Water Quality Trading Scenario: *Nonpoint Source Credit Exchange*

Contents

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Significant water quality impacts may come from sources other than regulated point sources. The permitting authority, along with other stakeholders, may agree that the best way to meet water quality standards would be to involve the nonpoint sources in the watershed. Because nonpoint sources are not regulated by the Clean Water Act (CWA), a trading program that allows nonpoint sources to generate and sell credits may provide an economic incentive for these sources to implement new or additional best management practices (BMPs) that reduce pollutant loadings to receiving waters.

Single point source–nonpoint source trades necessitate a trade agreement between a point source and one or more nonpoint sources. The nonpoint source(s) reduce pollutant loads below an established baseline to generate credits, which the point source may purchase. Single point source–nonpoint source trades would be reflected in an individual National Pollutant Discharge Elimination System (NPDES) permit for the point source either by referencing or incorporating the terms of the trade agreement. Through trading, the point source can meet water quality-based requirements at a lower cost and, provided there is adequate accountability and verification, the nonpoint source will be compensated for contributing to the point source's water quality-based requirements. A point source may purchase nonpoint source credits in one of two ways: (1) directly from nonpoint source(s) by coordinating with a nonpoint source or a program administered by an entity responsible for a group of nonpoint source dischargers; or (2) from a nonpoint source credit exchange that contains pollutant reduction credits contributed by approved nonpoint source BMPs. There are two general types of exchanges: (1) a broker-facilitated exchange where the broker brings parties together for trades and (2) a central exchange where the point sources are not required to deal directly with nonpoint sources.

This water quality trading scenario focuses specifically on the second type of exchange and presents the challenges related to nonpoint source credit generation and then addresses issues specific to developing and issuing NPDES permits that implement point source–nonpoint source trades where the point source, or an entity representing a group of point sources, purchases credits from a nonpoint source credit exchange. Issues covered under this scenario include the following:

- The function of a nonpoint source credit exchange
- Quantifying nonpoint source loads and credits
- Establishing baselines for nonpoint source sellers
- Accountability
- Trade agreements
- Components of a NPDES permit
  - Permit cover page
  - Effluent limits
  - Monitoring
  - Reporting requirements
  - Special conditions

A hypothetical example (shown in highlighted boxes) is presented throughout this scenario to illustrate how NPDES permit writers might work with credit buyers and sellers to assist in trading and ensure each facility's NPDES permit contains the appropriate limits, requirements, and other conditions. Keep in mind that there are a range of options for incorporating trading provisions into a NPDES permit. The hypothetical example discussed throughout this scenario illustrates just one of the many options a NPDES permit writer might use.

The Function of a Nonpoint Source Credit Exchange

A nonpoint source credit exchange is a centralized pool of credits established by a third-party who buys credits from nonpoint sources to sell to point sources (Figure 1). The purpose of a nonpoint source credit exchange is to allow point sources to purchase nonpoint source pollutant reduction credits through a credit exchange managed by a third party, whether government, private, or nonprofit. This is different than point source–nonpoint source trading, however, in that the point sources are not directly trading with nonpoint sources. Rather, nonpoint sources generate pollutant load reductions and sell these pollutant load reductions as credits to the credit exchange. Point sources may then purchase credits from the credit exchange rather than independently identifying and purchasing credits directly from nonpoint sources.

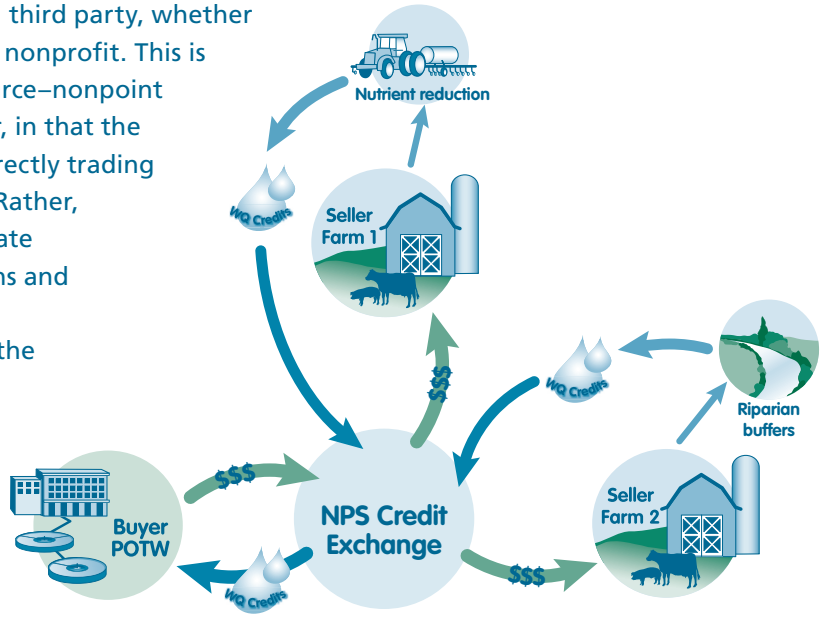

Figure 1. Nonpoint source credit exchange.

A variety of entities can establish and administer credit exchanges, including state agencies, local governments, nonprofit nongovernmental entities, soil and water conservation districts, private entities or other third parties. Management responsibilities for the credit exchange will vary according to the watershed and needs of the trading partners. Nonpoint source credit exchanges perform many of the functions that a point source and nonpoint source would otherwise have to perform (e.g., trade negotiations) as potential trading partners. In addition to negotiating the trades, the credit exchange can provide continuity by establishing standards for trading, defining credits eligible for trading, setting credit prices, verifying the operation and maintenance of BMPs, and tracking important trade information for all participants. A nonpoint source credit exchange might perform some or all of these functions, thereby influencing the roles of the trading partners accordingly. The more responsibility that rests with the exchange, the more streamlined the process of negotiating a trade

agreement may be for the point source and the permitting authority. The role the exchange takes on could greatly reduce the transaction costs of trading. Given that the nonpoint source credit exchange might perform some of these functions, the responsibilities of the permitting authority and the point source trading partner pertaining to trade negotiation might be streamlined during the permit development process.

Accounting for Delivery and Location Ratios in a Nonpoint Source Credit Exchange

Because the nonpoint source credit exchange is an intermediary between the credit generators and the credit users, delivery and location ratios must be accounted for by the nonpoint source credit exchange. If the credit exchange is tracking individual credits, in other words, if it *knows* which nonpoint source generated the credits that are being sold to a particular point source, a delivery ratio could be established that applies to that trade. Where all dischargers are discharging directly to the waterbody of concern, this method of equalizing water quality impacts of pollutant loads from various sources might be necessary.

Where the dischargers are upstream of the waterbody of concern, it might be more efficient for the credit exchange to apply location ratios to all the credit purchases and sales that it makes. Because the amount of reduction produced at the source is greater than the amount of reduction that reaches the downstream waterbody of concern, a location ratio specific to that source is applied to convert the source's reduction to credits available at the waterbody of concern. After location ratios are applied, the credit exchange will be purchasing and selling standardized credits for the waterbody of concern. For example, if a nonpoint source credit generator has a 5:1 location ratio with a downstream waterbody of concern (i.e., for every 5 units of pollutant discharged from the nonpoint source, one unit of pollutant reaches the waterbody of concern), the credit exchange would purchase 5 units of pollutant reduction from that nonpoint source for every credit that becomes available for sale from the exchange. Likewise, if a point source credit user has a 3:1 ratio with the waterbody of concern, each credit purchased by that point source would count for 3 units of *end of pipe* pollutant reduction.

A permitting authority should be aware of technical challenges associated with nonpoint source credit generation, including how the trading program accounts for uncertainty in measuring nonpoint source pollutant loads and how equitable baselines are set for nonpoint source credit sellers, when developing NPDES permits that implement point source–nonpoint source trades. One benefit of using a nonpoint source credit exchange is that the entity administering the credit exchange will have the primary responsibility for resolving these nonpoint source, credit-generation issues. This section presents the technical challenges related to nonpoint source credit generation and then addresses issues specific to developing and issuing NPDES permits that implement point source–nonpoint source trades where the point source, or an entity representing a group of point sources, purchases credits from a nonpoint source credit exchange.

Quantifying Nonpoint Source Loads and Credits

For most continuous point source discharges, measuring pollutant loads and the effectiveness of controls is simply a matter of measuring pollutant concentrations in effluent and converting concentration-based limits to mass-based limits using flow. Conversely, as noted in U.S. Environmental Protection Agency's (EPA) *Water Quality Trading Policy* (Trading Policy), the diffuse nature of nonpoint source pollutants along with variability in precipitation, land management practices, and the effect of soil type, slope, and cover on pollutant loadings to receiving waters, creates a great degree of uncertainty in determining loading from nonpoint sources and measuring the effectiveness of BMPs. For example, pollutant loads in runoff from a crop field are dependent on crop type, soil type, slope, fertilizer use patterns, weather and the amount of time it takes for runoff to reach the receiving water. These factors could vary by season and from year to year; therefore, the pollutant load is highly variable and may be difficult to measure. The same factors contribute to difficulties in measuring the effectiveness of BMPs used to reduce nonpoint source pollutant loads.

Nonpoint sources typically employ BMPs to reduce pollutant loading to a receiving water. BMPs are schedules of activities, technologies, structural controls, changes in or prohibitions of practices, maintenance procedures, and other measures to prevent or mitigate pollutant runoff to waters. Examples of nonpoint source BMPs include riparian buffer plantings, wetland creation or restoration, sediment basins, filter strips, crop sequencing, and nutrient management. Nonpoint source pollutant load reductions can sometimes be measured directly, but trading programs typically use the best available performance information to estimate load reductions for a particular BMP and then discount these estimated values using uncertainty ratios to account for the technical challenges in determining BMP effectiveness.

Potential Issues

Lag Time

Permitting authorities should be aware of potential time lags between BMP installation and full pollutant reduction efficiency. BMPs that are not yet fully functional cannot generate the full number of expected credits. Credits generated by nonpoint sources through installation of BMPs may not be available immediately because of a time lag between installation of the BMP and its effectiveness in reducing loadings or otherwise improving water quality. In some cases, the credit generation could be prorated on the basis of pollutant reduction the BMP is achieving during the current reconciliation period, even where the BMP has not reached its maximum expected pollutant reduction efficiency. The decisions required to determine when credits have been generated may have already been made in the program design. The permitting authority should be aware of these decisions made in trading program design.

Clean Water Services, Oregon

Clean Water Services can compensate for the heat load from publicly owned treatment works (POTWs) with nonpoint sources generating credits through increased shade provided by riparian planting. Because trees provide more shading as they grow, a component of Oregon Department of Environmental Quality's (DEQ) Heat Source model is used to determine effective shade for each project based on the year of initiation.

If the trade agreement or other document external to the permit does not dictate how and when credits become available for purchase, the NPDES permit should address the time lag between BMP installation and full treatment efficiency (see *Reporting Requirements*).

Period of BMP Performance

The permitting authority should also determine whether and when a BMP's credit generating capacity expires. Credit generation by nonpoint sources might decrease or stop if the BMP becomes less effective due to a natural degeneration, a lack of maintenance, or changing conditions on-site. A BMP's life expectancy depends on proper design, placement, and maintenance. Some BMPs have a discrete or short life or must be renewed. For example, nonpoint sources must renew crop sequencing each season. Other BMPs have a longer life span but require ongoing maintenance and repair to maintain effectiveness. For example, a sediment catch basin requires periodic inspection to ensure structural integrity and regular cleaning to remove and properly dispose of collected sediments. In addition, activities or conditions may change on-site affecting the efficiency of installed BMPs. For example, a vegetated buffer strip designed to filter sediment from a 5-acre crop field may be overwhelmed and become ineffective if the operator decided to increase the field size to 8 acres.

> Proper operation and maintenance are critical to ensuring the ongoing performance and attaining the expected life span of a BMP. Trading programs should include mechanisms to ensure that BMPs installed to generate credits are being operated and maintained according to procedures and guidelines established by Natural Resources Conservation Service (NRCS), EPA, or other agencies or product manufacturers.

The permitting authority should specify in the permit the approved BMPs and associated expected life spans established by the trading program. Continued credit generation may require periodic certification that a nonpoint source continues to implement a practice, that the nonpoint source is taking specified operation and maintenance actions, and that the BMP design and specification are still appropriate for the site. The trading program should account for the life span of a credit source and determine when credits are deemed permanently expired and thus unavailable for any future allocation. Permits implementing nonpoint source trading can contain or reference provisions to require certification of BMP performance and define when a BMP generating credits expires (see *Reporting Requirements* and *Special Conditions*).

Lower Boise River, Idaho

The Lower Boise trading framework addresses the issue of certifying BMP performance by having the NPDES point sources purchasing credits sign a Reduction Credit Certificate at the end of each month, certifying that the BMP is still in place and that it produced a specific reduction amount during the month that just occurred. The NPDES buyer certifies that they are aware of the penalties for false certification by signing that Reduction Credit Certificate, which then establishes the credit that they can then transfer into their own account and use to cover their discharge. EPA and Idaho Department of Environmental Quality (Idaho DEQ) conduct random audits of some BMPs to determine if the certification was valid.

BMP Failure

To address the potential inadequacy of generated credits (i.e., treatment control failure), credit exchanges should consider reserving credits that would be available to credit purchasers if the primary credit source is insufficient. Entities administering credit exchanges can reserve credits in a number of ways. One option is for the credit exchange to *overbuy* available credits from nonpoint source BMPs approved to generate credits. Another option is to require point source dischargers that want the ability to purchase credits from the credit exchange—now or in the future—to pay a user fee to the credit exchange that will in turn finance additional nonpoint source BMPs approved to generate credits.

Uncertainty

EPA's Trading Policy recommends that states and tribes establish methods to account for greater uncertainties in estimates of nonpoint source loads and reductions (see Appendix B). There are three types of uncertainty related to nonpoint source BMPs:

- Measurement uncertainty, which addresses the level of confidence in the field testing of a nonpoint source BMP
- Implementation uncertainty, which addresses the level of confidence that a nonpoint source BMP is properly designed, installed, maintained, and operated
- Performance uncertainty, which addresses the risk of a BMP failing to produce the expected results

Options for Addressing Uncertainty

Uncertainty Ratios

The application of an uncertainty ratio helps ensure that actual loads resulting from a trade do not violate the water quality standards despite the inability to accurately measure them (Jones et al. 2005). An uncertainty ratio should be applied to estimated nonpoint source load reductions to account for any potential inaccuracies in the methodology or assumptions used in the estimation. Uncertainty ratios are particularly important to account for potential inaccuracies in the estimation methodology when credits from nonpoint source BMPs are estimated or calculated.

Uncertainty, and therefore the uncertainty ratio, can be reduced by enhancing the level of confidence in BMP effectiveness values through employing one or more of the following three practices.

Monitoring BMP Effectiveness

Monitoring BMPs installed for generating credits is the most effective method for reducing uncertainty. Two types of monitoring are possible. In some instances it is possible to conduct edge-of-field monitoring to determine BMP performance. Another type of monitoring is ambient monitoring. Placing monitoring gauges in the stream at strategic locations between the buyer and the seller would allow for gauging water quality impacts of BMPs. EPA's *Monitoring Guidance for Determining Effectiveness of Nonpoint Source Controls* (EPA/841-B-96-004) provides guidance on the design of water quality monitoring programs to assess both impacts from nonpoint sources and effectiveness of control practices and management measures.

Modeling BMP Effectiveness

Modeling that uses local data to calculate nonpoint source pollutant loadings and BMP effectiveness is also an important tool. For instance, estimates of pollutant reductions (e.g., total phosphorus (TP) and sediment) might be based on soil erosion reductions using the standardized or revised Universal Soil Loss Equation (USLE). This method incorporates soil type, plant cover, rainfall, slope, and agricultural conservation practice factors to calculate the soil loss from an area. The soil loss information may then be translated to estimate loadings of sediment-bound phosphorus. An uncertainty ratio should be applied to modeled estimates. All modeling should be ground truthed by local monitoring data, which could lead to a reduction in uncertainty.

Estimating BMP Effectiveness

Where monitoring and modeling are impracticable, BMP effectiveness can be estimated through other means. For example, it might be possible to identify a set of tested BMPs with performance data that have been well established through field testing or under controlled conditions. These data may be used to estimate the reductions achieved at a nonpoint source that installs one or more of the tested BMPs. The trading program, with input from local soil and conservation experts, might identify a list of local BMPs that meet minimum design, construction, maintenance, and monitoring requirements. Preestablished performance data can be used to estimate loading reductions for local nonpoint sources. Potential uncertainty ratio reduction is an advantage of implementing local BMPs with high levels of measurement precision and accuracy.

South Nation River Watershed, Ontario, Canada

The trading program established formulae that are used to calculate the amount of phosphorus that is controlled annually from various agricultural practices. For example, the formula used to calculate the amount of phosphorus controlled through proper manure storage is:

$$\textit{Kg of P per year controlled} = \textit{\# of animals} \times \textit{animal phosphorus factor} \times \textit{days} \times 0.04$$

where:

- # of animals = the number of animals contributing manure to the area,
- Animal phosphorus factor = U.S. Department of Agriculture's (USDA) estimates of the amount of phosphorus excreted per animal,
- Days = the number of days that the animals are contributing manure to the area, and
- 0.04 represents the assumption that approximately 4 percent of the total amount of manure excreted would have been transported in runoff from improperly stored manure.

In addition to manure storage, formulae have also been established to calculate the amount of phosphorus controlled through use of clean water diversions, proper storage and handling of milkhouse washwater, preventing livestock access to watercourses, various cropping practices, and buffer strips (O'Grady and Wilson No date).

The Idaho Department of Environmental Quality's draft Pollutant Trading Guidance

Idaho DEQ's November 2003 draft *Pollutant Trading Guidance* provides a list of approved agricultural BMPs that can be used to generate TP reduction credits for trading in the Lower Boise River watershed. The draft guidance document includes estimates of BMP effectiveness and uncertainty discounts for specific watersheds (the uncertainty discount is subtracted from the effectiveness estimate). The guidance also lists the procedures for determining the amount of credits and associated monitoring and maintenance requirements for each BMP. Table 1 lists selected BMPs approved by Idaho DEQ for use in nutrient trading in the Lower Boise River watershed. A separate list of watershed-specific BMPs, along with effectiveness estimates and uncertainty ratios, will be generated for each watershed that would like to develop a trading program consistent with the Idaho *Pollutant Trading Guidance*. For more information on trading in Idaho, see Appendix A.

Table 1. Selected BMPs approved for trading in the Lower Boise River watershed

BMP	Life span	Effectiveness	Uncertainty
Sediment Basins (farm scale)	20 years	75%	10%
Constructed Wetland	15 years	90%	5%
Microirrigation	10 years	100%	2%
Crop Sequencing	1 season	90%	10%
Filter Strips	1 season	55%	15%

Establishing Baselines for Nonpoint Source Sellers

As stated in the *Essential Trading Information for Permit Writers* section, a nonpoint source should meet the specified baseline before entering the trading market as a credit seller. Baseline is defined as the pollutant control requirements that apply to a buyer and seller in the absence of trading. After a seller meets its baseline, it can generate credits.[1] A baseline for a nonpoint can be derived from a load allocation (LA) established under a total maximum daily load (TMDL). Where an LA does not exist, EPA's Trading Policy states that state and local requirements or existing practices should determine a nonpoint source's baseline (see Figure 2). The trading program provisions could also specify some additional minimum level of control that nonpoint sources would have to achieve before they could generate credits. The baseline level of control should never be less than existing practice. There are difficulties associated with establishing baselines for nonpoint sources and, although permitting authorities may not have direct involvement in establishing these baselines, a permit writer should be aware of these issues and how they might affect the trading provisions in permits.

To be reliable, trading programs establishing baselines for nonpoint source sellers should use the maximum amount of verifiable information on loadings in a watershed, such as a TMDL

[1] Some trading programs may require a seller to implement controls beyond the baseline before generating credits.

or other watershed loading analysis. Where a TMDL establishes a reliable LA for nonpoint sources, an individual nonpoint source's portion of the LA can be used to set its trading baseline. Where a TMDL or similar analysis is not available or does not represent the most accurate information on nonpoint source loading in the watershed, the trading program or state policy can establish a set of minimum BMPs that a nonpoint source must install to be eligible for trading. The pollutant load from the nonpoint source after installing these BMPs would be considered the baseline for estimating further reductions that could then be counted as credits. The permit should reference any state trading program or other document that contains the model used for estimating credits. It is important to note that nonpoint source baselines established using less-verifiable information on pollutant loading are likely to have less public support and, more relevant to permit writers, may be challenged as inconsistent with water quality standards.

Nonpoint Source Seller Baseline for Trading

NPS Seller With TMDL	NPS Seller Without TMDL
Load allocation	State and local requirements and/or existing practice

Figure 2. Nonpoint source seller baseline for trading.

Nonpoint Source Baseline Derived from TMDL Load Allocations

An LA established under a TMDL defines the nonpoint source load reductions necessary to achieve water quality standards. EPA would not support a trading program that allows nonpoint sources to sell credits if the discharge is contributing to water quality impairment; therefore, nonpoint sources should meet their portion of the LA before generating credits to sell on the trading market.

TMDLs might specify an LA for an individual nonpoint source or for a category of nonpoint source dischargers in a watershed. If established for an individual nonpoint source (e.g., a single farm), the individual nonpoint source should use the LA as its baseline for generating credits. However, if the TMDL establishes an aggregate LA for a category of nonpoint sources (e.g., all farms in a watershed) or all nonpoint sources on a particular tributary, the watershed stakeholders, including the permitting authority or trading program, need to decide how to equitably distribute that aggregate LA among the individual nonpoint source dischargers in a scientifically valid manner. For example, if the LA is expressed as an overall load reduction percentage (e.g., 25 percent reduction in total nitrogen (TN) loading watershed-wide), the trading program might require each nonpoint source discharger to reduce its individual loading by that percentage before generating credits. Alternatively, where the LA is expressed as a total aggregate loading reduction (i.e., total pounds per day), the trading program would distribute the LA among the individual nonpoint sources

EPA's Trading Policy states that where a TMDL is in place, the LA or other appropriate baseline serves as the threshold for nonpoint sources to generate credits. This does not mean that EPA requires all nonpoint sources in a watershed to meet an aggregate LA for a single nonpoint source to participate in trading. The Trading Policy's intent is that each nonpoint source participating in trading under a TMDL make reductions consistent with the LA before they can generate credits (additional reductions) for sale. This approach ensures that progress is made toward water quality standards with each trade. States have flexibility to set other appropriate baselines and can, in fact, decide to require all nonpoint sources to meet the baseline before participating in trading.

to define the baseline for each nonpoint source. The trading program might use land cover, total production, proximity to the waterbody of concern, or some other variable to determine the appropriate distribution of the aggregate LA among individual nonpoint sources. The best method of distributing an aggregate LA among nonpoint source dischargers will vary; watershed stakeholders should work together to determine the most appropriate method for establishing the nonpoint source baseline.

Once the LA is equitably distributed among nonpoint sources in the watershed, an individual nonpoint source should reduce its load by its portion of the LA before it generates credits. To verify the required load reduction and quantify the credits generated after the baseline is met requires quantification of the nonpoint source load, either through direct monitoring or estimation. For more information, see the *Quantifying Nonpoint Source Loads and Credits* section above.

Nonpoint Source Baseline Set at a Minimum Level of BMP Implementation

In watersheds where a TMDL has not been developed, the nonpoint source baseline is derived from state, tribal, and local requirements. The nonpoint source should meet this baseline before generating credits. A trading program can choose to require a more stringent level of BMP control before credits can be generated. In any case, the level of control required to generate credits should never be less than existing practice.

In any watershed, it is likely that different nonpoint sources will be at different levels or stages of BMP implementation. For example, in a watershed where animal feeding operations (AFOs) are the primary nonpoint source pollutant contributors, some AFOs might be actively working with the Natural Resources Conservation Service (NRCS) to implement comprehensive nutrient management plans that minimize nutrient and sediment runoff. Other AFOs might not have installed any BMPs either because they do not participate in any NRCS programs or because they are in the early stages of planning and implementation. These nonpoint source facilities might contribute a much greater pollutant load than those who have proactively reduced nonpoint source pollutants. A trading program can choose to require nonpoint sources to implement a minimum level of BMPs before trading to provide some level of equity among nonpoint source credit generators in the watershed. In addition, implementing a minimum level of BMPs demonstrates a commitment on the part of the credit generators participating in the trading program.

Trading programs should consider baseline equity issues among nonpoint source participants. EPA encourages states or trading programs to set a minimum level of BMP requirements for nonpoint sources before they can generate credits.

Where the nonpoint source baseline is set at a minimum level of BMP implementation, credits can be generated after meeting the minimum level of control. Quantifying the credits generated will generally require quantification of the nonpoint source load after implementing the minimum required BMPs, either through direct monitoring or estimation. For more information, see the *Quantifying Nonpoint Source Loads and Credits* section above. In certain instances, it is impossible or impracticable to quantify a baseline by measuring or estimating

Lower Boise River, Idaho

In Idaho, DEQ designates the nonpoint source baseline year (currently 1996 for the Lower Boise, but this may be amended based on the technical outcome of a pending TMDL) for each trading marketplace in the state. Each nonpoint source then calculates the baseline load for the baseline year and uses it to determine the eligibility of reductions to serve as credits for trading. In other words, in the Lower Boise River watershed, if a nonpoint source installed a BMP in 1999, the farm would have already created eligible credits. However, pollutant reductions from a BMP installed in 1994 would not be eligible. Nonpoint sources in Idaho are required to use the BMP List's estimating equation for particular BMPs (which incorporates the USDA Surface Irrigation Soil Loss (SISL) equation) to calculate baseline loads. For more information about this trading program, see Appendix A.

the nonpoint source pollutant load. In these cases, a trading program could allow nonpoint sources to generate credits for estimated reductions from BMPs. For example, if sufficient data are available to establish that a particular BMP, installed under specified conditions, will achieve a loading reduction of X lbs/day, the nonpoint source might be allowed to generate credits equivalent to X lbs/day without actually having quantified the pollutant load before installing the BMP. Trading programs should use this approach only where sufficient data on the efficacy of the BMPs are available to develop a reliable estimate of the expected reductions. The baseline pollutant load should always be quantified where possible.

Red Cedar River, Wisconsin

TP reduction credits associated with a BMP were estimated using TP loading models to estimate reductions from well-established and well-understood practices. Soil testing of each field was done to calculate the TP delivery to the stream from the field where the BMP was used (Breetz et al. 2004). For more information about this trading program, see Appendix A.

Determining Maximum Feasible Nonpoint Source Load Reductions

It is not feasible for a nonpoint source to control 100 percent of its pollutant runoff to a waterbody. Therefore, it is important that some analysis be done to estimate the maximum amount of pollutant runoff that can be controlled from the nonpoint sources in a watershed. The difference between this estimate and the nonpoint source's baseline equals the maximum nonpoint source load reductions available for trading.[2] This is a way to ensure that credits being purchased result in actual reductions. This increases the surety that the trading program can meet its goal of achieving water quality standards.

[2] The maximum tradable nonpoint source load reduction is not equal to the maximum number of credits available for trading in a watershed because of the impact of trading ratios. Because trading ratios can vary depending on many factors (as described in the *Developing Trade Ratios* section), determining the maximum number of credits is not as useful as determining the maximum tradable nonpoint source load reduction for the purpose of ensuring that every trade results in a reduction of total load to the waterbody.

A trading program can directly calculate the maximum tradable nonpoint source load reduction for a watershed. A watershed's maximum tradable nonpoint source load reduction can be calculated by first determining the maximum feasible implementation of BMPs; second, estimating the reduction from that level of BMP implementation based on watershed modeling, published BMP efficiency information, or best professional judgment; and finally, taking the difference between the maximum loadings reduction and the aggregate baseline for all sellers. In addition, this calculation could be done for an individual farm.

The trading program may want to include a mechanism for ensuring that this maximum tradable nonpoint source load reductions is not exceeded. This could be done, for example, by specifying the maximum tradable nonpoint source load reductions in the program documentation and then tracking credit sales, and therefore load reductions, by nonpoint sources to ensure that this maximum is not exceeded.

Pennsylvania's Tradable Loads for Addressing the Chesapeake Bay's Tributary Strategies

In 2003 EPA developed a document titled, *The Technical Support Document for the Identification of Chesapeake Bay Designated Uses and Attainability* to help states develop and adopt refined water quality standards to address nutrient- and sediment-based pollution in the Chesapeake Bay and its tidal tributaries. As part of this analysis, the Chesapeake Bay Program developed four nutrient reduction scenarios on the basis of different levels of BMP and control technology implementation by 2010. The levels ranged from current implementation to "everything, everywhere, by everybody" (E3), which approximates the maximum nutrient and sediment load reductions available in the watershed. To create the most objective and uniform maximum implementation level possible, the E3 scenario was developed without considering site-specific constraints and program participation levels. If these factors were considered, certain aspects of the E3 scenario may not be feasible. Nutrient and sediment loads resulting from each nutrient reduction scenario were estimated using the Chesapeake Bay Program's Phase 4.3 Watershed Model. For example, the estimated loadings for the E3 scenario for Pennsylvania agriculture were 21,153,000 lbs TN/yr and 1,896,000 lbs TP/yr. (More information on the development of the E3 scenario is available in Appendix A of the *Technical Support Document* at **www.chesapeakebay.net/uaasupport.htm**)

Recognizing that model estimates based on the E3 scenario likely overestimated the maximum feasible nutrient and sediment load reductions, Pennsylvania made adjustments to the estimates to better represent a feasible effort. One adjustment was reducing by 10 percent the level of nonpoint source reductions estimated in the E3 scenario. The selection of a 10 percent reduction is subjective, because estimates of the feasible level of implementation for nonpoint source BMP implementation vary widely. Additionally, Pennsylvania estimated the reductions for those BMPs in *Pennsylvania's Tributary Strategy* that were not included in the E3 scenario. These additional reductions were included in the revised E3 scenario. The estimated loadings for the revised scenario for agriculture were 21,819,000 lbs TN/yr and 1,726,000 lbs TP/yr. After adjusting the E3 scenario estimates, Pennsylvania estimated the maximum allowable credits as the difference between the load estimates from the revised E3 scenario and the *Pennsylvania Tributary Strategy* loadings goal. The Tributary Strategy loads for agriculture were 27,580,000 lbs TN/yr and 2,123,000 lbs TP/yr yielding final tradable loads of 5,760,000 lbs TN/yr and 397,000 lbs TP/yr. The scenario values and the tradable load values will change as new BMPs are developed or the efficiencies of existing BMPs are revised.

Accountability

Mechanisms Under the NPDES Program

EPA's Trading Policy notes that "States and tribes should establish clear enforceable mechanisms consistent with NPDES regulations that ensure legal accountability for the generation of credits that are traded."

Such enforceable mechanisms might include, among other things, requirements for water quality or effluent monitoring, credit purchase and sale accounting, and assessment of BMP effectiveness. These mechanisms might be contained in state regulations, the project trade agreement, or both. By incorporating such accountability provisions of the trade agreement (or the entire trade agreement) into a NPDES permit, the state or tribe makes the point source legally responsible for their performance.

EPA's Trading Policy also states that "In the event of default by another source generating credits, an NPDES permittee using those credits is responsible for complying with the effluent limitations that would apply if the trade had not occurred."

To account for the possibility of a failed trade (e.g., insufficient generation of necessary credits by the seller), EPA recommends that the permit (and any accompanying trade agreement) clearly describe the respective responsibilities and legal liability (if any) of the buyer and the seller (see *Special Conditions*).

Mechanisms Outside of the NPDES Program

To further clarify and protect their interests, the trading parties may choose to enter into a contract or other agreement separate from any applicable NPDES permit. Such a contract or agreement could, where appropriate, address a variety of financial or legal considerations and contingencies among the trading parties, including what happens in the case of default by any party. For example, the point source buyer might use such a contract to memorialize an agreement that the credits it needs are available; the nonpoint source seller might use such a contract to guarantee payment for its services; a credit exchange might use such a contract for both of these reasons. Where a credit exchange is involved, the exchange might enter into separate contracts with the buyer and seller, all parties could enter into one contract, or the buyer and seller could enter into a contract without the exchange.

Great Miami River Watershed, Ohio

After a soil and water conservation district's proposal is approved, the Miami Conservancy District (MCD, the broker of the program) enters into a contract with the successful soil and water conservation district for project implementation. The soil and water conservation district then enters into a project agreement with the nonpoint source responsible for implementing the BMPs. MCD tracks the credits generated and allocates them to the buyers. A separate Load Reduction Workgroup will evaluate the accuracy of reduction estimates every two years. For more information on this program, see Appendix A.

Trade Agreements

Typically, the terms that govern a trading program will be developed outside the NPDES permit process and can be incorporated or reflected in the permit (see Appendix C). The Trading Policy describes several mechanisms for implementing trading through NPDES permits (see Appendix B). NPDES permits authorizing water quality trading should reference any existing trade agreement in the permit and fact sheet.

All trade agreements referenced in NPDES fact sheets and permits should meet certain minimum standards to help ensure the trades authorized by the permit are consistent with water quality standards. At a minimum, the trade agreement should be a written agreement that is signed and dated by authorized representatives of all trading partners. Verbal trade agreements should not be referenced in NPDES permits. The written trade agreement should contain sufficient detail to allow the permitting authority to determine with some degree of certainty that the terms of the agreement will result in loading reductions and generation of sufficient credits to satisfy water quality requirements. If there is no formal, outside trade agreement, trading can still occur; however, the permit writer will need to more explicitly describe the trading program in the fact sheet and authorize specific aspects of the trading program as permit conditions. Trading partners can specify the details pertaining to the negotiated terms of the trade (e.g., credit price, payment schedule, consequences for failure to fulfill negotiated terms) in a separate, written and signed contract.

Trade Agreements with Nonpoint Source Credit Exchanges

A nonpoint source credit exchange is a pool of nonpoint source credits managed by a third party that facilitates trades. As a result, point sources purchasing credits from a nonpoint source credit exchange do not trade directly with nonpoint sources. The nonpoint source generates pollutant load reductions and sells the pollutant load reductions as credits to the entity administering the nonpoint source credit exchange. Point sources may then purchase credits from the credit exchange rather than directly from the nonpoint sources. Point source purchasers, therefore, will enter into trade agreements with the nonpoint source credit exchange.

As described above, the entity administering the nonpoint source credit exchange can establish standards for trading, set credit prices, determine eligible credits, verify the operation and maintenance of BMPs, account for delivery, location, and uncertainty ratios and track important trade information for all participants. A trade agreement established between a point source and the nonpoint source credit exchange should outline all these issues, and the permitting authority should consider the information contained in the trade agreement when developing permits for participating point sources.

Maize Creek Example: Trade Agreements

What You Need to Know…

Pollutant: Biochemical Oxygen Demand

Driver: Maize Creek Watershed Management Plan nutrient reduction goals (pre-TMDL) for point and nonpoint sources

Nonpoint Source Credit Exchange: ***Maize Creek Producers' Nutrient Exchange (MCPN Exchange)—Nitrogen and Phosphorus***

- **Credit Sellers:** Ten farms in the Maize Creek Watershed
- **Agricultural Nutrient Reduction Goals (baseline):** 10 percent reduction in TP and TN loading from current estimated loads to reduce in-stream biochemical oxygen demand (BOD).
- **Estimated Load Reduction:** The Niblet County Soil and Water Conservation District established the MCPN Exchange to facilitate trading between local farms and point source dischargers in the Maize Creek Watershed. The MCPN Exchange has developed a list of BMPs eligible for trading along with estimated loading reductions. The BMP loading reductions estimates, as well as applicable ratios, have been reviewed and approved by the state NPDES permitting authority. Ten farms implemented conservation tillage to achieve the baseline of a 10 percent reduction in TP and TN loads from current estimated loads. These 10 farms are eligible to participate in the MCPN Exchange and have signed the required trade agreement. The farms have agreed to install and maintain additional BMPs to reduce in-stream BOD by reducing TP and TN loads. Collectively, participants in the MCPN Exchange will meet the BOD load reduction needs of the point sources in the watershed. The loading reductions are based on an average loading reduction per month over a typical 12-month period for the watershed. The MCPN Exchange will monitor BMP installation and maintenance to verify availability and continued generation of credits, as well as track and report all trades to all participants.

Credit Buyer: ***City of Earington POTW***[a]

- **Existing TBEL**[b]**:** 1,000 lbs/day (average monthly) of BOD
- **Current Loading:** 1,000 lbs/day (average monthly) of BOD
- **Approved Watershed Management Plan Total BOD Reduction Goal:** 15 percent reduction from current BOD loading (reduction of 150 lbs/day (average monthly) to 850 lbs/day)
- **WWTP**[c] **Treatment Capabilities:** Treatment to 1,000 lbs/day of BOD (average monthly)

Location: All the farms participating in the MCPN Exchange are upstream of potential point source buyers, including the Earington POTW. All point and nonpoint sources discharge directly to Maize Creek.

Notes: [a] POTW = publicly owned treatment works; [b] TBEL = technology-based effluent limitations; [c] WWTP = wastewater treatment plant

Maize Creek Example: Trade Agreements *(continued)*

Applicable Trade Ratios:

- **Delivery:** The MCPN Exchange has developed a set of ratios that account for the location of the farms in relation to each potential buyer.
- **Uncertainty:** The MCPN Exchange developed a set of uncertainty ratios to account for uncertainties associated with BMP efficiencies, implementation, maintenance and monitoring.
- **Equivalency:** The MCPN Exchange has worked with the NPDES permitting authority to develop a ratio to relate the in-stream effects of nitrogen and phosphorus loading reductions by the farms to required BOD reductions by point source buyers.

The NPDES permitting authority has reviewed and approves of all ratios developed by the MCPN Exchange. These ratios will be applied to the loading reductions achieved by the member farms to determine the number of credits generated.

Multiple point sources within the Maize Creek Watershed, including the city of Earington POTW, wish to participate in the MCPN Exchange and have asked the permitting authority to authorize them to trade to meet the BOD load-reduction goals in the approved Maize Creek Watershed Management Plan. The NPDES permitting authority worked with the MCPN Exchange, potential point source buyers, and other key stakeholders to craft the provisions of the trade agreement and provided the necessary information (e.g., baseline, minimum control levels) to facilitate the trade between the city of Earington POTW and the MCPN Exchange. The city of Earington POTW's permit is scheduled for renewal in 3 years, and at that time, the NPDES permit writer will incorporate provisions to allow the city of Earington POTW to purchase from the MCPN Exchange the equivalent of 150 lbs/day of total BOD necessary to achieve the 15 percent load reduction required under the approved watershed management plan.

As required, the permitting authority receives a copy of the trade agreement that is signed and dated by authorized representatives of the city of Earington POTW and the MCPN Exchange. The permit writer reviews the trade agreement to verify that the information is accurate and consistent with water quality standards. The permit writer develops permit requirements for the city of Earington POTW that are consistent with the provisions in the trade agreement and incorporates those requirements in the effluent limitations (i.e., baseline and minimum control level), reporting, and monitoring provisions of the permit.

The basic terms of the trade agreement between the city of Earington POTW and the MCPN Exchange are as follows:

- The city of Earington POTW will purchase the necessary amount of equivalent total BOD credits to compensate for a discharge of 150 lbs/day of BOD (average monthly) for a period of 5 years to correspond with the NPDES permit term.
- The delivery, uncertainty, and equivalency ratios approved by the NPDES permitting authority will be applied to the nitrogen- and phosphorus-loading reductions achieved by the member farms to determine the number of BOD credits generated. Nutrient load reductions will be converted to BOD credits by the exchange using the applicable ratios.

Maize Creek Example: Trade Agreements *(continued)*

- Member farms must continue to meet their baseline requirement of 10 percent nutrient reduction (either through continuation of conservation tillage, or through alternate approved BMPs) to maintain eligibility to participate in the MCPN Exchange.
- Credit buyers must meet applicable minimum control levels before purchasing credits to meet the baseline established in the Maize Creek Watershed Management Plan.
- The MCPN Exchange will conduct the necessary BMP monitoring and inspections to verify and certify credit generation.
- The MCPN exchange will provide the city of Earington POTW with the necessary BOD Analysis Reports to submit to the NPDES permitting authority to verify and certify the generation of credits by agricultural operations participating in the exchange.
- Trades occur monthly and credits may not be applied in any month other than the one in which the credits are generated.

In a separate contract, the city of Earington POTW and the MCPN Exchange articulate the financial and liability conditions for the trade. The terms of the separate contract, which the permit writer does not ask to see because it has no bearing on the NPDES permit requirements for the city of Earington POTW, are as follows:

- The city of Earington POTW will pay the MCPN Exchange $22.50 per credit of BOD on a monthly basis. All payments for a calendar month are due to the MCPN Exchange by the 15th of the following calendar month.
- The city of Earington POTW will pay the MCPN Exchange an administration fee of $15 per month during the 5-year permit term. This fee will help defray the cost of BMP inspection, monitoring, reporting, and other administrative functions of the exchange.
- Failure to fulfill the terms of this agreement on behalf of the city of Earington POTW will result in a breach of the trade agreement and terminate participation in the purchase of TP credits through the MCPN Exchange.

The city of Earington POTW's renewed NPDES permit will not include any provisions of the city of Earington POTW's contract with the MCPN Exchange; however, the NPDES permit writer receives a copy of the trade agreement that is signed and dated by authorized representatives of the city of Earington POTW and the MCPN Exchange. The permit writer reviews the trade agreement to verify that the information related to baselines and estimated pollutant load reductions is accurate and does not conflict with any of the city of Earington POTW's existing NPDES permit requirements. At the time of permit renewal, the NPDES permit writer will incorporate provisions to authorize the purchase of BOD credits from the MCPN Exchange and ensure that the permit effluent limitations, monitoring, reporting, and special conditions requirements reflect the purchase of BOD credits to achieve compliance with the facility's water quality-based effluent limitation (WQBEL). The permit writer will incorporate provisions as necessary from the signed trade agreement in the permit and reference the agreement in the fact sheet. A copy of the trade agreement is also attached as part of the permit's administrative record.

Components of a NPDES Permit

NPDES permits that authorize water quality trading are no different than typical NPDES permits in many respects—they require the same structure, analyses, and justification. All permits have five basic components: (1) cover page; (2) effluent limitations; (3) monitoring and reporting requirements; (4) special conditions; and (5) standard conditions. Standard conditions are the same for all NPDES permits and will not be addressed in this Toolkit. In addition, consistent with Title 40 of the *Code of Federal Regulations* (CFR) section 124.6, all permits are subject to public notice and comment. This process provides all interested parties an opportunity to comment on the trading provisions in the permit.

Each NPDES permit is accompanied by a permit fact sheet. The information in these fact sheets is not enforceable. The purpose of the fact sheet is to explain to the public the requirements in the permit. Thus, at a minimum, the fact sheet should explain to the public any trading provisions in the permit. There is a wide variety of options for including trading information in the fact sheet that ranges from explaining the minimum control level (buyer) or trading limit (seller) to including the entire trading program.

There are a variety of issues, however, that may require special consideration when developing a permit to implement water quality trading with a nonpoint source credit exchange. Appendix E provides the permit writer with a list of fundamental questions that should be addressed during the permit development process.

Permit Cover Page

The cover page of a NPDES permit typically contains the name and location of the permittee(s), a statement authorizing the discharge, the specific locations for which a discharge is authorized (including the name of the receiving water), and the effective period of the permit (not to exceed 5 years). In addition, the cover page may list the pollutants regulated by the permit. For instance, the cover page of an overlay permit for TP may state that the overlay permit addresses only TP and that other parameters are addressed in each facility's individual permit.

The cover page also could specifically authorize trading between the permitted point source and the nonpoint source(s) generating credits. However, whereas the cover page for a permit that includes trading between point sources would include the specific authorized discharge locations for each point source, because a nonpoint source is a diffuse pollutant source (e.g., farms, ski areas, golf courses), a permit that implements a trade with a nonpoint source trading partner might not reference a specific discharge location for the nonpoint source involved in the trade. The cover page could, however, simply name the nonpoint source either by category (e.g., farms, golf courses) or by the name of the specific nonpoint source (e.g., Rock Creek Dairy, Rolling Hills Country Club) and provide a general description of nonpoint source location (e.g., Hudson River at West Point). Further, if the point source purchased credits from a nonpoint source credit exchange, the cover page should name the nonpoint source credit exchange or managing party.

The cover page also should address the regulation, legal authority, policy statements, planning documents and the trade agreement that support trading between point and nonpoint sources in the Authority section of the cover page. If the state has issued regulations or policy documents authorizing water quality trading, the permit writer should reference these. For example, if trading is considered a water-quality management tool in the state's Water Quality Management Plan, this may establish authority for integrating trading into NPDES permits and can be referenced on the cover page (Jones et al. 2005).

Effluent Limitations

Effluent limitations are the primary mechanism for controlling the discharge of pollutants from point sources into receiving waters. When developing a permit, the permitting authority focuses much of its effort on deriving appropriate effluent limitations. As in all NPDES permits, permits that include trading must include any applicable TBELs and, where necessary, WQBELs, that are derived from and comply with all applicable technology and water quality standards. Furthermore, limits must be enforceable, and the process for deriving the limits should be scientifically valid and transparent.

EPA's Trading Policy does not support trading to meet TBELs unless trading is specifically authorized in the categorical effluent limitation guidelines on which the TBELs are based. Applicable TBELs thus serve as the minimum control level below which the buyer's treatment levels cannot fall. This section discusses the overarching principles of how to express all applicable effluent limitations in permits for dischargers participating in water quality trades.

Credit Buyers

Permits for credit buyers should include both the baseline, which is the WQBEL that defines the level of discharge the buyer would have to meet through treatment **when not** trading, and a minimum control level that must be achieved through treatment **when** trading. The permit should also include the amount of pollutant load to be offset (minimum control level – baseline) through credit purchases when trading. Most often, the applicable TBEL will serve as the minimum control level. A permitting authority can choose to impose a more-stringent minimum control level than the TBEL to prevent localized exceedances of water quality standards near the point of discharge but not one that is less stringent the TBEL. In a NPDES permit or fact sheet, the effluent limitations for a credit buyer could be described as follows:

- The Discharger must meet, through treatment or trading, a mass-based effluent limitation for Pollutant A of **<insert baseline>**. If this effluent limitation is met through trading, the Discharger must purchase credits from authorized Sellers in an amount sufficient to compensate for the discharge of Pollutant A from Outfall 001 in excess of **<insert baseline>**, but at no time shall the maximum mass discharge of Pollutant A during **<insert averaging period>** exceed the minimum control level of **<insert minimum control level>**. Thus, the maximum mass discharge of Pollutant A to be offset through credit purchases is **<insert minimum control level – baseline>**.

Maize Creek Example: Effluent Limitations

Applicable Trade Ratios:

- **Delivery:** The MCPN Exchange has developed a set of ratios that account for the location of the farms in relation to each potential buyer.
- **Uncertainty:** The MCPN Exchange developed a set of uncertainty ratios to account for uncertainties associated with BMP efficiencies, implementation, maintenance and monitoring.
- **Equivalency:** The MCPN Exchange has worked with the NPDES permitting authority to develop a ratio to relate the in-stream effects of nitrogen- and phosphorus-loading reductions by the farms to required BOD reductions by point source buyers.

Multiple point sources within the watershed, including the city of Earington POTW, wish to participate in the exchange and have asked the permitting authority to authorize them to trade to meet the BOD loading reduction requirements in the approved watershed management plan. The permitting authority has chosen to modify individual permits to authorize trading with the exchange.

The POTW's existing permit includes state required TBELs the permittee currently meets.

The permit writer will include the calculated WQBELs and trading provisions in the renewed permit for the city of Earington POTW. The permit will also include the minimum control level (i.e., TBEL or existing discharge) that chooses to trade with the exchange.

Permit Language:

Table 2. Monthly average mass loading effluent limitations for BOD

Facility	Units	Existing TBEL	WQBEL	Effluent limitation with trading
City of Earington POTW	lbs/day	1,000	850 (Baseline)	1,000 (Minimum Control Level/TBEL)

A. The permittee is authorized to discharge BOD from permitted outfalls to Maize Creek provided the discharge meets the limitations set forth herein. Provision X of this permit authorizes the permittee to purchase BOD credits generated by nonpoint source phosphorus load reductions from Maize Creek Producers Nutrient Exchange (MCPN Exchange).

B. The discharge from Outfall 001 shall comply with the monthly mass loading of BOD established by either a or b:

   a. The WQBEL set forth in Table 2; or,

   b. The Effluent Limitation With Trading set forth in Table 2 provided the permittee has secured BOD credits generated by nonpoint source phosphorus load reductions from the Exchange sufficient to compensate for any discharge in excess of the WQBEL set forth in

Maize Creek Example: Effluent Limitations *(continued)*

Table 2. The number of pounds of nonpoint source phosphorus load reductions required to be purchased shall be calculated as follows:

Pounds phosphorus required = (Actual Discharge – WQBEL) × Trade ratio

Where:

Actual discharge = the BOD load, expressed in lbs/day as a monthly average,

Trade ratio = Ratios established in the trade agreement between the permittee and the MCPN Exchange and incorporated by reference herein

C. Credits purchased by the permittee may be applied only for the calendar month(s) during which they were generated by the exchange.

Pollutant Form, Units of Measure, and Timing Considerations

The permit should explicitly identify the pollutant or pollutants being traded. The permitting authority should ensure that the trading program or agreement and the calculated WQBELs are consistent in terms of the form of the pollutant, units of measure, and timing.

For example, if the pollutant specified in the WQBEL is nitrate-nitrogen, credits generated under the trade agreement should be for nitrate-nitrogen and not for total Kjeldahl nitrogen (TKN) or some other form. If, on the other hand, the WQBEL is for TN, buyers and sellers should trade TN credits. In this case, a discharger may be required to measure TN. If there are concerns about localized impacts, and WQBELs are also specified for a particular form or forms of nitrogen, the discharger may be required to monitor TKN, nitrite, and nitrate (all expressed as N) and then calculate its TN discharge.

Also an equivalency ratio may be needed when two sources are trading pollutants such as TN or TP, but are actually discharging different forms of nitrogen or phosphorus (e.g., one discharger's phosphorus discharge is made up primarily of biologically available phosphorus while its trading partner's discharger is primarily bound phosphorus). An equivalency ratio may also be needed in cross-pollutant trading of oxygen demanding pollutants (e.g., phosphorus and BOD). In this case, the equivalency ratio would equal the ratio between the two pollutants impacts on oxygen demand. Where possible, the nonpoint source credit exchange or trading program should account for any necessary equivalency ratios with regard to pollutant form or type; the permit writer simply needs to be aware of the pollutant form or type addressed in the trade agreement to ensure that the permit is consistent. Note, however, that under most circumstances it will be difficult to account for equivalency ratios in a nonpoint source credit exchange model. The equivalency ratio is calculated on the basis of the ratios of different forms or types of a pollutant in the discharges of both the credit generator and the credit purchaser. Therefore, unless all the nonpoint source credit generators are discharging pollutant forms or types with the same ratio, the credit exchange would have to track individual transactions from generators to sellers to determine how much each credit would be worth.

For example, a point source purchaser needs to purchase credits from the credit exchange equivalent to 100 lbs/day for the ratio of pollutant forms being discharged at the point source. The credit exchange has credits deposited by 5 different nonpoint sources (Source A, Source B, Source C, Source D, and Source E), each discharging the pollutant forms at a different ratio. The credit exchange may have to sell credits to the point source from one, two, three, four, or all five of the nonpoint sources. The credit exchange would have to make sure that the correct equivalency ratio is applied to the credits deposited by Source A, based on which point source is buying the credits that Source A deposited. The exchange has to apply a different set of ratios for the credits from Sources B, C, D, and E. The situation becomes more complicated if the credits from one or more of the nonpoint sources are split between multiple point source buyers. Finally, it is possible that, depending on the ratios, there may not be enough credits to meet all of the buyers' needs, but that would not be known until the credit exchange determines how many credits each nonpoint source deposits and how many credits each point source needs and begins to optimize the distribution of credits based on all of the possible combinations of buyers, sellers, and ratios. In complicated credit exchange situations like this, an extended period of monitoring before trading may be necessary to better determine the expected BMP performance from each potential nonpoint source credit seller and, thus, whether the exchange will have enough credits to satisfy the needs of all the potential buyers.

Maize Creek Example: Pollutant Form, Units of Measure, and Timing

What You Need to Know…

Pollutant: Biochemical Oxygen Demand

Driver: Maize Creek Watershed Management Plan nutrient reduction goals (pre-TMDL) for point and nonpoint sources

Nonpoint Source Credit Exchange: Maize Creek Producers' Nutrient Exchange—Nitrogen and Phosphorus

Credit Sellers: ***Ten farms in the Maize Creek Watershed***

Credit Buyer: ***City of Earington POTW***

Location: All the farms participating in the MCPN Exchange are upstream of all potential point source buyers. All point and nonpoint sources discharge directly to Maize Creek.

Pollutant Form

The watershed management plan indicates a need for the city of Earington POTW, the credit buyer, to control BOD discharges. The plan includes loading reduction recommendations for the members of MCPN Exchange (credit seller) as well. Each member farm will install one or more BMPs from an approved list established in the trade agreement to reduce phosphorus and nitrogen loads 10 percent as indicated in the watershed management plan. Because controlling nutrients reduces oxygen demand, the credit exchange was able to work with the permitting authority to establish an equivalency ratio that accounts for the relationship between nutrients and BOD load reductions. This will enable the MCPN Exchange to sell the nutrient reductions in the form of BOD credits to the POTW.

Maize Creek Example: Pollutant Form, Units of Measure, and Timing *(continued)*

Units of Measure

The BOD WQBELs based on the reduction recommendations in the watershed management plan are expressed in lbs/day as a monthly average to correspond with the units and averaging period in the plan. The BOD limits in the POTW's existing permit are also expressed in lbs/day as a monthly average. The trade agreement also specifies these units for trading. The nutrient load reductions for the credit exchange will be calculated and expressed in lbs/day as a monthly average over a typical 12-month period to determine the number of credits they can generate to sell the POTW.

Timing of Credits

Credits are available beginning at the time of permit issuance. This allows 24 months for the MCPN Exchange member farms' BMPs to be fully implemented and 12 months for the credit exchange to gather monitoring data to verify that the BMPs are achieving the expected nutrient removal efficiency and will generate credits as expected. These data are necessary to better understand how loading and reduction may vary over time and to develop monthly credit generation data to correspond with monthly average effluent limitations. Trades will occur monthly to correspond with monthly average effluent limitations. The MCPN Exchange member farms will be able to continue to generate credits as long as the controls are properly operated and maintained, the credit exchange is able to demonstrate reductions, and the nonpoint source baseline does not change in a way that would reduce or eliminate the credits (e.g., based on a new TMDL that includes WLAs for the permittee or LAs for the MCPN Exchange member farms). The ability of MCPN Exchange to continue to generate credits will be assessed during the renewal of the city of Earington's POTW NPDES permit every 5 years.

Anti-backsliding, Antidegradation, and New Discharges Special Considerations

EPA's Trading Policy discusses anti-backsliding and antidegradation and how these provisions can be met through trading.

Anti-backsliding

The term *anti-backsliding* refers to a statutory provision (CWA section 402(o)) that, in general, prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains WQBELs, permit conditions, or standards that are less stringent than those established in the previous permit (USEPA 1996b). The CWA establishes exceptions to this general anti-backsliding prohibition. EPA has consistently interpreted section 402(o)(1) to allow for less stringent effluent limitations if either an exception under section 402(o)(2) or, for WQBELs, the requirements of section 303(d)(4) are met (USEPA 1996b). Section 402(o)(2) and 40 CFR 122.44(l) provide exceptions for circumstances such as material and substantial alterations to the facility, new information, events beyond the permittee's control, and permit modifications under other sections of the CWA. Section 303(d)(4), which applies only to WQBELs, allows a less-stringent WQBEL in a reissued permit when the facility is discharging to a waterbody attaining water quality standards as long as the waterbody continues to attain water quality standards even after the WQBEL is relaxed. In addition, revising the limitation must

be consistent with the state's antidegradation policy. If the discharge is to a waterbody that is not attaining water quality standards, a less-stringent WQBEL is allowed only when the cumulative effect of all revised effluent limitations results in progress towards attainment of water quality standards. For a detailed discussion of the anti-backsliding exceptions, see EPA's *NPDES Permit Writers' Manual* (EPA-833-B-96-003). EPA's Trading Policy states:

> *EPA believes that the anti-backsliding 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, 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.*

A permit writer should simply explain in the fact sheet of the permit how the limitations in the permit, after accounting for any trading provisions, are at least as stringent as the limits in the previous permit or, alternatively, how anti-backsliding provisions of the CWA are satisfied.

Antidegradation

As repeated throughout this document, NPDES permits may not facilitate trades that would result in nonattainment of an applicable water quality standard, including the applicable antidegradation provisions of water quality standards. Permitting authorities should ensure that WQBELs developed to facilitate trade agreements accord with antidegradation provisions and that antidegradation reviews are performed when required. Nothing in the Trading Policy per se changes how states apply their antidegradation policies, though states may modify their antidegradation policies to recognize trading.

The Trading Policy states:

> *EPA does not believe that trades and trading programs will result in "lower water quality"…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.*

Special considerations for antidegradation relative to water quality trading depend on the tier of protection applied to the waterbody as described below.

Tier 1 is the minimum level of protection under antidegradation policies. For Tier 1 waters, the antidegradation policy mandates protection of existing in-stream uses. Because EPA neither supports trading activities nor allows issuance of permits that violate applicable water quality standards, which should protect existing uses at a minimum, any supported trading activities incorporated into a NPDES permit should not violate antidegradation policies applicable to Tier 1 waters.

Tier 2 protects waters where the existing water quality is higher than required to support aquatic life and recreational uses. Water quality in Tier 2 waters may be lowered (only to the level that would continue to support existing and designated uses), but only if an antidegradation review finds that (1) it is necessary to lower water quality to accommodate important social or economic development, (2) all intergovernmental and public participation provisions have

been satisfied, and (3) the highest statutory and regulatory requirements for point sources and BMPs for nonpoint sources have been achieved. The Trading Policy supports trading to maintain high water quality when trading is used to compensate for new or increased discharges. Thus, the Trading Policy supports reductions of existing pollutant loadings to compensate for the new or increased load so that the result is *no lowering of water quality*. A state, in applying its antidegradation policy, may decide to authorize a new or increased discharge to high-quality water and may decide to use trading to completely or partially compensate for that increased load. If the increased load to Tier 2 waters is only partially compensated for by trading, an antidegradation review would be required to address the increased load.

Tier 3 protects the quality of outstanding national resource waters and waters of exceptional recreational or ecological significance. In general, antidegradation policies do not allow any increase in loading to Tier 3 waters that would result in lower water quality. EPA supports trading in Tier 3 waters to maintain water quality.

Monitoring

Permitting authorities may want to consider developing monitoring and reporting requirements to characterize waste streams and receiving waters, evaluate wastewater treatment efficiency, and determine compliance with permit conditions in the trade agreement. Monitoring and reporting conditions of a NPDES permit may contain specific requirements for sampling location, sample collection method, monitoring frequencies, analytical methods, recordkeeping, and reporting. If the permit conditions include compliance with provisions in a trade agreement, the permitting authority should include monitoring, record-keeping, and reporting requirements that facilitate compliance evaluations and, where necessary, enforcement actions related to the trading requirements. Discharge monitoring requirements should be consistent with the provisions of the trade agreement in terms of pollutants and forms of pollutants monitored, reporting units, and timing. The permit provisions should ensure that the results of discharge monitoring will be useful to the permittee, the permitting authority, and the general public in determining whether the provisions of the trade agreement are being met. Permits that authorize point source–nonpoint sources trades via a nonpoint source credit exchange should also address the unique considerations for monitoring and reporting that will facilitate evaluating the effectiveness of BMPs used to generate pollutant reduction credits.

Sample Collection and Analysis

The same discharge sampling location used for compliance in any existing NPDES permits should be used for determining compliance with effluent limitations developed for traded parameters. Samples collected as part of a self-monitoring program required by a NPDES permit must be performed in accordance with EPA-approved analytical methods specified in 40 CFR Part 136 (*Guidelines for Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act*) where Part 136 contains methods for the pollutant of concern. Where no Part 136 methods are available, the permit writer should specify which method the point source should use for compliance monitoring.

Parties Responsible for Monitoring

In a permit that authorizes trading between a point source(s) and a nonpoint source credit exchange, the permittee(s) will be responsible for all the monitoring activities that would normally be required in any NPDES permit. If the permit is an overlay permit covering multiple point sources and is used to incorporate water quality trading for specific pollutants, the permitting authority may establish monitoring requirements by reference to the facility's individual NPDES permit for consistency. Alternatively, the overlay permit could specifically list the monitoring location and requirements.

Ambient Monitoring

Ambient monitoring is one way to show whether a trade agreement meets or improves water quality. In addition to traditional discharge monitoring requirements, ambient water quality monitoring may be appropriate at strategic locations to ensure that the trade is not creating localized exceedances of water quality standards and to document the performance of the overall trading program. Permits with mixing zones may include monitoring requirements as appropriate to ensure that water quality criteria are not exceeded at the edge of the applicable mixing zone.

BMP Monitoring and Trade Tracking

To assure that nonpoint source BMPs are performing properly, the permitting authority should add permit conditions specifying that a BMP be monitored and inspected on a regular basis. For permits that authorize trading with a nonpoint source credit exchange, however, such provisions may not be necessary. In general, the credit exchange will likely have the responsibility for monitoring BMPs and verifying pollutant reductions. In some cases, the trading program itself might establish these responsibilities. The permit writer should determine whether and how the nonpoint source credit exchange verifies pollutant reductions. In some cases, monitoring and inspections might be required of point sources if the credit exchange does not adequately monitor BMPs. In other cases, a third party assumes responsibility for BMP monitoring.

Under any of these scenarios, the permitting authority should be aware of the monitoring and reporting responsibilities established in the trading program or through the credit exchange and should ensure that the permit conditions do not contradict these requirements. Where the trading program provides that the point source conduct inspections and monitoring of nonpoint source BMPs, the permit should incorporate or reference those requirements. Where the trading program provides that a third party conduct inspections and monitoring, the permit should also reference those requirements and clarify the permittee's responsibilities, if any, for reporting or using the information and data gathered through the inspections and monitoring activities or conducting these activities itself should the third party fail to fulfill its responsibilities.

Permitting authorities should consider developing trade tracking forms and establishing discharger trade reporting requirements to monitor trading activities and any alternative compliance activities implemented if a BMP fails to perform as expected (see *Special Conditions*). In addition, credit exchanges should consider holding surplus credits in reserve to be used to compensate for point source pollutant loads in the event of a failed trade.

Maize Creek Example: Monitoring

What You Need to Know…

Pollutant: Biochemical Oxygen Demand

Driver: Maize Creek Watershed Management Plan nutrient reduction goals (pre-TMDL) for point and nonpoint sources

Nonpoint Source Credit Exchange: *Maize Creek Producers' Nutrient Exchange—Nitrogen and Phosphorus*

Credit Sellers: *Ten farms in the Maize Creek Watershed*

Credit Buyer: *City of Earington POTW*

Location: All the farms participating in the MCPN Exchange are upstream of potential point source buyers, including the city of Earington POTW. All point and nonpoint sources discharge directly to Maize Creek.

The facility's existing permit includes TBELs based on state treatment standards for BOD and monitoring requirements to sample the effluent monthly for BOD to determine compliance. The renewed permit will incorporate new effluent limits (based on the approved watershed management plan) as well as the necessary provisions and effluent limits to authorize trading.

In the renewed permit, the POTW will be required to monitor for BOD weekly. The discharger will be required to submit monthly discharge monitoring reports (DMRs) year-round by the 15th of the month following monitoring to the permitting authority to gauge compliance. Ambient receiving water monitoring requirements are included in the existing NPDES permits and are adequate to ensure that localized exceedances of water quality standards do not develop as a result of trades.

Permit Language:

- The permittee shall monitor effluent BOD a minimum of one time per week. The permittee shall determine the average monthly mass loading based on actual monthly average flow. Flow monitoring shall be continuous.

Reporting Requirements

The permitting authority should establish reporting requirements to support the evaluation of water quality trading programs. For example, in addition to reporting discharge monitoring results, permitting authorities might require a permittee to report the number of credits purchased. Permitting authorities might also require an annual monitoring report specific to the pollutants involved in the trade, to provide information on annual loading in accordance with the requirements of the trading program. Permits incorporating water quality trades should require reporting at a frequency appropriate to determine compliance with the trading provisions. Permitting authorities should consider any requirements of the trading programs related to monitoring and reporting and ensure that the permits are consistent with these requirements. Permits may require reporting of monitoring results at a frequency established through the permit on a case-by-case basis but in no case may that frequency be less than once per year.

In addition to reporting of discharge monitoring results, trading programs may establish other reporting and tracking requirements. It is essential that there is a mechanism for tracking trades. The nonpoint source credit exchange should conduct trade tracking and reporting for credit generation. If the credit exchange does not report trades to the permitting authority, the permitting authority might require the permittee to submit an additional form such as a reduction credit certificate form (see Appendix C). The permitting authority can hold point sources liable if they violate any trading provision included in the permit or any trade agreement incorporated by reference into the permit, and point sources are certainly liable if they do not meet their permit limits.

If not provided by the nonpoint source credit exchange, the permitting authority might also want to require verification of project installation and performance specifications before allowing the permittee to use credits. The permit could include provisions requiring the point source purchaser to provide the required verification.

Data Reporting to EPA

EPA administers two systems to store NPDES permit data and track compliance, the Permit Compliance System (PCS) and the new Integrated Compliance Information System (ICIS). PCS is the old, computerized management information system that contains data on NPDES permit-holding facilities to track the permit, compliance, and enforcement status of these facilities.

The new system, ICIS, was deployed in June 2006 to approximately 20 states. ICIS contains integrated enforcement and compliance information across most of EPA's programs including all federal administrative and judicial enforcement actions. In addition, ICIS has the capability to track other activities occurring in an EPA Region that support enforcement and compliance programs. These include Incident Tracking, Compliance Assistance, and Compliance Monitoring. In the future, ICIS will be deployed to all states, and PCS will no longer be used.

Neither PCS nor ICIS is structured to actually track trades.

PCS is designed to compare actual discharge monitoring data against required effluent limitations to determine a facility's compliance with its NPDES permit. To determine compliance under a trading scenario, it is necessary for the NPDES permitting authority to compare actual discharge monitoring data and the quantity of credits purchased against required effluent limitations. For credit buyers, compliance is actually tracked against two effluent limitations—the minimum control level and the baseline. The challenge in using PCS to determine compliance under a trading scenario is that the system does not automatically make adjustments to the reported actual discharge—it will not subtract the quantity of credits purchased. Therefore, this type of adjustment must be done before entering information into PCS so that the system has only one reported number to compare against an effluent limitation.

Point source credit buyers have a baseline and a minimum control level (the facility's TBEL or current discharge, whichever is most stringent). To determine compliance for a credit buyer, the NPDES permitting authority will need to know that (1) the facility's actual discharge is less than or equal to its minimum control level, and (2) that the number of credits purchased results in the facility achieving its baseline. Therefore, point source credit buyers could report

Maize Creek Example: Reporting

What You Need to Know…

Pollutant: Biochemical Oxygen Demand

Driver: Maize Creek Watershed Management Plan nutrient reduction goals (pre-TMDL) for point and nonpoint sources

Nonpoint Source Credit Exchange: ***Maize Creek Producers' Nutrient Exchange—Nitrogen and Phosphorus***

Credit Sellers: ***Ten farms located in the Maize Creek Watershed***

Credit Buyer: ***City of Earington POTW***

Location: All the farms participating in the MCPN Exchange are upstream of potential point source buyers, including the city of Earington POTW. All point and nonpoint sources discharge directly to Maize Creek.

The city of Earington POTW's renewed permit authorizes trading for BOD with the MCPN Exchange. The permit requires, in addition to monitoring reports, regular reporting of any changes to the trade agreement and reports for tracking trades. The facility's permit will contain monthly average effluent limitations for BOD; therefore, monthly trade transactions will be necessary to maintain compliance. The trade agreement between the permittee and the MCPN Exchange indicates that trades will be tracked by the exchange. The trade tracking system generates trading notification forms and monthly trading summaries for the entire program. Credits must be used in the same month they are generated and trading notification forms must be submitted to the regulatory agency by the 15th of the month following the trade.

In addition, the permit requires biannual reporting to summarize year-to-date transactions and actual reductions and loading reflected by monitoring. According to the trade agreement, this is to be compiled by the MCPN Exchange but must be reported on a facility-specific basis to the permitting authority.

Permit Language:

No trade is valid unless it is recorded in the Maize Creek Producers Nutrient Exchange electronic trade tracking system or equivalent system that records all trades and generates trading notification forms and a monthly summary of all trades valid for each calendar month. The recordkeeping system must be capable of ensuring that a particular credit is not sold to more than one trading participant. The trading notification forms and trading summary may be compiled by the MCPN Exchange, but each permittee is responsible for the submittal of all documentation and reports. Trading notification forms for each monthly trade must be submitted to **<the Permitting Authority>** by the 15th day of the month following the trade.

two types of information: (1) the facility's actual discharge, and (2) the difference between the actual discharge and the quantity of credits purchased. Both numbers would be entered into PCS to determine compliance. PCS would compare the actual discharge against the minimum control level to determine permit compliance and eligibility as a credit buyer. PCS would also compare the difference between the actual discharge and the quantity of credits

purchased against the facility's baseline; the difference should be less than or equal to the WQBEL to indicate that the facility has purchased enough credits to meet its baseline and remain in compliance with its WQBEL. PCS can accommodate two different effluent limits for the same parameter; therefore, it has the capability to determine compliance with both the minimum control level and the baseline for a credit buyer.

ICIS also allows the NPDES permitting authority to report two limits; therefore, this system can also accommodate both the baseline and the minimum control level for credit buyers. New DMR forms will also have two lines to report both the baseline and the minimum control level. Like PCS, ICIS does not actually adjust actual discharges with the number of credits bought. Under the current design, ICIS will allow a facility with an existing NPDES permit to also have a trading partner entered into the system. Once a trading partner is entered for a facility, ICIS will allow the entry of an adjusted value for the buyer—this is the reported actual discharge adjusted by the number of credits bought. If an adjusted value is entered, this value is used to determine permit violations and percent exceedances (USEPA 2006).

In addition to challenges related to limits and the type of information to report, NPDES permits with trading provisions might also raise issues related to reporting periods and automated compliance tracking. PCS will not support a reporting extension beyond 30 days. This type of reporting extension might be necessary in some instances to allow adequate time for the administrative activities necessary for trading partners to coordinate and reconcile trades. ICIS, however, will support a 45-day reporting period. In rare instances when a permitting authority uses annual limits, both PCS and ICIS will allow for one limit to be monthly and one to be annual. However, the permitting authority will have to manually flag annual limit effluent violations for reportable noncompliance (RNC) and significant noncompliance (SNC) to track compliance.

Special Conditions

Special conditions are developed to supplement effluent limitations and may include additional monitoring activities, management practices, pollution prevention requirements, ambient stream surveys, compliance schedules (if authorized by the permitting authority), and toxicity reduction evaluations (TREs). Special conditions also include permit modification and reopener conditions and can be used to address water quality trading. Special conditions of a NPDES permit will be very important in incorporating the terms of a trade agreement. Even where the specific terms of the agreement are not directly incorporated into the permit, the special conditions will be used to refer to, and require compliance with, the trade agreement housed in a separate document.

The special conditions included in a NPDES permit to implement trading will depend on provisions of the trade agreement and the effluent limitations and monitoring and reporting requirements established in the permit. However, the permitting authority should consider incorporating special conditions that support the trading conditions. For example, the special conditions of the permit may specify conditions for purchasing credits, additional monitoring and special reporting requirements, and special conditions for failed trades.

Specifying Conditions for Purchasing Credits

Permits that implement trades between point sources and a nonpoint source credit exchange should specify the practices or approaches used to generate credits, if possible. The permitting authority might choose to include these conditions as part of the effluent limitations section of the permit, or as a special condition. While the permit cannot require a nonpoint source to use a particular BMP to generate credits, it can prohibit a point source from purchasing credits that were not generated through use of approved BMPs. Specificity in the permit will depend on the nonpoint source credit exchange's mechanisms for tracking the nonpoint source practices and approaches used to generate credits and distributing credits to point sources. A nonpoint source credit exchange might obtain credits from a nonpoint source and, in some instances, will have no mechanism in place to link the exact origin of specific credits purchased by a point source. Depending on the structure of the nonpoint source credit exchange, the permitting authority or entity managing the trade might determine the appropriate BMPs external to the permit.

The special conditions specific to point source–nonpoint source trading via a nonpoint source credit exchange should also address the timing of when credits are available and when the practice or approach generating credits expires as an eligible source of credits. If not adequately addressed through the nonpoint source credit exchange, the permit might stipulate that continued credit generation requires periodic certification that a practice is still in place and that the nonpoint source is taking specified operation and maintenance actions. As discussed above, permitting authorities may consider establishing monitoring and reporting requirements to ensure that nonpoint sources generating credits are properly installing and maintaining BMPs to continue generating credits. This is especially important if a trade relies on calculated credits and neither the permit nor the nonpoint source credit exchange requires monitoring data to verify pollutant reductions.

Special conditions also could be used to specify the reconciliation period for credits or when credits may be used relative to when they are generated. Effluent limitations will dictate the reconciliation period, as discussed above, but special conditions can clarify the reconciliation period and ensure that credits are not based on future reductions that cannot be verified, thus reducing the risk of noncompliance.

Special conditions addressing liability, provisional requirements that apply when credits are unavailable or when a limit is exceeded, and outlining the specific requirements for establishing trade agreements among permittees can be important in issuing acceptable permits that will not require modification each time circumstances change for one of the dischargers covered under the permit.

Lower Boise River, Idaho

The Lower Boise model uses pounds of TP as its unit of measurement and reconciles trade account balances monthly against the reported discharge amounts. The point source must sign and submit new Reduction Credit Certificates at the end of each month to establish the credit for that month that they can transfer to their own account using the Trade Notification Form. The credits can be used to offset only pollutant discharge for the same month in which they were created. The trades are monitored through the automated Trade Tracking System. For more information about this trading program, see Appendix A.

Additional Monitoring and Special Reporting

The permitting authority might articulate special monitoring requirements as special conditions, as described above. If not adequately addressed through the nonpoint source credit exchange, the permitting authority might require additional monitoring to assess the effectiveness of BMPs or to verify BMP installation, implementation, and maintenance. Any special conditions established to determine BMP effectiveness should specify the party responsible for conducting monitoring and inspections to verify BMP effectiveness and accuracy of the trade ratios assumed in the permit.

Tracking trading activities is particularly important in point source–nonpoint source trades. Because the permittee is the only trading partner regulated, the permitting authority generally will not be able to require tracking information to be reported by the credit exchange. Where permitting authorities will not receive adequate credit tracking reports from the credit exchange, they should consider establishing special conditions in the permit that facilitate tracking. For point source–nonpoint source trades via nonpoint source credit exchanges, the permitting authority might require the point source to provide additional information on the nonpoint source(s) generating the credits or the nonpoint source credit exchange selling the credits reported in the tracking report. For instance, the permit might require the permittee to provide or obtain tracking information via the nonpoint source credit exchange, such as

- Identification of nonpoint source (name, address, phone number)
- Type and location of BMP
- Monitoring method and frequency
- Monitoring results (actual measured quantities, or observations regarding installation and maintenance, at nonpoint source)
- Subtraction of a portion of the reported reduction amount (in pounds) to meet any retirement ratio requirement as specified in the trade agreement
- Conversion of reduction quantity to normalized measure of loading (multiply by trade ratio, including location or delivery ratio, equivalency ratio, and uncertainty ratio, where applicable)
- Time period for which credit is verified, per monitoring requirements for that BMP
- Certifying statement signed by the point source that the information provided is true, accurate, and complete, and that the installation, maintenance, and monitoring of the BMP meets the requirements for that BMP as specified in the trade agreement (Idaho DEQ 2000)

This information may be provided to the permittee by the nonpoint source credit exchange or another entity (e.g., a soil and water conservation district) through a mechanism such as a memorandum of understanding (MOU) or a trade agreement.

Special Conditions for Failed Trades

The success of a trade depends on credit sellers fulfilling trade obligations. Where a point source–nonpoint source trade involves a nonpoint source credit exchange, the nonpoint source credit exchange or trading program might include mechanisms to ensure that the

trade obligations are met by participating nonpoint sources. In addition, credit exchanges should consider holding surplus credits in reserve to be used to compensate for point source pollutant loads in the event of a failed trade. The permitting authority might use special conditions to establish provisional requirements that apply if the credits a point source buyer needs are unavailable from either the credit exchange or surplus credits held in reserve and a point source is unable to comply with calculated WQBELs. The permitting authority would include these special conditions in addition to any enforcement provisions. The trading program should address what degree of risk the permittee bears from purchasing credits that nonpoint sources do not deliver or are proven invalid at a later point in time. The trading program or trade agreement might also describe the respective responsibilities of the buyer and the seller in the case of a failed trade. In any case, the burden of compliance falls on the permittee. The permittee can address the risk of trade failure in a private contract with the seller. The permit might require the permittee notify the permitting authority when a trade fails or how and when it will either secure credits from an alternate source or comply with the calculated WQBELs established in the permit. Monthly reconciliation minimizes risk by requiring certification from buyers and sellers on a monthly basis.

Finally, the permitting authority may reference a reserve of surplus credits held by the nonpoint source credit exchange as a means of managing uncertainty of nonpoint source trading. All such reserved credits would be generated in the same time period they are used or traded. Special conditions could establish the availability of credits held in reserve to the permittee and any conditions placed on the permittee if it desires to use reserved credits.

Accountability

Permits that cover one or more point sources buying credits from a nonpoint source credit exchange should state that the permitted point sources are responsible for meeting effluent limitations derived from water quality standards regardless of whether the nonpoint source trading partners or credit exchange comply with the terms of a trade agreement.

Maize Creek Example: Special Conditions

What You Need to Know…

Pollutant: Biochemical Oxygen Demand

Driver: Maize Creek Watershed Management Plan nutrient reduction goals (pre-TMDL) for point and nonpoint sources

Nonpoint Source Credit Exchange: ***Maize Creek Producers' Nutrient Exchange—Nitrogen and Phosphorus***

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Maize Creek Example: Special Conditions *(continued)*

The NPDES permit writer has reviewed the signed trade agreement for trading between Earington POTW and the MCPN Exchange. The agreement describes how the POTW will meet its new WQBEL through trading with the MCPN Exchange. The NPDES permit writer has developed the appropriate effluent limitations, monitoring, and reporting requirements for the POTW. The special conditions in the POTW NPDES permit focus on general authority, credit definition, notification of amendment to the trade agreement, notification of unavailability of credits, BMP certification, permit reopeners and modification provisions, and enforcement liability.

Permit Language:

General Authority

The permittee is authorized to participate in water quality trading with the Maize Creek Producers Nutrient Exchange, as specified in the Maize Creek Producers Nutrient Exchange Trade agreement, for the purposes of complying with the BOD effluent limitations and the watershed management plan goals required in this permit (Table 2). The authority to use trading for compliance with these limits is derived from: <**insert state law where applicable**> and section 402 of the federal Clean Water Act 33 United States Code (U.S.C.) section 1342. EPA's policies on Water Quality Trading (1/13/03) and Watershed-Based NPDES Permitting (1/7/03) endorse water quality credit trading. Additionally the Maize Creek Watershed Management Plan authorizes water quality trading as a means of achieving the allocations established.

Credit Definition

Credits will be measured in pounds of BOD per day on a monthly average basis. One trading credit shall be defined as one (1) unit of pollutant reduction (pound of BOD) to Maize Creek. All pollutant load reductions purchased and sold by the Maize Creek Nutrient Exchange as equivalent BOD credits represent pollutant load reductions with the appropriate delivery, uncertainty, and equivalency trading ratios applied as detailed in the Maize Creek Producers Nutrient Exchange Trade agreement. All valid credits are tradable. The permittee may purchase credits from the Maize Creek Producers Nutrient Exchange so long as the BMPs utilized to generate credits are documented as providing pollutant reductions beyond the load reduction indicated in the Maize Creek Watershed Management Plan.

Notification of Amendment to the Trade Agreement

The permittee is required to notify the permitting authority in writing within 7 days of the Maize Creek Producers Nutrient Exchange Trade Agreement being amended, modified, or revoked. This notification must include the details of any amendment or modification in addition to the justification for the change(s).

Notification of Unavailability of Credits

The permittee is required to notify the permitting authority in writing within 7 days of becoming aware that credits used or intended for use by the permittee to comply with the terms of this permit are unavailable or determined to be invalid. This notification must include an explanation of how the permittee will ensure compliance with the WQBELs established in this permit, either

Maize Creek Example: Special Conditions *(continued)*

Permit Language (continued):

through implementation of on-site controls or by conducting an approved emergency phosphorus offset project approved by the NPDES permit writer.

BMP Certification

The Maize Creek Producers Nutrient Exchange Trade Agreement specifies that each member will install BMPs beginning in January 2008. The Trade Agreement also includes a requirement that the BMPs be maintained in accordance with NRCS Conservation Practice Standard 350 for sediment basins and NRCS Conservation Practice Standard 656 for constructed wetlands. The permittee is required to inspect BMPs to verify the BMPs have been installed and are being maintained as required under the trade agreement. This permit authorizes the Niblet County SWCD to conduct these inspections on behalf of the permittee, per the terms of the signed MOU with the permittee. The permittee is required to submit a certification each year with the annual report, required by section X of this permit, that the permittee or the Niblet County SWCD has performed these inspections.

Permit Reopeners, Modification Provisions

The permitting authority may, for any reason provided by law, summary proceedings or otherwise, revoke or suspend this permit or modify it to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment or to implement a new Maize Creek BOD TMDL should one be developed. The permitting authority may also reopen and modify the permit to suspend the ability to trade credits to comply with the total BOD waste discharge limitations in Table 2.

Enforcement Liability

The permittee is liable for meeting its most stringent effluent limitation. No liability clauses contained in other legal documents (e.g., trade agreements, contracts) established between the permittee and other authorized buyers and sellers are enforceable under this permit.