mechanism for

---

[227] U.S. EPA, NPDES Permit Writers' Manual, EPA-833-K-10-001, at 5-1 (Sept. 2010), *available at* http://www.epa.gov/npdes/pubs/pwm_2010.pdf.

[228] "EPA does not support trading to comply with existing [TBELs] except as expressly authorized by federal regulations. Existing technology-based effluent guidelines for the iron and steel industry allow intraplant trading of conventional, nonconventional and toxic pollutants between outfalls under certain circumstances (40 C.F.R. § 420.03)." 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610–11.

[229] Technology-based requirements exist for all sources. TBELs are derived by using national effluent limitation guidelines by industry. Industry-specific technology-based effluent guidelines have been promulgated for over 50 different industrial categories. *See* 40 C.F.R. pts. 405–99 (2013). The permitting entity can also rely on ad hoc best professional judgment to set TBELs if not effluent limit guidance exists. *See* 33 U.S.C. § 1342(a)(1); 40 C.F.R. § 125.3(a)(2) (2013). While TBELs exist for all sources, they do not exist for all pollutants from all sources. In the case of publicly owned treatment works (POTWs), TBELs are secondary treatment standards as defined in CWA section 1314(d)(1). 33 U.S.C. § 1311(b)(1)(B). POTW facilities have TBELs for five-day biochemical oxygen demand (BOD), total suspended solids (TSS), and pH. 40 C.F.R. § 133.102 (2013). POTWs do not have secondary treatment TBELs for temperature or nutrient discharges. *See id.* In late 2012, EPA rejected a rulemaking petition to include nitrogen and phosphorous removal standards within the national secondary treatment standards for POTWs. Letter from Michael H. Shapiro, U.S. EPA Deputy Asst. Administrator, to Ann Alexander, Natural Resource Defense Council (Dec. 12, 2012), *available at* http://www.epa.gov/npdes/pubs/ow_shapiro_nrdcpetition.pdf.

[230] *See* 33 U.S.C. §§ 1311(b)(1)(C), 1312(a).

[231] 40 C.F.R. § 131.12(a)(4) (2013) (where potential water quality impairment is associated with a thermal discharge, the anti-degradation policy and implementing method must be consistent with 33 U.S.C. § 1326). CWA section 1326(a) allows for adjustment of effluent limitations associated with thermal discharges where necessary.

[232] 40 C.F.R. § 122.44(d)(1)(vii)(B) (2013).

ensuring that the source is only discharging according to its permit limits, which are either consistent or inconsistent with WLAs, regardless of whether trading is involved.

This is consistent with the fact the permit issuer—EPA or states with CWA authority—has broad statutory discretion to choose the proper effluent limitations in a permit,[233] as well as the discretion to include in permits any "requirements as [s/]he deems appropriate,"[234] including provisions such as compliance schedules[235] and re-opener clauses[236] that assist in making trading a viable compliance alternative. Moreover, permit writers cannot issue a permit if s/he determines that the imposition of conditions cannot ensure compliance with applicable state water quality standards,[237] and applicable requirements of the CWA and its implementing regulations.[238] Thus, trading can be incorporated into NPDES permits so long as it will not result in a violation of water quality standards, or other provisions of the CWA and its implementing regulations.[239]

As a result of this discretionary flexibility to set effluent limitations in NPDES permits, EPA details three paths to meet permit WQBELs in its 2003 U.S. EPA Trading Policy, but leaves it up to the permittee to select the path. As EPA provided, "[o]ne option is to implement pollution prevention, reuse, or recycling measures adequate to meet the WQBEL at the point of

---

[233] *See* 33 U.S.C. § 1342(a)(1) (permits can be issued if a discharge will meet all applicable technological requirements, *or* if based on "such conditions as the Administrator determines are necessary to carry out the provisions of [the CWA].").

[234] 33 U.S.C. § 1342(a)(2); 40 C.F.R. 122.43(a) (2013) ("In addition to conditions required in all permits (§§ 122.41 and 122.42), the Director shall establish conditions, as required on a case-by-case basis, to provide for and assure compliance with all applicable requirements of CWA and regulations.").

[235] Compliance schedules can be included in NPDES permits, where appropriate. 40 C.F.R. § 122.47(a) (2013). Where a schedule of compliance exceeds one year, the permit must include interim requirements and dates for their achievement. *Id.* § 122.47(a)(3). In the case of water quality trading, such interim achievements might include minimum credit/year purchase milestones, minimum project/year implementation milestones, and requirements as to when the regulated entity must secure a trading partner.

[236] Reopener clauses can be included in NPDES permits, where necessary to achieve water quality standards. *See* 40 C.F.R. § 122.44(d)(1)(vi)(C)(4) (2013).

[237] 40 C.F.R. § 122.4(d) (2013).

[238] 40 C.F.R. § 122.4(a) (2013).

[239] *See* 40 C.F.R. § 122.4(a) (2013) ("No permit may be issued … [w]hen the conditions of the permit do not provide for compliance with the applicable requirements of CWA, or regulations promulgated under CWA."); *id.* § 122.4(d) ("No permit may be issued … [w]hen the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States."); *see also* 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611 ("EPA does not support any use of credits or trading activity that would cause an impairment of existing or designated uses, adversely affect water quality at an intake for drinking water supply or that would exceed a cap established under a TMDL.").

discharge. The second option is to install treatment technology. The third option is trading[.]"[240] A facility could also implement treatment/pollution reduction measures to address a portion of its reduction requirement, and purchase its remaining reductions via water quality trading.[241] In the context of trading under TMDLs, EPA does require that water quality trades used to meet a point source's WQBEL "should be consistent with the assumptions and requirements upon which the TMDL is established," and that trades cannot delay implementation of a TMDL nor cause the combined point and nonpoint source loading to exceed the TMDL.[242] Therefore, under the 2003 U.S. EPA Trading Policy, once a nonpoint or point source has met baseline requirements—which are discussed at length in Section 2 of this Draft Recommendations document—it can provide a "credit" to a point source within the same watershed to help the point source meet its WQBEL.[243]

III. Requirements Applicable to TMDL-based NPDES Permits that Include WQT

In addition to meeting WQBELs, point sources that rely on trading in areas covered by a TMDL or other watershed-wide strategy documents must also comply with anti-degradation, anti-backsliding, and other substantive and procedural permit issuance conditions in order to participate in water quality trading.

A. Anti-Degradation Policy Compliance

Water quality trades and trading programs must comply with anti-degradation policies. In water-quality limited waters (Tier 1), states must maintain and protect existing designated uses.[244] EPA endorses trading so long as existing uses are maintained and protected.[245] In high quality waters where water quality exceeds levels necessary to sustain propagation of fish, shellfish, and wildlife and recreation in and on the water (Tier 2), water quality cannot be degraded unless it is determined necessary to accommodate important economic or social development in the area.[246] Unless justified, water quality trading may not result in "lower water quality" for Tier 2 high quality waters.[247] In state-designated "outstanding natural resources waters" (Tier 3), water quality must be maintained and protected without

---

[240] U.S. EPA, Water Quality Trading Toolkit for Permit Writers*,* 30–31, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.

[241] *Id.* at 20.

[242] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

[243] *Id.*

[244] 40 C.F.R. § 131.12(a)(1) (2013).

[245] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611.

[246] 40 C.F.R. § 131.12(a)(2) (2013).

[247] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611 (interpreting language in 40 C.F.R. § 131.12(a)(2)).

exception.[248] Additional anti-degradation considerations may apply where potential water quality impairment is associated with thermal discharges.[249] EPA does not believe that anti-degradation review should be triggered under its regulations when trades or the trading program overall achieves a "no net increase" of the pollutant traded, and designated uses are not impaired.[250] Therefore, the scope of anti-degradation requirements and review will vary depending on the type/quality of the water into which a discharge will occur.[251]

B. Compliance with Provisions in 40 C.F.R. § 122

With a TMDL in place, sources must also address various permit-related provisions in section 122 of the federal regulations prior to engaging in trading. First, a point source's WQBEL must be consistent with the assumptions and requirements of any available TMDL wasteload allocations for point sources.[252] If a TMDL is in place, the "cause or contribute"[253] provision does not apply. Nonetheless, permit writers still need to determine that permit limits based on TMDL WLAs are sufficient to control all pollutants that are or may be discharged at levels that would "cause, have the reasonable potential to cause, or contribute" to violations of water quality standards.[254] Second, where an owner or operator of a *new* source proposes to discharge into an impaired waterway, and the relevant agency has performed a "pollutant loads allocation" (i.e., a TMDL or something analogous), the new source/discharger must demonstrate (prior to the close of the public comment period for the permit) that 1) there is sufficient remaining pollutant load to allocate to it, and 2) that existing dischargers in that waterbody segment are subject to compliance schedules meant to bring the segment into

---

[248] 40 C.F.R. § 131.12(a)(3) (2013).

[249] *Id.* § 131.12(a)(4) (where potential water quality impairment is associated with a thermal discharge, the anti-degradation policy and implementing method must be consistent with 33 U.S.C. § 1326). CWA section 1326(a) allows for adjustment of effluent limitations associated with thermal discharges where necessary.

[250] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611. EPA's position is consistent with the purposes underlying water quality standards (including anti-degradation, which is in subpart 131.2, titled "water quality standards"). *See* 40 C.F.R. § 131.2 (2013) (the purpose of water quality standards is to "protect public health or welfare, enhance the quality of water and serve the purposes of the [CWA]."). It is also consistent with EPA regulations describing the safeguards necessary when water quality degradation is allowed. *See id.* § 131.12(a)(2) ("In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control."). States may have additional anti-degradation regulations that should be considered in making this determination.

[251] 40 C.F.R. § 131.12(a) (2013); *see* 33 U.S.C. § 1313(d)(4)(B).

[252] 40 C.F.R. § 122.44(d)(1)(vii)(B) (2013).

[253] *Id.* § 122.4(i).

[254] *Id.* § 122.44(d)(1).

compliance with water quality standards (not necessarily before the new discharger begins discharging).[255]

C. Anti-Backsliding Compliance

Point sources wishing to participate in water quality trading in a TMDL context must comply with the relevant "anti-backsliding" provisions of the CWA. Under these provisions, NPDES permits generally may not be renewed, reissued, or modified to contain less stringent effluent limitations than those found in the previous permit.[256] This means that once an entity has achieved a particular effluent limitation—technological (TBEL) or water quality-based (WQBEL)—future permit iterations cannot be renewed, reissued, or modified to contain less stringent limits, unless either a section 402(o)(2) exception applies, or section 303(d)(4) is met.[257] In the TMDL context, only the section 304(d)(4) exemption applies. CWA section 303(d)(4) is broken into two parts, the first of which applies to non-attaining waters and the second of which applies to attaining waters. For non-attaining waters, the CWA allows a less stringent WQBEL if the permittee meets two conditions: 1) the existing limit must have been based on a TMDL or "other WLA established under [CWA § 303]"; and 2) relaxation of the limit is only allowed if attainment of water quality standards will be ensured or the designated use not being attained is removed in accordance with the "use attainability analysis" provisions of 40 C.F.R. 131.10(g).[258] For attaining waters covered by a TMDL, a point source's effluent limit may only be revised if the revision is "subject to and consistent with the anti[-]degradation policy …."[259]

---

[255] 40 C.F.R. § 122.4(i)(1)–(2) (2013). A "schedule of compliance" is a "schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an effluent limitation, other limitation, prohibition or standard." 33 U.S.C. § 1362(17). Schedules of compliance that last beyond one year must set interim requirements on at least an annual basis, or if impracticable to divide into increments, interim progress reports. 40 C.F.R. § 122.47(3) (2013). Compliance schedules can be modified after floods, acts of God, or other events that the permittee has little control over. *Id.* § 122.62(a)(4). Compliance schedules are not limited to the life of the permit, but require compliance "as soon as possible." *Id.* § 122.47(a)(1).

[256] 33 U.S.C. § 1342(o)(1); 40 C.F.R. § 122.44(l).

[257] U.S. EPA NPDES Permit Writers' Manual, at §7.2.1.3 ("EPA has consistently interpreted CWA 402(o)(1) to allow relaxation of WQBELs if the relaxation is consistent with the provisions of CWA section 303(d)(4) or if one of the exceptions in CWA 402(o)(2) is met.")..

[258] 33 U.S.C. § 1313(d)(4)(A)(i) ("where the applicable water quality standard has not yet been attained, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section may be revised only if (i) the cumulative effect of all such revised effluent limitations based on such total maximum daily load or waste load allocation will assure the attainment of such water quality standard ….") (emphasis added). The 2003 EPA Trading Policy cites to this provision explicitly in the anti-backsliding section. 68 Fed. Reg. at 1611.

[259] *Id.* § 1313(d)(4)(B).

Moreover, allowing a facility to meet its WQBEL via trading does not constitute a revised effluent limitation if the facility is still responsible for the same level of pollution reduction.[260] Therefore, if a facility meets its WQBEL through the purchase of credits, and the facility remains responsible for the same level of pollutant reduction, the 2007 U.S. EPA Trading Toolkit suggests that trading does not constitute a less stringent effluent limitation, even if the facility itself has a larger actual discharge at its pipe.[261] Although unclear, trading-related provisions expressly incorporated into a permit (i.e., ratios, calculation methods, etc.) may be subject to anti-backsliding, unless an exception applies.[262]

D. Additional Procedural Safeguards: Oversight & Public Involvement

Lastly, the ability to use water quality trading as a NPDES permit compliance alternative in a region covered by a TMDL is limited by two other important procedural safeguards. First, for all permit decisions, including those that allow for trades, EPA retains an oversight role.[263] Therefore, EPA has authority to review trading provisions included in these permits to determine whether a permit is outside the guidelines and requirements of the CWA. To the extent EPA foresees the need to restrict trades, it may do so. Second, the public has the right to notice and comment on TMDLs that authorize water quality trading,[264] and to permits that authorize trades to meet WQBELs.[265] Therefore, this is robust opportunity for public input in developing appropriate water quality trading programs.

IV. Requirements Applicable to NPDES Permits that Include WQT Outside of TMDLs

Outside-of-TMDL trades with NPDES permits can be structured similarly to trades under TMDLs, although with some differences. U.S. EPA discusses three types of pre-TMDL trades in its 2003 Trading Policy. First, the Policy discusses watershed-scale trading programs that reduce loadings to a specified cap, supported by baseline information on pollutant sources and

---

[260] *See* 2007 U.S. EPA Trading Toolkit, at 21 (describing anti-backsliding in a pre-TMDL trading context, but arriving at conclusions that would logically apply in a TMDL context as well); 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611 ("EPA believes that the antibacksliding provisions of Section 303(d)(4) of the CWA 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.").

[261] *See* 2007 U.S. EPA Trading Toolkit, at 21 (describing anti-backsliding in a pre-TMDL trading context, but arriving at conclusions that would logically apply in a TMDL context as well).

[262] Revised regulations, guidance, or test methods appear to fall outside of the backsliding conversation entirely. *See* 33 U.S.C. § 1342(o)(2)(B)(i).

[263] *Id.* § 1342(d); *see also* 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1613.

[264] *See* 40 C.F.R. § 130.7(d)(2) (2013) (EPA must publish a notice seeking public comment on the TMDL); *id.* § 130.7(c)(1)(ii) (calculations used to establish a TMDL must be subject to public review as defined in a state's Continuing Planning Process).

[265] *Id.* § 124.10; 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611.

loadings.[266] This type of trading ostensibly requires a TMDL-like watershed analysis capable of properly dividing load between sources. Second, the Policy discusses individual pre-TMDL trades that result in a net reduction of the pollutant traded, thus ensuring that further impairment is avoided.[267] Third, the Policy discusses pre-TMDL trading that achieves a direct environmental benefit relevant to the conditions or causes of impairment to achieve progress toward restoring designated uses where reducing pollutant loads alone is not sufficient or as cost-effective.[268] Pre-TMDL trades might eliminate the need for a TMDL in the watershed.[269] If pre-TMDL trading does not, however, result in attainment of applicable water quality standards, the 2003 U.S. EPA Trading Policy notes that EPA expects a TMDL to be developed.[270]

With respect to the first type of pre-TMDL trade—watershed wide trading that reduces loadings to a specified cap based on baseline information—the process is not significantly different than under TMDLs; except there is no formal TMDL document approved by EPA. Caps for total loading are derived from baseline information on pollutant sources and loadings that is consistent with water quality standards.[271] Establishing baseline information requires quantification of current conditions (including current pollutant loads from point and nonpoint sources in the watershed, and background levels).[272] Therefore, similar TMDL-like information must be gathered and calculated in order to approve a watershed-wide trading program without a TMDL. To ensure the credibility of credits created and generated in this type of environment, baseline measurement and quantification should be consistent with the methodologies that would be utilized in that particular TMDL process. A watershed-wide, cumulative impacts analysis may be needed in order to establish WLA-like amounts that would serve as the basis of permit limits. Outside-of-TMDL examples include the Minnesota Pollution Control Agency pre-TMDL phosphorous trading program,[273] the Great Miami River Watershed

---

[266] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

[267] *Id*.

[268] *Id*.

[269] 2007 U.S. EPA Trading Toolkit, at 21.

[270] 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610.

[271] 2007 U.S. EPA Trading Toolkit, at 21.

[272] *Id*.

[273] Minnesota's pre-TMDL phosphorous trading (PTPT) allows new and expanding wastewater treatment facilities that discharge to a nutrient-impaired water to receive a discharge permit prior to completion of the applicable TMDL. Through PTPT, a new or expanding facility may increase its phosphorus discharge by purchasing a phosphorus reduction at another permitted facility (only facilities with effluent phosphorous limits in their permits can sell credits). Trades must be upstream of the impaired water; trades can be between entities within the same major watershed (trade ratio of trade ratio of 1.2 to 1 for new facilities and 1.1 to 1 for expanding facilities); 2) between buyers and sellers in different major watersheds, but within the same basin, and the seller is closer to the impaired water than the buyer (trade ratio of 1.2 to 1 for new facilities and 1.1 to 1 for expanding facilities); or 3) between buyers and sellers in different major watersheds, but within the same basin, and the buyer is closer to the

trading program,[274] and the Neuse River, where a TMDL later incorporated a prior pre-TMDL cap.[275]

The permit issuer would issue NPDES permits allowing for trading to point sources that are largely the same.[276] Nonetheless, the permit limit would still need to be consistent with water quality standards.[277] In both pre-TMDL and TMDL contexts, NPDES permits limit the amount of pollutants that can be discharged by a point source into a waterbody.[278] In both contexts, unless a specific regulatory exception applies, trading cannot be used to comply with an existing TBEL.[279] Like in the TMDL context, where a point source's TBEL is insufficient to meet the water

---

impaired water than the seller (trade ratio of 1.4 to 1). PTPT cannot exacerbate violations of water quality standards. The buyer's phosphorus mass limit will be adjusted upwards and the seller's phosphorus mass limit will be adjusted downwards in proportion to the extent of the trade. The trade is not effective until the permits have been changed. Once the period of the trade ends, each facility's phosphorus permit limit reverts to its original value. Minnesota Pollution Control Agency, Pre-TMDL Phosphorous Trading Permitting Strategy (Dec. 18, 2013), *available at* http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/tmdl-projects/special-projects/pre-tmdl-phosphorus-trading.html. The Minnesota Supreme Court upheld the MPCA's interpretation of the CWA, and upheld a WWTP permit that allowed for pre-TMDL phosphorous trading. *In re* Cities of Annandale and Maple Lakes NPDES/SDS Permit Issuance, 731 N.W.2d 502 (Minn. 2007).

[274] Soil and water conservation districts work with local farmers who agree to change their practices. Together, they submit projects that reduce nitrogen and phosphorous run-off. An advisory committee (WWTPs, agricultural producers, Ohio Farm Bureau Ass'n, Ohio Water Envtl. Ass'n, community watershed organizations, county SWCDs, ODNR, and USDA) review the proposals. The Waste Conservation Subdistrict manages an Insurance Pool of credits to be used as a "guarantee" for credits being generated for eligible buyers. Credits are used by WWTPs to meet their NPDES permit requirements. Those who participate in advance of regulatory requirements must produce credits at 1 to 1 ratio (for discharges to fully attaining waters) and at a 2 to 1 ratio (into impaired waters). Permittees who participate after the imposition of regulatory requirements must contribute at 2 to 1 and 3 to 1, respectively. SWCDs do the project implementation. Miami Conservancy Dist., Water Conservation Subdist., Great Miami River Watershed Water Quality Credit Trading Program: Operations Manual (Feb. 8, 2005), *available at* http://www.miamiconservancy.org/water/documents/TradingProgramOperationManualFeb8b2005secondversion.pdf

[275] In 1999, North Carolina completed a TMDL for the Neuse River. The Neuse River Compliance Association established a pre-TMDL cap for the watershed in 1997. 2007 U.S. EPA Trading Toolkit, at 21, n. 7.

[276] Without a TMDL, permits need not be consistent with TMDL wasteload allocations. *See* 40 C.F.R. § 122.44(d)(1)(vii)(B) (2013).

[277] *See id.* § 122.44(d)(1)(i) ("Limitations must control all pollutants or pollutant parameters ... which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard[.]").

[278] 33 U.S.C. §§ 1311(a), 1342.

[279] "EPA does not support trading to comply with existing [TBELs] except as expressly authorized by federal regulations. Existing technology-based effluent guidelines for the iron and steel industry allow intraplant trading of conventional, nonconventional and toxic pollutants between outfalls under certain circumstances (40 C.F.R. § 420.03)." 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1610–11.

quality standards that apply in a waterbody, or where no TBEL exists for a particular pollutant from a particular type of source,[280] the permit will instead include more stringent WQBELs—which may include "alternative effluent control strategies" such as BMPs and other non-numeric limitations—to ensure that water quality standards are met.[281] As in the TMDL context, the 2007 U.S. EPA Trading Toolkit suggests that permittees can meet WQBELs in the pre-TMDL context by "implement[ing] pollution prevention, reuse, or recycling measures adequate to meet the WQBEL at the point of discharge[, or by] install[ing] treatment technology[, or by] trading[.]"[282]

In pre-TMDL trading environments, both regulators and permittees may desire the inclusion of compliance schedules,[283] and re-opener clauses.[284] Moreover, in pre-TMDL trading contexts, permittees may only participate if the regulators include a provision in NPDES permits and/or state regulations describing whether actions taken in the pre- or outside-TMDL environments can be counted equally towards compliance with future permit limits based on future TMDL WLAs. Similar to permits issued in a TMDL context, however, pre-TMDL permits can only include trading so long as trading will not result in a violation of water quality standards, or the CWA or its implementing regulations.[285]

Permits issued outside of a TMDL need to conform to largely the same provisions as in a TMDL context. In both contexts, a permit writer cannot issue a permit if the imposition of conditions cannot ensure compliance with applicable state water quality standards,[286] and applicable requirements of the CWA and its implementing regulations.[287] Moreover, in both contexts, permits are subject to anti-degradation and procedural safeguards (oversight and public involvement). These provisions ensure that water quality trades are protective even without a

---

[280] *See supra* notes 228–229 and accompanying text.

[281] *See* 33 U.S.C. §§ 1311(b)(1)(C), 1312(a).

[282] 2007 U.S. EPA Trading Toolkit, at 20.

[283] Compliance schedules can be included in NPDES permits, where appropriate. 40 C.F.R. § 122.47(a) (2013). Where a schedule of compliance exceeds one year, the permit must include interim requirements and dates for their achievement. *Id.* § 122.47(a)(3). In the case of water quality trading, such interim achievements might include minimum credit/year purchase milestones, minimum project/year implementation milestones, and requirements as to when the regulated entity must secure a trading partner.

[284] Reopener clauses can be included in NPDES permits, where necessary to achieve water quality standards. *See id.* § 122.44(d)(1)(vi)(C)(4).

[285] *See* 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611 ("EPA does not support any use of credits or trading activity that would cause an impairment of existing or designated uses, adversely affect water quality at an intake for drinking water supply or that would exceed a cap established under a TMDL."); 40 C.F.R. §§ 122.4(a), (d) (2013).

[286] 40 C.F.R. § 122.4(d) (2013).

[287] *Id.* § 122.4(a).

TMDL. However, there are a few important distinctions between the TMDL and outside-of-TMDL contexts related to anti-backsliding and provisions in 40 C.F.R. § 122.

A. Anti-Backsliding Compliance

Point sources wishing to participate in water quality trading outside of a TMDL must also comply with the relevant "anti-backsliding" provisions of the CWA. This means that once an entity has achieved a particular effluent limitation—technological (TBEL) or water quality based (WQBEL)—future permit iterations cannot be renewed, reissued, or modified to contain less stringent limits, unless either a section 402(o)(2) exception applies or section 303(d)(4) is met.[288] In an outside-of-TMDL context, only the section 402(o)(2) exceptions apply.[289]

Allowing a facility to meet its WQBEL via trading does not necessarily constitute a revised effluent limitation in the outside-of-TMDL context if the facility is still responsible for the same level of pollution reduction.[290] Therefore, if a facility not covered by a TMDL meets its WQBEL through the purchase of credits, and the facility remains responsible for the same level of pollutant reduction, the 2007 U.S. EPA Trading Toolkit suggests that trading does not necessarily constitute a less stringent effluent limitation, even if the facility itself has a larger actual discharge at its pipe.[291]

B. Compliance with Provisions in 40 C.F.R. § 122

If there is no TMDL, point sources must address the "cause or contribute" provisions in the federal regulations prior to engaging in trading. Under this provision, new sources or new dischargers cannot be issued a permit if the discharge from construction or operation will "cause or contribute" to a violation of water quality standards.[292] In order to make this showing, the permit writer must determine that permit limits are sufficient to control all pollutants that are or may be discharged at levels that would "cause, have the reasonable

---

[288] 33 U.S.C. § 1342(o)(1); 40 C.F.R. § 122.44(l) (2013). "EPA has consistently interpreted CWA 402(o)(1) to allow relaxation of WQBELs if the relaxation is consistent with the provisions of CWA section 303(d)(4) or if one of the exceptions in CWA 402(o)(2) is met." U.S. EPA NPDES Permit Writers' Manual, at § 7.2.1.3.

[289] The relevant 402(o)(2) exceptions are 1) material and substantial alterations occurred after permit issuance and a less stringent limitation is appropriate; 2) new information arose that was not available at the time of the permit, or there was a mistake in the permit, and this different information would have justified less stringent limitations; 3) occurrence of an un-remediable event outside the permittee's control; 4) the permittee received a permit modification; and 5) the permittee installed the controls necessary to meet effluent limitations, and properly operated/maintained the facility, but was unable to achieve the pervious effluent limitation, thus making the new effluent limitation the level of pollutant control actually achieved. *Id.* § 1342(o)(2)(A)–(E); 40 C.F.R. § 122.44(l) (2013).

[290] *See* 2007 U.S. EPA Trading Toolkit, at 21; 2003 U.S. EPA Trading Policy, 68 Fed. Reg. at 1611.

[291] *See* 2007 U.S. EPA Trading Toolkit, at 21.

[292] 40 C.F.R. § 122.4(i) (2013).

potential to cause, or contribute" to violations of water quality standards.[293] None of EPA's regulations define "cause or contribute." Therefore, it is unclear whether every discharge necessarily "causes or contributes" to a violation of water quality standards, and recent case law interpreting this provision has not provided clarity.[294] Water quality agencies should consider this uncertainty when developing permits, trading programs, rules, and/or guidance.

V. Conclusion

As discussed in the first four sections of this appendix document, water quality trading is allowable so long as it complies with the relevant CWA provisions and implementing regulations, and is bracketed by sufficient safeguards to ensure compliance with water quality standards. However, actual water quality trades must be designed to ensure that all regulatory requirements are met in individual cases. This may require a case-by-case review of trading. Sections 1–11 of this Draft Recommendations document provides the necessary safeguards to determine trade eligibility, verification, tracking, and monitoring so as to comply with and attain water quality standards.

[293] *Id.* § 122.44(d)(1).

[294] *See, e.g.,* Friends of Pinto Creek v. U.S. EPA, 504 F.3d 1007 (9th Cir. 2007), *cert. denied*, 129 S.Ct. 896 (2009); *In re* Cities of Annandale and Maple Lake, 31 N.W. 2d 502 (Minn. 2007); Assateague Coastkeeper v. Maryland Dep't of the Env't, 28 A.3d 178, 180 (Md. Ct. Spec. App. 2011).

VIII. Appendix C. Sources Cited

This appendix lists all of the sources cited in this Draft Recommendations document, divided according to the type of source:

Federal Statutes

- Columbia River Gorge National Scenic Area Act, 16 U.S.C. §§ 544–544p (2012)
- Federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1387 (2012)
- 5 U.S.C. § 552 (2012)
- 42 U.S.C. § 7651b (2012)
- 42 U.S.C. § 9601 (2012)
- 42 U.S.C. § 9607 (2012)

State Statutes

- CAL. WATER CODE § 13260 (2014)
- FLA. STAT. § 403.067 (2013)
- OR. REV. STAT. § 192.502 (2013)
- PA. CODE § 96.8 (2014)
- WASH. REV. CODE § 90.48.080 (2014)
- WISC. STAT. § 283.84 (2014)

Cases

- PUD No. 1 of Jefferson Cnty. v. Washington Dep't of Ecology, 511 U.S. 700 (1994)
- Friends of Pinto Creek v. U.S. EPA, 504 F.3d 1007 (9th Cir. 2007), *cert. denied*, 129 S.Ct. 896 (2009)
- Pronsolino v. Nastri, 291 F.3d 1123 (9th Cir. 2002)
- Nat'l Park & Conservation Ass'n v. Stanton, 54 F.Supp.2d 7 (D.D.C. 1999)
- Longview Fibre Co. v. Rasmussen, 980 F.2d 1307 (9th Cir. 1992)
- Am. Farm Bureau Fed'n v. U.S. EPA, No. 1:11–CV–0067, 2013 WL 5177530 (M.D. Pa. Sept. 13, 2013)
- Nw. Envtl. Def. Ctr. v. Oregon DEQ, No. 9905-05144, 2000 WL 35562955 (D. Or. Oct. 19, 2000)
- Lemire v. Washington, 178 Wash.2d 227 (Wash. 2013)
- *In re* Cities of Annandale and Maple Lakes NPDES/SDS Permit Issuance, 731 N.W.2d 502 (Minn. 2007)
- Assateague Coastkeeper v. Maryland Dep't of the Evn't, 28 A.3d 178 (Md. Ct. Spec. App. 2011)

Federal Agency Documents

- Nat'l Resources Conservation Serv., Conservation Practice Standard: Nutrient Management, Code 590 (Jan. 2012), *available at* http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046896.pdf
- U.S. Dep't of Interior, Adaptive Management: The U.S. Department of the Interior Technical Guide (2007, updated 2009), *available at* http://www.usgs.gov/sdc/doc/DOI-%20Adaptive%20ManagementTechGuide.pdf
- U.S. EPA, Chesapeake Bay Program Office, Phase 5.3 Community Watershed Model, EPA 903S10002 – CBP/TRS-303-10 (Dec. 2010), *available at* http://www.chesapeakebay.net/about/programs/modeling/53

- U.S. EPA, Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment (2010), *available at* http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html
- U.S. EPA, State Program Status (Apr. 14, 2003), *available at* http://cfpub2.epa.gov/npdes/statestats.cfm
- U.S. EPA, Multimedia Strategy for Priority Persistent, Bioaccumulative & Toxic (PBT) Chemicals (Apr. 18, 2011), *available at* http://www.epa.gov/pbt/pubs/fact.htm
- U.S. EPA, Nonpoint Source Program & Grants Guidelines for States & Territories (Apr. 12, 2013), *available at* http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf
- U.S. EPA, NPDES Permit Writers' Manual, EPA-833-K-10-001 (Sept. 2010), *available at* http://www.epa.gov/npdes/pubs/pwm_2010.pdf
- U.S. EPA, Office of Wastewater Mgmt., Water Permitting 101, *available at* http://www.epa.gov/npdes/pubs/101pape.pdf
- U.S. EPA, Quality Management Tools – QA Project Plans (Apr. 29, 2011), *available at* http://www.epa.gov/QUALITY/qapps.html
- U.S. EPA, Technical Memorandum: Components of Credit Calculation (May 14, 2014), *available* http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/TradingTMs/CreditCalculationTM_FINAL_5_14_14.pdf
- U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608 (Jan. 13, 2003), *available at* http://www.gpo.gov/fdsys/pkg/FR-2003-01-13/pdf/03-620.pdf
- U.S. EPA, Water Quality Standards Handbook - Ch. 1: General Provisions, 40 C.F.R. § 131— Subpart A (Sept. 15, 1993), *available at* http://water.epa.gov/scitech/swguidance/standards/handbook/chapter01.cfm
- U.S. EPA, Water Quality Trading Toolkit for Permit Writers*,* 30–31, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.
- U.S. Fish & Wildlife Service, et al., 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 (Jan. 4, 2008), *available at* http://www.fws.gov/oregonfwo/LandAndWater/Documents/PublicFunding-final.pdf
- U.S. Fish & Wildlife Service, et al., Van Vleck Ranch Mitigation Bank Enabling Instrument (Mar. 2009), *available at* https://rsgisias.crrel.usace.army.mil/ribits/f?p=107:16:9983804408263::NO::P16_DOCUMENT_ID:11263

State Documents

- Alpine Cheese Co., et al., Alpine Cheese Phosphorous Nutrient Trading Plan (Jan. 1, 2006, expired 2011), *available at* http://www.epa.ohio.gov/Portals/35/wq_trading/alpine%20cheese%20trading%20plan%201%201%2006.pdf
- California Reg'l Water Quality Control Bd., San Diego Region, Resolution No. R9-2005-0019 (Feb. 9, 2005), *available at* http://www.waterboards.ca.gov/sandiego/water_issues/programs/watershed/docs/swu/shelter_island/2005_0019.pdf
- Colorado Dep't of Pub. Health & Env't, Water Quality Control Div., Colorado Pollutant Trading Policy (Oct. 2004), *available at* http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-

Type&blobheadervalue1=inline%3B+filename%3D%22Policy.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251949264999&ssbinary=true

- Connecticut Dep't of Envtl. Prot., Connecticut's Nitrogen Credit Exchange – An Incentive-based Water Quality Trading Program (Mar. 2010), *available at* http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/water_quality_trading_summary_2010.pdf
- Florida Dep't of Envtl. Prot., Water Quality Credit Trading: A Report to the Governor and Legislature (Dec. 2006), *available at* http://www.dep.state.fl.us/water/Watersheds/docs/WQ_CreditTradingReport_final_December2006.pdf
- Idaho Dep't of Envtl. Quality, Water Quality Pollutant Trading Guidance (July 2010), *available at* http://www.deq.idaho.gov/media/488798-water_quality_pollutant_trading_guidance_0710.pdf
- Maryland Dep't of the Env't, Water Mgmt. Admin., Maryland Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed (Apr. 17, 2008), *available at* http://www.mde.maryland.gov/programs/Water/Documents/www.mde.state.md.us/assets/document/NutrientCap_Trading_Policy.pdf
- Maryland Dep't of Agric., Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed: Phase II – A Guidelines for the Generation of Agricultural Nonpoint Nutrient Credits (draft 2008), *available at* http://www.mdnutrienttrading.com/docs/Phase%20II-A_Crdt%20Generation.pdf
- Miami Conservancy Dist., Water Conservation Subdist., Great Miami River Watershed Water Quality Credit Trading Program: Operations Manual (Feb. 8, 2005), *available at* http://www.miamiconservancy.org/water/documents/TradingProgramOperationManualFeb8b2005secondversion.pdf
- Minnesota Pollution Control Agency, Pre-TMDL Phosphorous Trading Permitting Strategy (Dec. 18, 2013), *available at* http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/tmdl-projects/special-projects/pre-tmdl-phosphorus-trading.html
- Montana Dep't of Envtl. Quality, Response to Comments on Montana's Draft Policy on Nutrient Trading (Oct. 28, 2011), *available at* http://deq.mt.gov/wqinfo/NutrientWorkGroup/PDFs/DraftTradingPolicyRespComm10_11.pdf
- North Carolina Program Evaluation Div., Department of Environment and Natural Resources Mitigation Determinations: Special Report to the General Assembly, Rep. No. 2009-3 (Dec . 16, 2009), *available* http://www.ncleg.net/PED/Reports/documents/Wetlands/Wetland_Report.pdf
- Oregon Dep't of Envtl. Quality, Interim Management Directive: Compliance Schedules in NPDES Permits (2007, updated June 21, 2010), *available at* http://www.deq.state.or.us/wq/pubs/imds/ComplianceSchedule.pdf
- Oregon Dep't of Envtl. Quality, Internal Management Directive: Water Quality Trading in NPDES Permits (Dec. 2010, updated Aug. 2012), *available at* http://www.deq.state.or.us/wq/pubs/imds/wqtrading.pdf
- Virginia Dep't of Envtl. Quality, Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners, *available at* http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VANPSTradingManual_2-5-08.pdf
- Virginia State Water Control Bd., Fact Sheet: Modification of General VPDES Permit to Discharge to State Waters and State Certification Under the State Water Control Law (June 25, 2012),

available at http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VAN00FactSheet2012.pdf
- Washington Dep't of Ecology, Draft Trading Framework Paper for Review & Comment (Sept. 20, 2010), *available at* http://www.ecy.wa.gov/programs/wq/swqs/WQTradingGuidance_1010064.pdf
- Wisconsin Dep't of Natural Res., A Water Quality Trading How To Manual (Sept. 9, 2013), *available at* http://dnr.wi.gov/topic/surfacewater/documents/wqt_howto_9_9_2013signed.pdf
- Wisconsin Dep't of Natural Res., Guidance for Implementing Water Quality Trading in WPDES Permits (Aug. 21, 2013), *available at* http://dnr.wi.gov/topic/surfacewater/documents/WQT_guidance_Aug_21_2013signed.pdf

Federal Regulations

- 7 C.F.R. § 1410.63 (2013)
- 7 C.F.R. § 1466.36 (2013)
- 7 C.F.R. § 1467.20 (2013)
- 33 C.F.R. § 332.3 (2013)
- 40 C.F.R. § 2.208 (2013)
- 40 C.F.R. § 35.1605 (2013)
- 40 C.F.R. § 121.2 (2013)
- 40 C.F.R. pt. 122 (2013)
- 40 C.F.R. § 125.3 (2013)
- 40 C.F.R. pt. 130 (2013)
- 40 C.F.R. pt. 131 (2013)
- 40 C.F.R. § 133.02 (2013)
- 40 C.F.R. § 230.93 (2013)
- 40 C.F.R. § 312.11 (2013)
- 40 C.F.R. pts. 405–99 (2013)

State Regulations

- CAL. CODE REGS., tit. 17, § 95802 (2013)
- CAL. CODE REGS., tit. 17, § 95820 (2013)
- CAL. CODE REGS., tit. 17 § 95986 (2013)
- IDAHO ADMIN. C. r. 58.01.02.060 (2013)
- OR. ADMIN. R. 629-640-0000 (2013)
- OR. ADMIN. R. 340-041-0053 (2013)
- OR. ADMIN. R. 340-041-0061 (2013)
- OR. ADMIN. R. 340-071-0650 (2013)
- WASH. ADMIN. C. § 173-201A-400 (2013)

Permits

- MINNesota Pollution Control Agency, Permit No. MN003191: Rahr Malting Company NPDES Permit (Draft 2012), *available at* http://www.pca.state.mn.us/index.php?option=com_k2&id=715_1248a1315a91e0ead67f851640883724&task=download&view=item
- Minnesota Pollution Control Agency, Permit No. MN0040665: Southern Minnesota Beet Sugar Cooperative NPDES Permit (expired 2004)

- Oregon Dep't of Envtl. Quality, Permit No. 100985: City of Medford NPDES Waste Discharge Permit (issued Dec. 13, 2011), a*vailable at* http://www.deq.state.or.us/wqpr/4066_A120111074541933405 2.PDF

Communications

- Amended & Restated Delegation Agreement Between North American Electric Reliability Corporation & Western Electricity Coordinating Council (2011, FERC approved Mar. 1, 2012), *available at* https://www.wecc.biz/compliance/United_States/Documents/Complete%20Revised%20WECC%20Delegation%20Agreement%20with%20Exhibits.pdf
- Letter from Michael H. Shapiro, EPA Deputy Asst. Administrator, to Ann Alexander, Natural Resource Defense Council (Dec. 12, 2012), *available at* http://www.epa.gov/npdes/pubs/ow_shapiro_nrdcpetition.pdf
- Letter from Pam Inmann, Exec. Director of Western Governors' Association, to Ronald Nunnally, Chairman of the Western Electricity Coordinating Council (July 19, 2004), *available at* http://www.wecc.biz/committees/BOD/072904/Lists/Agendas/1/0704_WREGIS_Agenda_Item_VII.pdf
- 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
- Memorandum from James A. Hanlon, Director Office of Wastewater Management, to Joe Capacasa, Director, Water Permits Division EPA Region 3, *Annual Permit Limits for Nitrogen and Phosphorus for Permits Designed to Protect Chesapeake Bay and its tidal tributaries from Excess Nutrient Loading under the National Pollutant Discharge Elimination System* (Mar. 3, 2004), *available at* http://www.epa.gov/reg3wapd/npdes/pdf/ches_bay_nutrients_hanlon.pdf
- Memorandum from Robert H. Wayland, Director, EPA Office of Wetlands, Oceans and Watersheds, to EPA Regional Directors, *2002 Integrated Water Quality Monitoring and Assessment Report Guidance* (Nov. 19, 2001), *available at* http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/2002wqma.cfm
- Memorandum from Steven A. Herman, Assistant Administrator, U.S. EPA, to Regional Administrators, *Issuance of Final Supplemental Environmental Projects Policy* (Apr. 10, 1998), *available at* http://water.epa.gov/lawsregs/guidance/sdwa/upload/wsg_105.pdf

Secondary Sources

- CLIMATE ACTION RESERVE, NITROGEN MANAGEMENT: PROJECT PROTOCOL V. 1.1 (2013), *available at* http://www.climateactionreserve.org/how/protocols/nitrogen-management
- E. BRANOSKY, ET AL., WORLD RES. INST., COMPARISON TABLES OF STATE NUTRIENT TRADING PROGRAMS IN THE CHESAPEAKE BAY WATERSHED (2011), *available at* http://pdf.wri.org/factsheets/comparison_tables_of_state_chesapeake_bay_nutrient_trading_programs.pdf
- ELEC. POWER RESEARCH INST., CASE STUDIES OF WATER QUALITY TRADING BEING USED FOR COMPLIANCE WITH NPDES PERMIT LIMITS (2013), *available at* http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002001454
- ELEC. POWER RESEARCH INST., PILOT TRADING PLAN 1.0 FOR THE OHIO RIVER BASIN INTERSTATE WATER QUALITY TRADING PROJECT (2009), *available a* http://wqt.epri.com/pdf/ORB%20Trading%20Plan%208-1-12%20final.pdf

- ROSS & ASSOCS. ENVTL. CONSULTING, LTD., LOWER BOISE RIVER EFFLUENT TRADING DEMONSTRATION PROJECT: SUMMARY OF PARTICIPANT RECOMMENDATIONS FOR A TRADING FRAMEWORK (2000), *available at* http://www.deq.idaho.gov/media/489512-boise_river_lower_effluent_report.pdf
- WESTERN ELECTRIC OPERATING COUNCIL, WREGIS OPERATING RULES (2013), *available at* http://www.wecc.biz/WREGIS/Documents/WREGIS%20Operating%20Rules.pdf
- WILLAMETTE PARTNERSHIP, DRAFT GENERAL CREDITING PROTOCOL ADDENDUM: RIPARIAN PLANTING STANDARDS (2011), *available at* http://willamettepartnership.org/tools-templates/Draft%20Addendum%20Riparian%20Planting_2011.pdf
- WILLAMETTE PARTNERSHIP, ECOSYSTEM CREDIT ACCOUNTING SYSTEM: GENERAL CREDITING PROTOCOL V. 2.0 (2013)*, available at* http://willamettepartnership.org/news-and-publications/General%20Crediting%20Protocol%20v2.0_2013%2011%2001_Final.pdf
- WILLAMETTE PARTNERSHIP, ECOSYSTEM CREDIT ACCOUNTING—PILOT GENERAL CREDIT PROTOCOL: WILLAMETTE BASIN V. 1.1 (2009) *available at* http://willamettepartnership.org/General%20Crediting%20Protocol%201.1.pdf
- WILLAMETTE PARTNERSHIP, ET AL., PART II—IN IT TOGETHER: A HOW-TO REFERENCE FOR BUILDING POINT-NONPOINT WATER QUALITY TRADING PROGRAMS (2012), *available at* http://willamettepartnership.org/in-it-together

Periodicals

- 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
- Dan Kane, *EBX is Paid Twice for Wetlands Work*, NEWS OBSERVER (2009), *available at* http://www.newsobserver.com/2009/12/08/230607/ebx-is-paid-twice-for-wetlands.html
- David Cooley & Lydia Olander, *Stacking Ecosystem Service Payments: Risks and Solutions*, 42 ENVTL. L. REP. NEWS & ANALYSIS 10150 (2012), *available at* http://nicholasinstitute.duke.edu/sites/default/files/publications/stacking-ecosystem-services-payments-paper.pdf
- Jessica Fox & Royal C. Gardner, *The Legal Status of Environmental Credit Stacking*, 40 ECOLOGY L.Q. 101 (2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2375858
- Jessica Fox, Royal Gardner & Todd Maki, *Stacking Opportunities and Risks in Environmental Credit Markets*, 41 ENVTL. L. REP. 10122 (2011), *available at* http://wqt.epri.com/pdf/credit-stacking-environmental-opportunities-and-risks.pdf
- M. D. Tomer & 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 SCI. & TECH. 300 (2011), *available at* http://naldc.nal.usda.gov/download/49869/PDF

Internet

- EPRI, CREDIT TRADING REGISTRY, http://mer.markit.com/br-reg/public/orb/index.jsp?s=cp (Retrieved Oct. 2, 2013)