Introduction

Farmers and ranchers across the country are committed to clean water and viable farms. They understand the benefits of conservation practices to their farms, soil and operations. But producers and landowners often need resources to invest in the implementation of new practices. Water quality trading (WQT) can offer an innovative alternative source of funds, which is entirely voluntary for producers.

The United States has made significant progress in cleaning its rivers, lakes, and oceans. Investment in wastewater treatment plant technology, conservation practices with land managers, and restoration of natural systems is working in many places. The public continually supports clean water, yet there is still a long way to go in achieving the goal. More than half of the country’s streams, lakes, and estuaries are not meeting the water quality standards established under the Clean Water Act (CWA) to provide clean drinking water, recreation, fish and wildlife habitat, and other designated uses. The work that lies ahead will require additional tools and new approaches. Water quality trading provides a voluntary, market-based system that can help achieve water quality goals at a lower cost.

What is Water Quality Trading?

Water quality trading is an innovative, flexible approach that allows permitted point source dischargers of nutrients the choice of installing onsite technology/practices or working with other sources offsite to generate equal or greater pollutant reductions. When designed well and combined with other efforts in the watershed, WQT can help achieve water quality goals in a way that is beneficial for landowners, communities, and the environment.

How does it work?

A buyer (e.g., a permitted source such as a municipal wastewater facility) purchases water quality improvements, or credits, from a seller (e.g., a farmer or landowner) that reduces pollutants beyond what they would otherwise be required to do. Sources with high costs of reducing pollution purchase needed pollution credits from sources (either regulated or non-regulated) with lower costs. The cost difference provides the economic incentive for trading to occur. For example, farmers implement conservation practices like planting cover crops during the winter that reduce nutrients leaving their field and generate credits. A permitted source such as an electric power utility buys the resulting credits to meet a regulatory requirement or a corporation buys a credit to satisfy a sustainability goal. The
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transaction compensates the farmers for their costs while improving the overall health of the river.

Who Plays What Roles in a Trading Program?
One of the most challenging but ultimately rewarding aspects of WQT is that many stakeholders must get involved during program design and implementation to make it successful. Key actors include: Buyers/Permittees—usually regulated point sources (e.g., municipal and industrial wastewater facilities and utilities) and corporations involved in achieving sustainability goals; Sellers—usually farmers, ranchers or landowners who can generate credits by implementing improvements on current land or facilities; Aggregators—sellers that pool a number of credits together by working with multiple landowners or farmers; Permitting authorities/Regulators—under the Clean Water Act (CWA) water quality agencies set water quality standards and issue permits; Third Parties—a variety of actors playing roles such as developing programs, verification, and monitoring.

What are the potential benefits of WQT?
The core benefit of WQT is achieving improvements in water quality at a lower cost. Other benefits include: reduces cost and increases speed of complying with CWA; provides options and flexibility in meeting CWA requirements; creates new revenue streams for farmers and landowners; creates additional environmental benefits beyond water quality such as habitat; increases accountability and provides new tools for tracking water quality improvements from nonpoint sources; and builds new relationships between rural and urban, agriculture and utilities.

WHY SHOULD FARMERS AND CONSERVATIONISTS CARE?
WQT is a voluntary tool that can provide producers and landowners an alternative funding source or revenue stream to compensate for the cost of implementing and maintaining new conservation practices that improve water quality.

What role can producers play?
Reducing nutrients in water is one of the most costly and challenging environmental issues faced by our nation. USDA analyses have shown that the adoption of best management practices (BMPs) by farmers has prevented the loss of soil and nutrients on 34 percent of cultivated farmland. However, 46 percent of cropland still loses soil and nutrients that don’t have to be lost and 20 percent is losing soil and nutrients at an alarming rate because of the lack of BMPs. There are often significant cost differentials between the technologies that regulated point sources could use to meet discharge standards and the BMPs that farmers can install to reduce nutrient and sediment runoff into the watershed. Through markets, point sources can offer financial incentives to farmers to implement the BMPs and apply the resulting credits to meeting their discharge permits.

DISCLAIMER:
The contributors to the National Network engaged in an extensive dialogue to develop this document, Building a Water Quality Trading Program. National Network contributors believe that it represents a comprehensive, contextual, balanced, and robust collection of information on different, representative water quality trading programs. Practitioners from new and evolving water quality trading programs may look to this document as an important source of information as they build and update their trading programs. This document does not represent a consensus opinion, endorsement, or particular recommendation from any one National Network contributor. It seeks to cover the broad range of topics related to water quality trading to assist local stakeholders to develop and implement trading programs that meet local needs and conditions. This document does not create any binding requirements or standards of practice. Ultimately, stakeholders, state regulators, and/or U.S. EPA will clarify those requirements that apply to any particular trading programs or trading program participants.
How can producers benefit?
Farmers can receive financial benefits from generating and selling credits. If agriculture is fully involved in the creation and operation of a WQT market, the resulting market will help point and nonpoint sources work together to improve water quality more rapidly. Markets can provide:

- Additional funds to implement critical conservation practices that can reduce off-farm impacts and help farms avoid costly regulations in the future;
- Adequate technical assistance that maximizes the efficacy of practices on their farm;
- A fair payment based on transparent measurements of pounds of nitrogen, phosphorus or sediment reduced;
- A consistent, straight-forward process for both signing up and receiving payments;
- A potential mechanism to tie operators to landowners for a longer period (e.g., contracts of five years or longer) when credits are being generated on leased lands; and
- Measures, practices and policies based on trusted science from credible sources.

What are the challenges?
It is important for those who represent agriculture to get engaged early on in the development of markets to both influence elements that have a direct impact on farmer participation and to help simplify market information so that producers can readily understand the market and their commitments. Some of the critical issues for agriculture include:

- Deciding which farmers can participate and which credits qualify;
- Deciding which BMPs should be included;
- Balancing the need for public accountability with privacy concerns;
- Making sure the legal and fiscal liabilities for the landowner are clear;
- Making sure the length of contracts and the price and price structuring makes sense; and
- Creating synergies between WQT and existing conservation incentive programs.
Why get involved?
Ultimately, the collaborative process should: 1) build direct relationships between buyers and sellers of water quality credits; 2) enable business, environmental interests and other stakeholders to have candid conversations about long term goals, e.g., overall reductions for their watershed; 3) safeguard the interests of the broader community; and 4) facilitate organizations' adoption of agreements made by the stakeholder group.

NATIONAL NETWORK AND THE OPTIONS & CONSIDERATIONS GUIDE
The National Network on Water Quality Trading (Network) was established in 2013 to discuss WQT challenges and develop information resources for others interested in building trading programs that meet clean water goals. The Network's 18 initial participants represent a diversity of agricultural operations, wastewater and stormwater utilities, environmental groups, regulatory agencies, and practitioners delivering trading programs. This diversity is similar to that found in most emerging programs in the country. Since 2013, the Network’s dialogue has focused on identifying common trading issues and the options, considerations, and examples important to building a trading program. This dialogue is captured in the publication, Building a Water Quality Trading Program: Options and Considerations. The document covers trades wherein permitted wastewater and/or stormwater facilities (point sources) purchase water quality benefits from nonpoint sources (often agriculture) that reduce pollution above and beyond what they are required to do. It provides essential tools and guidance for new and evolving WQT programs.

As trading programs have developed, they have been guided by the same goals as those set out in the CWA—to restore fishable, swimmable waters in ways that eliminate harmful pollution and support clean water as an important part of healthy communities and healthy economies. Along the way, trading program developers have had to wrestle with tough ecological, economic, and social tradeoffs and face the reality that trading often represents one small, though potentially important, part of meeting those larger CWA goals cost effectively. While a WQT program should be designed to be consistent with the 2003 U.S. EPA Trading Policy and the CWA, the Network document provides additional guiding principles for successful programs.

In addition, the Network has identified 11 elements common to many trading programs that should be considered when designing and implementing WQT programs. For each of these elements, there is no “one size fits all solution.” Instead, there are considerations that make different options more or less viable under different conditions. In-depth presentation and discussion of these key elements of successful programs along with references to existing WQT programs makes up the bulk of Building a Water Quality Trading Program publication. National Network participants immediately recognized that trading programs are built to fit the unique ecological, social, and other conditions of a watershed, and emphasized the importance of sensitivity to local needs. Building a Water Quality Trading Program therefore does not provide explicit recommendations. It provides options and considerations to help facilitate easier and more consistent decision-making across a range of new and evolving trading programs.

Interest is growing in trading programs across the nation. Several states are contemplating new statewide trading statutes or rules, and more wastewater utilities are using trading approaches; however, not everyone is persuaded that trading programs are being designed in ways that are consistent with the CWA and other environmental goals. Further growth in trading, and its success in improving water quality depends on:

- Clear and consistent documentation of assumptions and decisions underlying trading program development and operations;
- Serious consideration of watershed science and goals in guiding the practical workings of trading programs;
- Incorporation of WQT into a suite of water quality protection goals and tools; and
- Regular, informative communications to the public to build confidence that progress is being made toward clean water goals in a timely way.
New and emerging trading programs can use this document to help meet some of these future challenges by using the information to:

- Provide consistent language for use in new trading programs;
- Speed decisions, through use of the options and examples to frame local dialogue; and
- Understand how different stakeholder groups may perceive different trading program design choices.

The Network and its participants will continue to build the tools and information resources needed to support water quality trading programs as they emerge and evolve, including information targeted for specific stakeholder groups, issues, and places.

CRITICAL ISSUES FOR AGRICULTURE

Overview
The elements of a WQT program will ultimately determine whether or not farmers feel comfortable participating in the market. By getting involved in setting up a market, agriculture can ensure a market framework that helps farmers implement more BMPs to address nutrient, sediment, and runoff. The following issues may be of particular interest to agriculture.

#1: Who is Eligible to Participate?
Ideally, markets want to include as many farmers and landowners who can generate credits as possible to ensure a robust supply of credits.

What are the options:
Markets need to decide on three basic eligibility criteria: 1) minimum eligibility requirements (trading baseline requirement), 2) project timing requirements (when a project must be installed in order to be eligible to generate credits) and 3) public funds restrictions (how public funds can be used for projects generating credits).

What the Network discussed:
Section 3.2. of the National Network document discusses options and considerations for how sellers can be eligible to generate credits. For eligibility requirements, areas of contention within the Network included how to be fair to farmers who are already good stewards—using BMPs to improve water quality. Water quality markets generally fund new practices, but there shouldn’t be incentives that encourage farmers to remove or stop using existing practices so practices can be re-installed later on to generate credits. There were also discussions about how farmers or landowners can reasonably document their eligibility with farm history records. The Network also provides options for how a market can specify a particular base year after which implemented projects can be eligible to generate credits. Many WQT programs include provisions restricting the use of public funds in those practices eligible to generate credits.

What Agriculture should look for or consider:
Producers can play an important role in helping WQT programs design eligibility requirements that create incentives for good stewardship and early adoption of BMPs. There are ways to reward good stewards, and the Network document discusses some of those options. Agriculture also can articulate opportunities for synergies between multiple sources of funding for BMPs (e.g., tracking the use of farm bill conservation cost-share programs, state cost share programs, and credit payments). Not all producers will be able to participate in a WQT program but agriculture can help engage growers of particular crops or producers in target areas.
#2: What water quality improvements are expected prior to generating credits (baseline)?

Baseline refers to the level of water quality expected of producers prior to generating credits and as a result helps define which producers can participate. That baseline level is often a source of debate in designing WQT programs and critically important to Agriculture (see Section 3.2.1).

**What are the options and what the Network discussed:**

The Network had several extensive conversations on nonpoint source baselines and set options based on a decision tree of criteria (see Figure 3.2.1). The credits a point source needs to purchase are based on assumptions that nonpoint sources are improving water quality above some base level. The Network struggled to find agreement on how to define that level— the nuance of what is “required” of landowners, what is “expected,” and what is “information” needed to support water quality goals (e.g., through a Total Maximum Daily Load). Network participants recognized the value of incentives for early adoption of BMPs and working in partnership with Agriculture. Yet, there also was concern about how trading programs fit into and contribute to broader efforts to go beyond just making water quality “better” and get closer to achieving clean water goals.

**What Agriculture should look for or consider:**

To participate in trading, producers may first need to achieve some baseline level of water quality improvement (e.g., using some basic BMPs). Agriculture can help trading programs understand the difference between what is required of landowners and what are conservation goals. The baseline levels need to be reasonable, if landowners are going to participate. Also, baseline levels need to logically tie to net benefits in water quality, otherwise point sources may choose or be required to install technology rather than trade. Setting the baseline can be one of the most challenging issues to resolve between Agriculture and environmental groups because broader clean water issues often come into play.
#3: Balancing the need for public accountability with privacy concerns

Trading programs need to strike an appropriate balance between the level of transparency needed to maintain a trusted system and comply with the CWA, and providing the level of confidentiality that some businesses and individuals need in order to engage in such programs (see Section 8.5.2).

What are the options:
Markets can withhold personal contact and confidential business information; they can withhold exact project locations from publicly available sites; or they may choose to withhold all information but the project name and credit quantity.

What the Network discussed:
Providing the maximum level of transparency may constrain trading program participation from Agriculture. However, withholding the project information such as project location may raise significant concerns by external stakeholders wondering how projects are being tracked. Simply reporting a project name and credit quantity doesn't give the public the information they need to feel confident water quality benefits from trading are real. However, if the trading program administrator is fully trusted by all parties, there may be less concern.

What Agriculture should look for or consider:
Trading will not work for everyone. Agriculture can help ensure that credit project review and tracking is consistent with the privacy expectations of producers in a particular watershed. Agriculture can advise on ways to provide information important to the public without triggering privacy concerns for producers participating in trading.

#4: How Markets Manage Risk

WQT markets need to address and mitigate various forms of uncertainty to be successful. This includes: scientific or biophysical uncertainty (i.e., inaccuracies in quantification, variability in performance), regulatory risk (i.e., regulations will change in the future), market uncertainty (i.e., there will not be adequate credit supply and/or credit demand), and buyer risk (i.e., purchased credits will not be delivered as promised). Combinations of eligibility policies, approved credit-generating actions, credit quantification methods, and trading ratios can be used to successfully address these uncertainties.

What are the options:
Trading ratios are one of the primary tools for managing the risks and uncertainties associated with BMPs including how much reduction is actually achieved by the BMP and the possibility of project failure (see Section 5.1). Trading ratios determine how many credits are available to a buyer and can be expressed as the number of credits needed per unit of discharge (e.g., a 2:1 ratio means that a buyer must purchase two credits for every one unit of impact). Programs can set uncertainty ratios (account for the inability to perfectly estimate the pounds of nutrients reduced), reserve ratios (set aside a portion of the estimated credits into a reserve pool to insure against unforeseen credit losses due to project failure) and retirement ratios (set aside a portion of credits for net environmental benefit). There may also be delivery ratios (to account for dilution as pollutants move from edge of field to the buyer's location) and equivalency ratios (that may account for different forms of the same pollutant).

What the Network discussed:
Trading ratios help ensure that a WQT program is delivering actual water quality improvements but they also reduce the number of credits for sale or increase the credits a point source needs to buy. Both options functionally increase the cost of trading relative to a point source's technology options. Care should be taken when selecting ratios to avoid creating redundancy in uncertainty measures, compounding multipliers, or using excessively large factors without justification. Network participants consistently affirmed that the exact numbers to use for trading ratios will depend on local condition, but for whatever numbers are chosen, there should be clear, documented logic behind trading ratios selected.

What Agriculture should look for or consider:
The size of the trading ratios has a big effect on credit prices. Trading ratios also can drive creative ideas to reduce uncertainty. When determining where (or whether) to set the uncertainty ratio, consider the degree of uncertainty introduced through BMP nutrient reduction estimations and whether that uncertainty is, in part, already compensated for through conservative estimation factors, direct monitoring, or other means.
#5: How to Define the Characteristics of Credits?

A credit is effective for use only during its credit life and some projects may continue to generate credits for many years (see Section 6.1). How programs approach credits in terms of ownership and accounting have important implications for agencies, buyers, and sellers.

**What are the options:**
The credit life may differ from the project life, which is the entire time over which a BMP is anticipated to function. It also may differ from the length of the contract through which a project developer agrees to deliver credits to the buyer (the credit contract period). For example, nutrient credits from a grass buffer may have a credit life of one year or less (e.g., seasonal or monthly credit lives), even if the landowner has entered a 5-year contract to install and maintain the BMP, and the project developer and permittee have entered into a 20-year contract for the delivery of credits.

**What the Network discussed:**
Credit life needs to be tied to the critical period in the relevant regulatory documents. For example, if a wastewater facility has a monthly discharge permit requirement, credits need to match that monthly requirement. This allows room for a credit life that is monthly, seasonal, annual, or that spans multiple years so long as the science supports that decision and is defined in the regulatory instrument.

**What Agriculture should look for or consider:**
BMPs are effective for varying lengths of time and it is important to think about maintenance and seasonality in these discussions. Also, Agriculture can help make sure participants understand what is meant by credit life, project life, project protection period (legal agreement) and credit contract period. Legal and fiscal liabilities for the landowner should be clear. The project protection period can be important to landowners. Many trading programs use 5-20 year contracts for a BMP, but some require permanent easements. In some watersheds, there may be concern over permanent easements, and Agriculture can help think through the pros and cons of a BMP contract length.

#6: Project Implementation Standards

Markets must set standards for projects or BMPs that ensure they meet performance expectations (see Section 7). This includes how to document important project aspects such as baseline and other eligibility criteria, quantification method inputs, and what kind of legal protections and maintenance funds for projects are needed and for how long. All these issues can benefit from active review and input from all stakeholders, especially farmers and landowners.
What are the options:
Markets can ask for project site screening, set BMP guidelines (design, maintenance and performance standards), require project design and management plans, ask for documentation of pre-project and post-project site conditions, set project protection and stewardship requirements and set aside project stewardship funds.

What the Network discussed:
Pre-screening project sites can help determine whether a site will meet established eligibility criteria but it may also add unnecessary costs for commonly applied and standardized BMPs. The use of BMP guidelines may prevent the customization of BMPs to fit each particular site and situation and limit the flexibility that producers may desire or need. Network participants recognized the need to keep documentation needs as simple as possible to reduce costs and make it easier for producers to participate. But this must be balanced with the need to have the documentation supporting the quantification of water quality credits.

What Agriculture should look for or consider:
Not all BMP types or agriculture operations will have the information needed to quantify credits and support trading. Agriculture can help define which BMPs (e.g., structural BMPs versus management BMPs) may require different approaches. Also, Agriculture can ensure markets have a pathway to incorporate and encourage innovative BMPs (like precision agriculture, two-stage ditches or controlled agricultural drainage) for inclusion into the trading program as they are ready.

#7: Who Plays What Roles

Although water quality agencies maintain responsibility for all aspects of a trading program, agencies may partner with designated third parties to perform administrative tasks per the considerations regarding trading program roles and responsibilities (see Sections 11.1, 11.3, and 11.4).

What are the options:
Third parties can: A) lead site screening and initial project review; B) confirm monitoring/inspection and maintenance; C) convey information to agencies for enforcement and compliance; and D) facilitate standards development. Agencies or point source permittees can also perform many of these functions.

What the Network discussed:
Network participants recognized that regulatory agencies, third parties, or the point source permittees might perform different functions and oversee parts of a trading program. The Network focused less on who played which roles, and more on what skill sets and attributes were needed. Some Network participants helped clarify that some roles cannot be delegated from point source or regulatory agencies to third parties.

What Agriculture should look for or consider:
Agriculture is more comfortable working with certain groups than others. They may prefer being verified by a soil and water conservation district rather than a water quality agency. Yet, the regulatory liability for credit performance often stays with point source permittees and authority often stays with water quality agencies. Agriculture can facilitate a conversation about how formal partnerships with third parties should be and how to structure more demanding oversight requirements placed by the government body on the third party.