BEST PRACTICES FOR WATER QUALITY TRADING JOINT REGIONAL AGREEMENT

Discussion Guide, June 5-6th, 2013

This Discussion Guide is intended to provide definitions, context, analysis, and options for addressing various components of water quality trading programs. It poses questions that will be discussed at the interagency workshops. This document may reference other trading programs, examples, or documents, but is not intended to serve as a published report or white paper and thus will not be extensively cited. This document will be included in the workshop packet and posted online following each workshop.

2. Overall Trading Program Requirements

This section describes some of the most fundamental design components for a trading program. From trading ratios to reserves, and from baseline to other additionality requirements, these elements provide a foundational part of a solid trading program. Considerations and options are presented for the following components, numbered corresponding to the organization of the Tier 2 draft outline:

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2.1 Trading ratios

Trading ratios are discount factors, generally applied to the total potential pollution reduction from a nonpoint source project to account for various factors. Trading ratios can help account for watershed processes, risk, and uncertainty. These factors often include uncertainty—both in terms of measurement error and project performance, attenuation of pollution from the nonpoint source to some downstream point of compliance (esp. for nutrients), ensuring environmental benefit, or ensuring equivalency across types of pollutants. This portion of the options memo draws heavily from U.S. EPA's Permit Writer's Toolkit (pp. 30-33) and includes excerpts from Willamette Partnership's *In It Together* (Vol 2, pp. 35):

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Delivery or location ratios: Account for the change in pollutant quantity and form as it moves from a point upstream to a further point downstream. Delivery ratios can also account for movement of pollutants from the edge of a field into the stream. Delivery ratios are sometimes included in models (e.g. the Chesapeake Bay Watershed Model), and are reflected in credit calculations themselves (e.g. Nutrient Net as applied in the Chesapeake). Delivery ratios usually incentivize action closer to the point of discharge. This may not always be appropriate. For example, Idaho's Lower Boise River program wanted to incentivize nutrient

reductions near the mouth of the river where they were needed most, while delivery ratios in the Lower Boise gave more credit for reductions further away from buyers. [redacted]

Equivalency ratios: These ratios adjust for trading in different forms of the same pollutant. For example, a point source may discharge nutrients in a form that is biologically available—algae can use it quickly to bloom, but nonpoint sources may reduce less biologically available forms of nutrients. Equivalency ratios can also account for cross-pollutant trades. For example, reducing a pound of phosphorus on farms might equal ten pounds of nitrogen discharged from a wastewater facility.

Uncertainty or Reserve ratios: There are a lot of unknowns in trading. Uncertainty ratios can help account for measurement uncertainty and implementation uncertainty as better science becomes available. Measurement uncertainty accounts for errors in credit calculation methods. Implementation uncertainty accounts for potential project failure, both from best management practices (BMPs) not performing as anticipated and from unanticipated events such as a flood knocking out filter strips. A portion of credits can be held in "reserve" to account for these failures. The Ohio River program requires that all projects reserve 10% of all credits sold to account for uncertainty and project failures. Sometimes, different BMPs may have different uncertainty ratios.

Retirement ratios: Retirement ratios can help trading create a net water quality benefit. For example, they can ensure that for every pound of sediment discharged into a stream, at least 2-4 pounds of sediment are removed. Retirement ratios can also be used to incentivize projects that deliver environmental benefits beyond water quality (e.g. a lower ratio for BMPs that provide habitat benefits in addition to nitrogen reductions). [redacted]

The different factors above can be merged together in a single ratio or kept separate. Keeping ratios separate may allow programs to better optimize project location and design to reduce risk, and more easily fold in new information on actual risk. As a final caution, trading ratios can be a significant factor in credit cost and should be developed carefully.

Ratios should be based in science. If watershed goals, economic feasibility, and appropriate levels of risk need to be considered, they are included in trading ratio decisions carefully and thoughtfully. Setting ratios too high reduces potential cost savings for point sources, but setting them too low places undue risk on the environment.

I. Options and examples

What documentation does there need to be to justify trading ratios?

Mathematically, trading ratios have an enormous impact on the quantity of credits available for sale, yet for trading programs around the country, there is often little documentation about how they are developed. How can trading programs better document the selection of a trading ratio, and where should that documentation lie? Should it be in the total maximum daily load (TMDL), trading plan attached to a permit, statewide policy, or multiple places?

What is the right scale at which to set trading ratios?

Some programs set trading ratios programmatically (e.g. a 2:1 ratio or a 3:1 ratio) or even at a statewide level. Others, particularly those attenuating pollution, use a set of standard factors to determine a ratio for each transaction.

Option A	Option B
Use standard factors to determine a ratio for each transaction. **Pros and Cons** The advantage of unique trading ratios based on a standard approach is the ability to address some of the unique risk and uncertainty factors for each trade without investing as much time and resources into every transaction. The biggest disadvantage is that this approach also creates uncertainty for potential buyers and sellers of credits. Buyers may have a harder time predicting the amount and cost of potential supply. Credit suppliers will have a hard time figuring out the amount of credits they have until they identify a likely buyer. The Ohio Basin program has built software that allows both buyers and sellers to adjust quantities and prices based on unique trading ratios. The Klamath program did an analysis of research on attenuation between various zones of the watershed. These attenuation rates are proposed as the basis of trading ratios.	*Apply a single trading ratio across the watershed/trading area.* **Pros and Cons** This approach simplifies the application of trading ratios, and provides more predictability for buyers and sellers. A single trading ratio works well where pollution reductions anywhere in the watershed will have similar benefits to the overall water quality standards and other goals. However, this approach also reduces a program's ability to account for site-specific factors and variation in delivery/attenuation throughout the watershed.
	Option C *In cases where information is not available to determine ratios under Option A or B, use a ratio of 2:1 or greater applied across the trading area until a more detailed ratio can be developed.* **Pros and Cons** This approach simplifies the application of trading ratios even more, but is not supported by the rationale provided in either Option A or Option B.

Does a ratio always need to account for delivery, equivalency, uncertainty, and retirement?

In some watersheds and for some pollutants, a state water quality agency and/or stakeholders may choose to adjust a ratio for several reasons. Delivery ratios may not be included if water quality improvements need to be focused in upper reaches to meet water quality standards. Equivalency ratios may not be applicable in some trading scenarios. But should there always be some accounting for uncertainty and retirement? Applying a retirement ratio might also be used to help address baseline pollution reduction requirements for nonpoint sources. Exemption 5: Deliberative Exemption 5: Deliberative

Option A	Option B
The documentation justifying a ratio should consider and record decisions for all four types of ratios.	*Only document ratios that were built into the final program design*

II. Recommended default: Ratios should be based in science. If watershed goals, economic feasibility, and appropriate levels of risk need to be considered, they are included in trading ratio decisions carefully and thoughtfully, and documented in a transparent manner. Trading ratios can be applied as standard factors to individual transactions or combined together and applied as a single ratio for all transactions within a watershed. For either choice, decisions on ratios need to be documented to identify reasoning behind decisions for delivery/location, equivalency, uncertainty, and retirement ratios. Ratios should always be greater than 1:1 (e.g. for every unit of pollution discharged, there should be more than one unit reduced).

III. Reasons to deviate from the default: For more complex projects, state agencies may choose to adjust the trading ratio factors to account for increases in uncertainty, possibilities of significant environmental improvement, etc.

2.2 Reserve Pool

Several recent trading programs have established a reserve pool of credits to programmatically manage the risks stemming from uncertainty and project failure. In general, the reserve is built by applying a reserve/ retirement ratio to each credit project. A percentage of credits (via the ratio) from each transaction are then placed in a reserve managed by a trading program administrator. The reserve pool manager controls access to the reserve based on rules set forth in the trading program. Following are outstanding questions regarding reserve pools:

- Who manages the reserve pool (market administrator, state, point source entity)?
- Under what circumstances can a point source access credits from the reserve pool, when must they be purchased?
- How is the reserve repopulated over time?
- If the reserve gets too large, how are surplus credits dealt with?

The biggest advantage of a reserve is that it provides a mechanism for pooling and addressing risk of project performance across the entire program. Not all trading programs use a reserve, however. In some trading programs, NPDES permit holders are required to hold a minimum number of credits. If any of the projects associated with those credits fail, then they have a window of time to remedy that problem. As such, some NPDES permittees would rather "self-insure" by developing more projects than their requirements.

I. Options and examples

Option A *In permits, point sources are required to purchase credits and place them into a reserve pool.* **Pros and Cons** This option provides the greatest protection from programmatic risk of project failure. It builds a cushion of additional credits to help achieve water quality improvements and reduce the risk of non-compliance. There needs to be an entity managing the reserve, which means there will be some administrative costs. Anti-backsliding issues may arise if the obligation to create a reserve pool is inserted into the permit as it relates to meeting effluent limits.	**Option B** *Some publicly-funded projects are allowed to generate credits for the reserve.* Exemption 5: Deliberative Exemption 5: Deliberative **Pros and Cons** Some programs have discussed whether to allow Farm Bill-funded or other conservation projects to generate credits for the reserve. Hopefully these credits would never be used, but they might. The advantage is the ability to apply stewardship and verification standards to these projects. The disadvantage is that some may perceive that conservation dollars are being used to offset impacts and that "double dipping" is occurring. Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative Exemption 5: Deliberative
Option C *No mandatory reserve pool. Allow point sources to pay for/develop their own reserve pools as a voluntary risk mitigation measure.* **Pros and Cons** If a trading program or a specific NPDES permittee would like to have a reserve pool, they may use an	

additional ratio or keep an additional balance of credits voluntarily. This option provides flexibility, but is not likely to build a large reserve if permittees have a long window to remedy failed credit projects, and therefore little incentive to contribute to the reserve. Where projects take time to mature (e.g. riparian buffers for shade) remedying failed projects will not have the same environmental benefit as relying upon projects that are already in place through a reserve pool.

II. Recommended default: Option A - build a reserve/retirement ratio into every trading program. Trading programs may treat this ratio as a retirement ratio (cancelling all credits discounted by the ratio), or use it to populate a reserve account. If a reserve account is created, there need to be rules and oversight controlling use of that reserve account and who administers the account. Those rules need to include provisions for projects failing because it is the fault of the project developer and failure because of force majeure events, such as floods, fire, and drought. Reserve credits should only be accessed by projects within the same trading area.

III. Reasons to deviate from the default: There may be instances where states choose not to include a reserve/retirement ratio.

2.3 Regulatory baseline and 2.4. Additionality

All credit-producing activities must be "additional," which means they are above and beyond what is otherwise required or would have happened without trading. For water quality trading to be additional (and for the credits generated from a nonpoint source to be eligible), the nonpoint sources that provide credits must first meet any obligations they have to reduce pollution, also known as the "regulatory baseline." Setting these baselines is often one of the hardest parts of building a trading program, and is the focus of this section. Other eligibility requirements used to meet additionality standards for generating credits are discussed in the Discussion Guide for Section 4.

Regulatory baseline requirements are drawn from state and local laws, regulations and policies, and TMDLs. This memo discusses several aspects of how to set and express regulatory baselines for trading, and how baseline related to achieving water quality goals, including:

- How are Load Allocations (LAs) modeled and completed?
- How do load allocations relate to baseline requirements for trading?
- How are a TMDL's reasonable assurances defined for meeting LA goals?
- How do existing state laws and policies shape baseline requirements beyond what is in a TMDL?
- How is a baseline requirement expressed in trading program? And at what scale?
- What is business as usual at individual project sites?

In an effort to help the agencies address these questions, Willamette Partnership (WP) and The Freshwater Trust (TFT) reviewed the following temperature, nutrient, and sediment TMDLs in Idaho, Oregon, and Washington:

- *Temperature*: Idaho (South Fork Clearwater); Oregon (Rogue Basin); Washington (Snoqualmie)
- *Nutrients*: Idaho (Mid Snake); Washington (Spokane); California (Upper Yakima)
- *Sediment*: Idaho (Lower Boise); Oregon (Bear Creek); Washington (Upper Yakima)

This review highlighted the variation across states and watersheds in how TMDLs address baseline and LAs, as well as a few general trends regarding implementation plans and reasonable assurances. In each of the below sections, we have provided summaries specific to the pollutants studied as it relates to human use allowance allocation (where applicable), load allocations, reasonable assurances, and suggestions for tying all of these factors together.

2.3.1. Human Use Allowance (HUA), and TMDL LAs

In each TMDL, regulators give allocations (or small amounts of allowable pollution) to sources of the target pollutant. Point sources are given Waste Load Allocations (WLAs) and nonpoint sources are given LAs. LAs define the pollution targets that nonpoint sources are supposed to meet. It is important to understand how LAs are set to understand how trades can help achieve water quality goals and how to set baseline requirements. LAs need to be connected to a regulatory trading baseline, but there is not a clear, consistent approach for how to do this in current trading programs around the country. The options below discuss ways to make those connections.

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1. ***Temperature***

A. HUA & LAs to Nonpoint Sources in the HUA:

For temperature, all three states include a HUA in their water quality standards.

- **Oregon Example**: In Oregon, "[i]nsignificant additions of heat are authorized in waters that exceed the applicable temperature criteria an individual point source in a temperature impaired waterbody."[1] This HUA is equal to 0.3°C. Oregon's TMDLs tend to focus on cumulative impacts in the waterbody, and the HUA is allocated to meet water quality standards at a "point of maximum impact" (POMI) in the watershed. Oregon often divides the HUA into cumulative allocations for point sources (typically 0.2°C), nonpoint sources (typically 0.05°C), and reserve capacity for future growth (typically 0.05°C). In Oregon, all nonpoint sources above the POMI are eligible to trade.
- **Idaho & Washington Examples**: In Idaho and Washington, there is also a 0.3°C HUA.[2] Instead of orienting the HUA around a point of maximum impact in the watershed, these two states use the HUA to ensure that individual point source discharges do not raise the receiving waterbody temperature by over 0.3°C at the end of the mixing zone.[3] Nonpoint sources do not explicitly receive a portion of the HUA. Without a POMI, it is possible that only nonpoint sources above the mixing zone of the particular point source would be eligible to trade.

B. LAs in TMDL

All three states include an analysis of "system potential vegetation" (a surrogate shade target) in the development of TMDLs and/or LAs because they have recognized that the loss of riparian vegetation is a large driver of waterway temperature issues. The three states all recognize that full shade is the target. There is variation in the extent to which it is assumed that temperature target can be attained through riparian revegetation.

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[1] OAR 340-041-0028(12)(b).
[2] IDAPA 58.01.02(401)(01)(c); WAC 173-201A-200(c).
[3] IDAPA 58.01.02(401)(01)(c); WAC 173-201A-200(c)(ii)(A).

Some TMDLs have begun to explore width-to-depth ratios, base flow changes, and geomorphology as well.

- **Oregon Example**: Prior to developing load allocations, Oregon models natural thermal potential, which assumes riparian vegetation, natural base flows (without diversions), and sometimes a more natural stream geomorphology. In Oregon, this entailed application of natural thermal potential condition criteria.[4]

- **Idaho & Washington Example**: In Idaho and Washington, LAs are based on the achievement of system potential shade. If some streams still exceed the numeric criteria in the water quality standards after achieving system potential shade, that thermal load may be attributed to natural background.[5]

2. *Sediments and Nutrients*

A. HUA

- **Oregon Example**: Oregon does not appear to have a HUA-type regulation for sediments, nutrients, or any parameters associated with those two pollutants (such as DO or pH).

- **Washington Example**: Washington includes HUA-type regulations for dissolved oxygen and pH.[6] For example, in river segments listed for dissolved oxygen, human actions considered cumulatively may not cause the DO to decrease more than 0.2 mg/L below natural conditions when DO levels are lower than aquatic life criteria for salmonids spawning, rearing and migration (8.0 mg/L). In lake segments, human actions considered cumulatively may not cause the DO to decrease more than 0.2 mg/L below natural conditions when DO levels are lower than aquatic life criteria for core summer salmonids habitat (9.5 mg/L). There are no nutrient- or sediment-specific HUA-type regulations.

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B. LAs to Nonpoint Sources in the HUA:

NPS load allocations are not set consistently. Often, it seems that baseline loads are calculated for particular industry sectors (e.g. agriculture), which are then multiplied by a percentage reduction target. This percentage reduction target seems to be based on best professional judgment. In other cases, this amount seems to be based on an expected reduction in human-caused pollution above natural background or baseline conditions. Another variable is whether LAs are established based on conservative estimates and assumptions, such as low flow water years. Currently, the states do not appear to allocate any nutrient or sediment loads to nonpoint sources.

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In several sediment TMDLs reviewed, for example, LAs were assigned using total suspended sediment (TSS) concentrations at fixed measurement points instream. Using the measured concentration and mass balance, some TMDLs calculated the reduction required at that point to achieve water quality standards. Implicitly, there is attenuation between measurement points and reduction requirements apply to the landscape upstream until the previous measurement point. Modeling on a watershed

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[4] OAR 340–041–0028(8).
[5] IDAPA 58.01.02.250.02; WAC 173-201A-070(2).
[6] WAC 173-201-200(d), (g)