State of Oregon
Department of Environmental Quality Memorandum

Date: Aug. 15, 2014

To: Environmental Quality Commission

From: Dick Pedersen, Director Dugg K. Caldera for

Subject: Agenda item J: Tour of Rogue Basin water quality-related sites
Aug. 27-28, 2014, EQC meeting

Background

Commissioners and some DEQ staff will tour two sites in the Medford area. This tour is organized to give the commissioners an opportunity to learn more about the practice of water quality credit trading in the Rogue Basin.

The commission will hear from DEQ water quality staff and representatives of the Medford Regional Water Reclamation Facility, the Freshwater Trust and the Oregon Association of Clean Water Agencies. Following a short informational presentation from these parties, the commissioners, project partners and staff will visit the facility and related streamside planting location

Next steps and commission involvement

The tour is informational, and there is no commission action associated with the tour.

Attachments

A. Medford restoration program overview
B. Map: Riparian planting sites
C. Long-term riparian monitoring sites
D. Discussion draft: Executive summary of water quality tradition recommendations in the Pacific Northwest

Report prepared by Stephanie Caldera

ROGUE RIVER BASIN

The Freshwater Trust

Riparian Restoration Program

In partnership with City of Medford

Thermal wastewater compliance with temperature credits generated by streamside shade actions

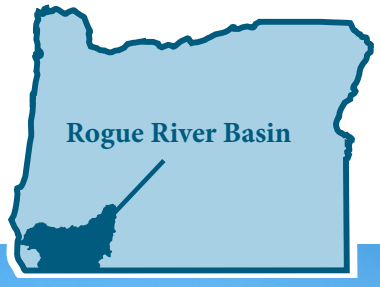
Due to projected population growth and an increase in discharge volume of treated wastewater, the City of Medford's wastewater treatment facility faced a potential exceedance of thermal load when renewing its NPDES permit. The plant handles 17 mgd typically and up to more than 100 mgd during storm events.

To address the higher temperature load of its discharge (which has minimal impacts to the mainstem Rogue where the outfall is located), the City of Medford entered into an agreement in 2011 to offset the temperature exceedance through a state-regulator-approved water quality trading program.

Under a water quality trading program, streamside plantings in the Rogue River basin provide shade to prevent stream/river warming and provide landowners an opportunity for additional revenue.

The offset credit contract directs The Freshwater Trust to plant and maintain 10-15 miles of streamside vegetation on the Rogue River and its tributaries to reduce the solar load on the water over time and protect critical spawning habitat for salmon.

In return, Medford's Regional Water Reclamation Facility achieves temperature compliance with regulators. This $6.5-million habitat restoration solution proved more cost-effective for the city when compared to the estimated $16-million facility upgrades, and a majority of that investment remains in the community as monitoring and maintenance continues for 20 years.



At a Glance: Medford Temperature Trading Program

Options:

- Holding pond to store treated water for 1 month of the year: **$16 Million**
- 10-15 miles of native riparian vegetation planted and maintained for 20 years: **$6.5 Million**

Riparian Shade Generates Credits:

- **262 million kilocalories/day** blocked by vegetation at critical spawning time of mid-October (current progress)
- **600 million kilocalories/day** will be blocked by vegetation at maturity—a 2:1 trading ratio for projected exceedance of 300 million kcals/day in 10 years

Current Progress:

Site	Planting Year	Acreage	Mileage	Phosphorus Reduction (lbs/yr)	Nitrogen Reduction (lbs/yr)	Sediment Reduction (lbs/yr)	Solar Load Avoided (kcal/day)
Rogue RM 128	2012	3.40	0.31	0	0.5	13.6	69,073,622
Applegate RM 28.5	2013	4.70	0.56	24.4	121.1	40,117	41,809,600
Applegate RM 29.5	2013	2.60	0.30	0.4	3.8	1,249	23,572,100
Applegate RM 30	2013	2.40	0.31	0.4	3.7	808	56,921,925
Little Butte RM 8.5	2014	2.77	0.57	*	*	*	21,412,533
Rogue RM 95	fall 2014	3.00**	0.71**	*	*	*	49,297,459**
Total		**18.87**	**2.76**				**262,087,239**

** not modeled yet* ***projected*

Ancillary Benefits:

In addition to the main environmental benefits of restoring streamside vegetation and reducing solar load, the restoration solution also results in:

- Less energy consumption than gray infrastructure upgrades
- Reduced streambank erosion and silting
- Improved habitat for Chinook salmon and steelhead

Economic Impact:

- Money pays local restoration contractors and services
- Farmers/landowners receive annual lease payments
- 20 jobs per $1 Million spent on restoration

Services Provided:

To create a compliance-grade program, The Freshwater Trust provided consulting services to Medford, including:

- Quantification of benefits of habitat restoration
- Trading program design and administration
- Site analysis and modeling
- Landowner outreach and contract negotiations
- Project financing and financial liability
- Liaison with regulator, consulting engineer, and permit holder
- Permit review and submittal
- Credits application and third-party verification
- Long-term monitoring of sites

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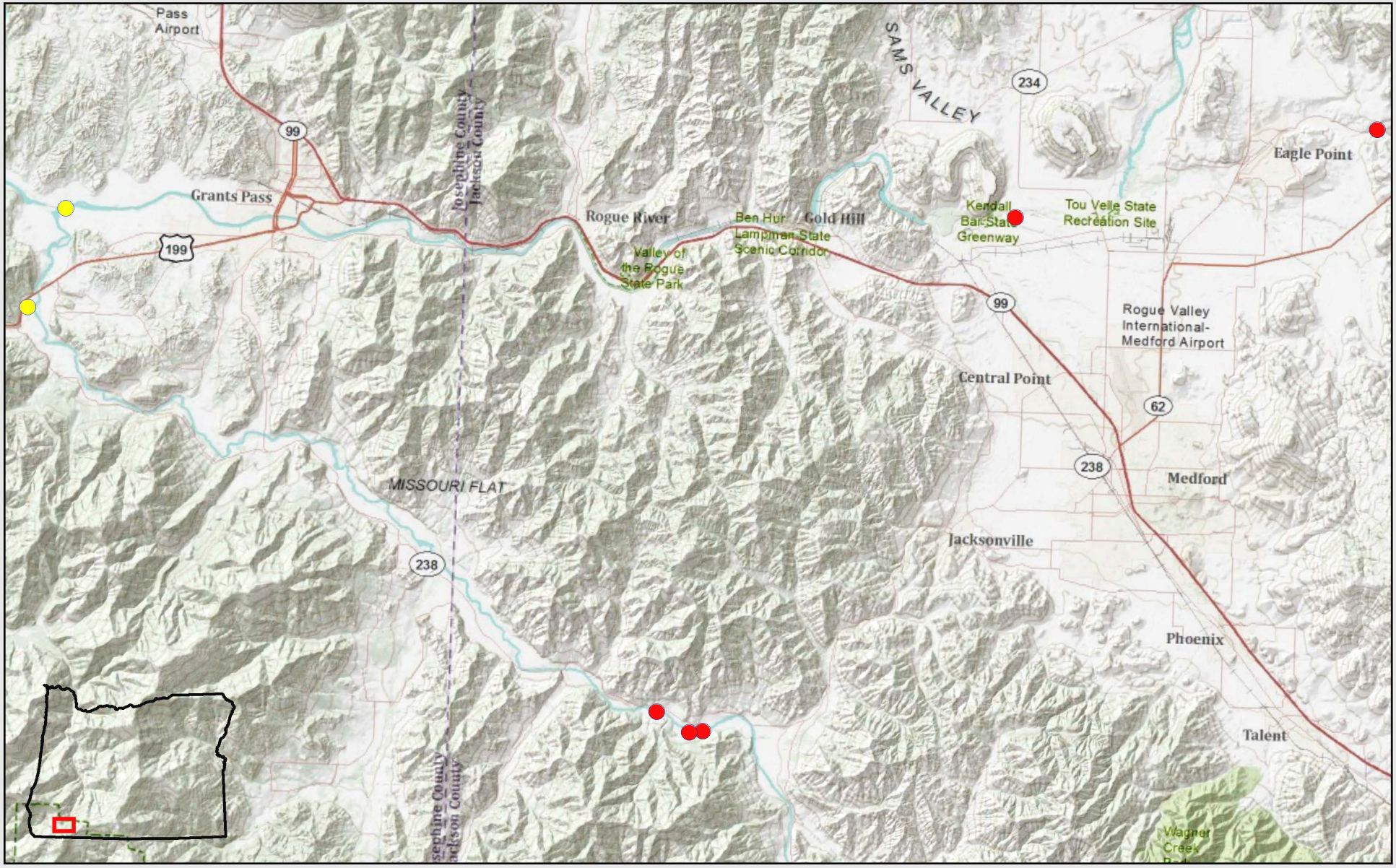
The Freshwater Trust

City of Medford Riparian Restoration Sites
August 2014



- Agreement signed
- Implemented & Verified

0 5 10 Miles

1 inch equals 20,000 feet

Coordinate System: NAD 1983 Oregon Statewide Lambert
Projection: Lambert Conformal ConicNorth American 1983

Item J 000004

Date: 8/15/2014

The Freshwater Trust®
Changing the course of conservation.

The Freshwater Trust is a 501(c)(3) Oregon-based not-for-profit organization that actively works to preserve and restore our freshwater ecosystems.

Long-term Monitoring of Riparian Restoration Sites

Riparian planting projects at sites in Oregon are designed and implemented to create water quality trading or conservation credits. After planting, the sites must continue to conform to strict standards in order for the credits to remain valid. Many sites are monitored from five to 20 years to ensure performance.

The projects' early years are crucial for the vegetation to get established and survive weeds, browsers, and drought or floods. Annual site surveys demonstrate that all sites continue to successfully meet the performance standards and create the intended ecological benefits, including reduced solar load on waterways, improved salmon habitat and reduced erosion and run-off.

Site Survey: Little Butte Creek at Denman Wildlife Refuge

Pre-Project Conditions | As Built | Year 2

Data collected at each site helps to build robust, repeatable protocols for trading programs, including:

- Planting, irrigation, and weed control methods that have the best cost-benefit ratio
- Tree and shrub species that do well under different soil and hydrology conditions and browser influence
- Optimal threshold for weed control
- Good seed mixes that result in better weed control and more native herb cover
- How a planted riparian forest develops over time

Little Butte RM 0.5: 2 growing seasons since planting

Measurement/Metric	Site Survey	Meets Standard
Native woody stem density	2,044 stems/acre	✓
Proportion native tree stems	52.4%	✓
Proportion native shrub and vine stems	47.6%	✓
Number of native woody species	17	✓
Percent cover of invasive woody species	0.2%	✓
Percent cover of invasive herbaceous species	4.1%	✓
	14,519,667 kilocalories per day	

Rogue RM 128: 1 growing season since planting

Measurement/Metric	Site Survey	Meets Standard
Native woody stem density	2,617 stems/acre	✓
Proportion native tree stems	48.1%	✓
Proportion native shrub and vine stems	51.9%	✓
Number of native woody species	27	✓
Percent cover of invasive woody species	5.5%	✓
Percent cover of invasive herbaceous species	0.8%	✓
	69,073,622 kilocalories per day	

Mill Race RM 2: 1 growing season since planting

Measurement/Metric	Site Survey	Meets Standard
Native woody stem density	1,569 stems/acre	Interplanting planned for 2014
Proportion native tree stems	45.6%	✓
Proportion native shrub and vine stems	54.4%	✓
Number of native woody species	15	✓
Percent cover of invasive woody species	1.7%	✓
Percent cover of invasive herbaceous species	18.1%	Control efforts continued for 2014
	2,452,618 kilocalories per day	

Lewis and Clark RM 9: 1 growing season since planting

Measurement/Metric	Site Survey	Meets Standard
Native woody stem density	1,665 stems/acre	✓
Proportion native tree stems	26.6%	✓
Proportion native shrub and vine stems	73.4%	✓
Number of native woody species	15	✓
Percent cover of invasive woody species	0.1%	✓
Percent cover of invasive herbaceous species	12.4%	✓
	18,529,251 kilocalories per day	

Middle Fork John Day RM 50: 1 growing season since planting

Measurement/Metric	Site Survey	Meets Standard
Native woody stem density	5,185 stems/acre	✓
Proportion native tree stems	7.0%	✓
Proportion native shrub and vine stems	93.6%	✓
Number of native woody species	15	✓
Percent cover of invasive woody species	0%	✓
Percent cover of invasive herbaceous species	8.8%	✓
	8,926,869 kilocalories per day	

EXECUTIVE SUMMARY

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

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.

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[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.

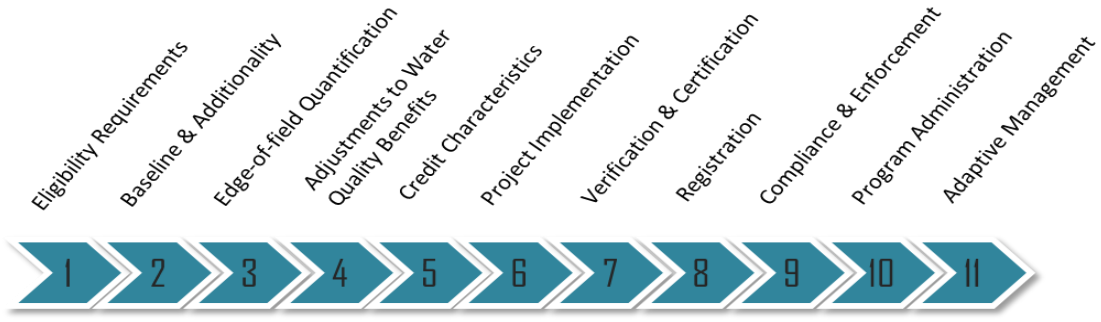
[2] *See* U.S. EPA, Water Quality Trading Toolkit for Permit Writers*,* 30–31, EPA 833-R-07-004 (Aug. 2007, updated June 2009), *available at* http://www.epa.gov/npdes/pubs/wqtradingtoolkit.pdf.

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.

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[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

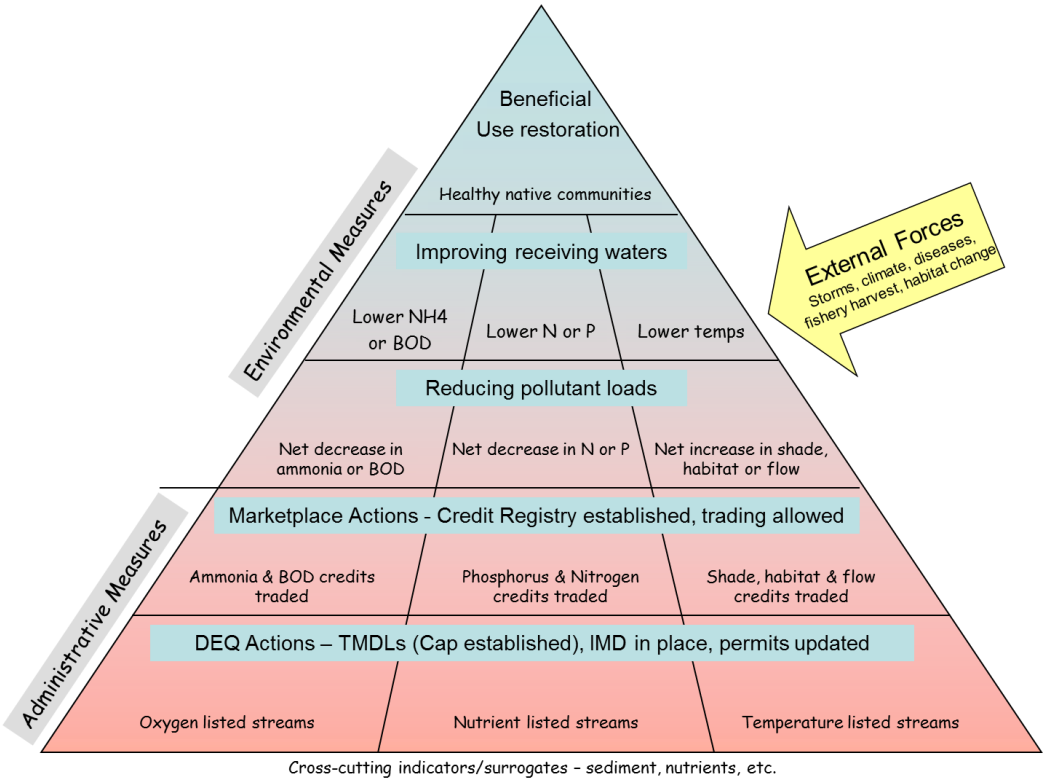
Current water quality challenges require flexible, innovative approaches that can be quickly adjusted and improved. In order to accelerate water quality improvements, it is important to move forward with the best information currently available and to test the assumptions underlying the current actions 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:

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