

Getting Paid for Stewardship: An Agricultural Community Water Quality Trading Guide



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Executive Summary

Introduction

Agricultural producers are finding opportunities to get paid for their stewardship activities through water quality trading. Generally, they *sell* the amount of nutrients or sediment reduced by conservation practices. Who buys the nutrient or sediment reductions? Facilities, like wastewater treatment plants, *buy* the reductions to help meet regulatory requirements that limit the amount of these substances that may be discharged in their wastewater to local waterbodies. These regulated facilities find that it is less expensive to pay producers to implement conservation practices than it is to install new treatment technologies. Through water quality trading, producers, regulated facilities, and local water quality all benefit.

Water quality trading is *not* a governmentally mandated program or regulatory requirement. It is simply a market-based tool that enables some industrial and municipal facilities to meet regulatory requirements more cost-effectively. Through trading, producers receive incentives to implement conservation practices.

Water quality trading programs that producers might participate in usually start at the local level. Trading programs are developed to address local water quality concerns and the needs of local stakeholders; therefore, each locally developed trading program will be different. However, the following eight key elements are found in most water quality trading approaches:

- Element 1: Assessing the potential for water quality trading
- Element 2: Determining what a producer can trade
- Element 3: Determining how much a producer can trade
- Element 4: Determining when a producer can trade
- Element 5: Finding a trading partner
- Element 6: Developing trade agreements and addressing liability
- Element 7: Verifying and certifying conservation practice implementation
- Element 8: Tracking and reporting pollutant reductions and trades

Increased participation by agricultural producers will further the success of water quality trading as a market-based tool for achieving water quality goals. Getting informed about the opportunities that exist is the first step.

Who should read this Guide?

This Guide is written for agricultural advisors or technical service providers who provide direct technical assistance to producers, including Extension agents, Certified Crop Advisers, soil and water conservation districts, farm bureaus, the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service, universities, and producer associations. You can use the

information in this Guide to introduce water quality trading to producers and advise producers on their potential role in the trading process.

What information is in this Guide?

The *Introduction* explains why producers might be interested in water quality trading, provides examples of producers getting paid for their stewardship activities through trading, and presents some important caveats for you to consider as you read the document.

Water Quality Trading in Agriculture presents an overview of water quality trading as it pertains to agriculture. This section explains water quality trading and how producers can benefit and discusses the potential challenges producers might face as they get involved in trading. It also describes the various players involved and their roles in water quality trading.

Key Elements in Conducting Water Quality Trading outlines the key elements of a water quality trading program. These are the eight elements listed above. Explanations of each element provide a big-picture view of the trading process and its functional components. Agricultural advisors who operate in areas where trading programs already exist might not need to read about each of the eight elements described. They may simply consult with officials of the existing program for further information.

Five appendices contain useful information including a fact sheet for farmers and ranchers, example forms and calculations, a list of additional resources for more information, and contact information for U.S. Environmental Protection Agency and USDA staff who might help producers learn more about local water quality trading opportunities.

The document provides examples in every section intended to demonstrate how the trading elements actually operate in the real world. It also lists questions you might help producers answer.

Introduction

Many agricultural producers already know the benefits of implementing conservation practices in their operations. Better soil, cleaner water, and greater profits are just some of the advantages. What if producers could earn even more for these same conservation practices? It's possible with water quality trading.

Water quality trading assigns economic value to the benefits generated by conservation practice implementation. Nitrogen and phosphorus in the soil are integral components of a producer's operation, but when excessive amounts of these substances run off fields, there is the potential to degrade water quality. Conservation practices reduce excess pollutants and improve water quality conditions. In addition to reducing pollutants, well-managed agricultural conservation systems can also mitigate elevated water temperatures and loss of wildlife habitat that can result from some land management practices. These improvements to water quality achieved through conservation practices are a valuable commodity that a producer can *trade* with an industrial or municipal facility that is required by law to reduce the amount of the same pollutants in its wastewater. The best part—the producer gets paid for the trade.

“We all know that the demand for conservation is far greater than the funding that is available, especially when budgets are tighter, as they are now and likely will be in the years ahead. Water quality credit trading will enable more conservation without overwhelming taxpayers.”

— Merlyn Carlson, Deputy Under Secretary, Natural Resources and Environment, USDA, from comments made at the Second National Water Quality Trading Conference, Pittsburgh, Pennsylvania, May 23, 2006

Paid for trade

Producers are finding opportunities to get paid for their stewardship through water quality trading. Consider these examples:

- In Barron County, Wisconsin, producers receive from the city of Cumberland approximately \$18.50 per acre for converting to no-till farming (Barron County 2005). It is less expensive for the city to decrease the amount of phosphorus entering the water by paying producers for this conservation practice than it is to upgrade its wastewater treatment plant and pay the annual operating costs for phosphorus removal. In addition, this conservation practice provides many other benefits to the local environment, such as increased wildlife habitat, that treatment at the city's facility would not provide (Jeff Streeter, Director of Public Works, city of Cumberland, personal communication, June 1, 2006).
- In Lancaster County, Pennsylvania, producers competed for federal Conservation Innovation Grant funding to implement conservation practices that would reduce the most phosphorus for the least cost per pound. The funds, distributed by the Pennsylvania Environmental Council, focused on improving water quality in the area surrounding the Conestoga River. Producers with winning proposals received funds ranging from \$1,500 for implementation of streambank stabilization to \$101,990 for installation of a waste storage facility for dairy cattle (PEC and WRI 2006).

“President Bush and EPA believe that America's farmers are producers of solutions, not creators of problems.”

— Stephen L. Johnson, Administrator, U.S. Environmental Protection Agency, from comments made at the Second National Water Quality Trading Conference, Pittsburgh, Pennsylvania, May 24, 2006

- Producers in Washington County, Oregon, work with the Tualatin Soil and Water Conservation District to participate in an enhanced Conservation Reserve Enhancement Program (CREP). Participating producers receive an extra \$128 per acre per year above the standard \$265 per acre per year for tree plantings to cool the excessively warm Tualatin River (Charles Logue, Clean Water Services, Technical Services Department Director, personal communication, May 23, 2006). The additional funds come from Clean Water Services, a wastewater and stormwater public utility that must reduce the amount of heated water entering the Tualatin River from its facilities.

By participating in water quality trading activities, producers receive additional incentives to support conservation practices that can improve soil, air, and water quality; raise land values; and contribute to the health and well-being of their families and neighbors. Water quality trading builds on conservation programs that are already familiar to producers—it is **not** a new government **mandate**, **nor** is it a regulatory requirement.

“Farming is more than just a way to make money, it is about family history. I take care of my property because I love it, not because of profit.”

— John Redding, National Association of Conservation Districts, from comments made at the Second National Water Quality Trading Conference, Pittsburgh, Pennsylvania, May 24, 2006

Who should read this Guide and why?

This Guide outlines the concept and basic elements of water quality trading for the individuals and organizations that serve as agricultural advisors to producers, such as soil and water conservation districts, Certified Crop Advisers (CCAs), Extension agents, farm bureaus, United States Department of Agriculture (USDA) agencies, such as the Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA), universities, producer associations and other agricultural interests. If you are an agricultural advisor, this Guide was written to help you understand basic water quality trading concepts and explain water quality trading to the producers you serve.

This Guide was written with the assistance of a review team comprising local, state, and federal agricultural advisors, and agricultural producers. Participants on the review team provided feedback during the development of this Guide to ensure it contains the information you need to increase your understanding of water quality trading.

Consider the following issues and keep them in mind as you read the document:

1. Technical details of water quality trading are specific to state and local trading programs. Water quality trading is a tool for improving local water quality. Therefore, water quality trading programs usually begin at the local and state levels and involve many important players to establish the ground rules and the process. If a trading program exists in your state or community, remember that the state or local trading program will have the technical information that is most relevant to you. This Guide provides general information. It does not give technical details on aspects of water quality trading that require input from local stakeholders. The goal of this Guide is to provide basic background information to help initiate discussions about water quality trading in areas where trading programs do not yet exist or are in the very early stages of development.

2. There are national guidelines for conducting water quality trading. While the process of water quality trading varies at the state and local levels, some national guidelines govern water quality trading *dos* and *don'ts*. National water quality trading guidelines can be found in the U.S. Environmental Protection Agency's (EPA) *2003 Water Quality Trading Policy (Trading Policy)* (USEPA 2003). Where applicable, EPA's *Trading Policy* is referenced in this Guide to help you understand the national guidelines.

3. The general elements of a water quality trading process presented in this Guide are intended to give you a *big picture* view of how water quality trading works. You will need to consider your roles and responsibilities in this context. This Guide presents the general elements of a water quality trading program that might seem complicated or overwhelming; however, not every element will require participation from you or your producers. The role of agricultural advisors and producers in each of the elements will vary among trading programs.

The following features will help you use this Guide:

- Case study examples that highlight various aspects of water quality trading and how existing trading programs address technical issues.
- Bolded terms and phrases that you will find thoroughly defined in the glossary.
- References to other existing resources on water quality trading that provide more information on technical issues related to trading. These resources include EPA's *Water Quality Trading Toolkit for Permit Writers and Water Quality Trading Assessment Handbook*.
- Useful resources, such as a ready-to-use fact sheet on water quality trading, an example trading form, a water quality trading contact list, and a comprehensive water quality trading resource list.



Photo courtesy of USDA NRCS



Photo courtesy of USDA NRCS

Water Quality Trading in Agriculture

What is trading?

Water quality trading is a market-based approach to improve water quality being used in some **watersheds**. It is a tool that connects industrial and municipal facilities subject to wastewater permit requirements with agricultural producers to economically achieve water quality improvements. These permitted facilities are referred to as **point sources** and, in this context, agricultural producers are referred to as **nonpoint sources**. Through water quality trading, a point source, such as a wastewater treatment plant, facing relatively high costs to remove excessive amounts of substances, such as nitrogen and phosphorus will compensate another party—either another point source or a nonpoint source, such as a farm or ranch—for less costly, yet equivalent, pollutant reduction. The trading partners enter into a contractual trading agreement, where both will benefit financially, and water quality will be improved with a lower investment. A water quality trading market exists only when point and nonpoint sources in a watershed have very different opportunities and costs to reduce their respective pollutant contributions, thereby creating a market for less-expensive approaches to improving water quality. Agricultural conservation practices are one such approach.

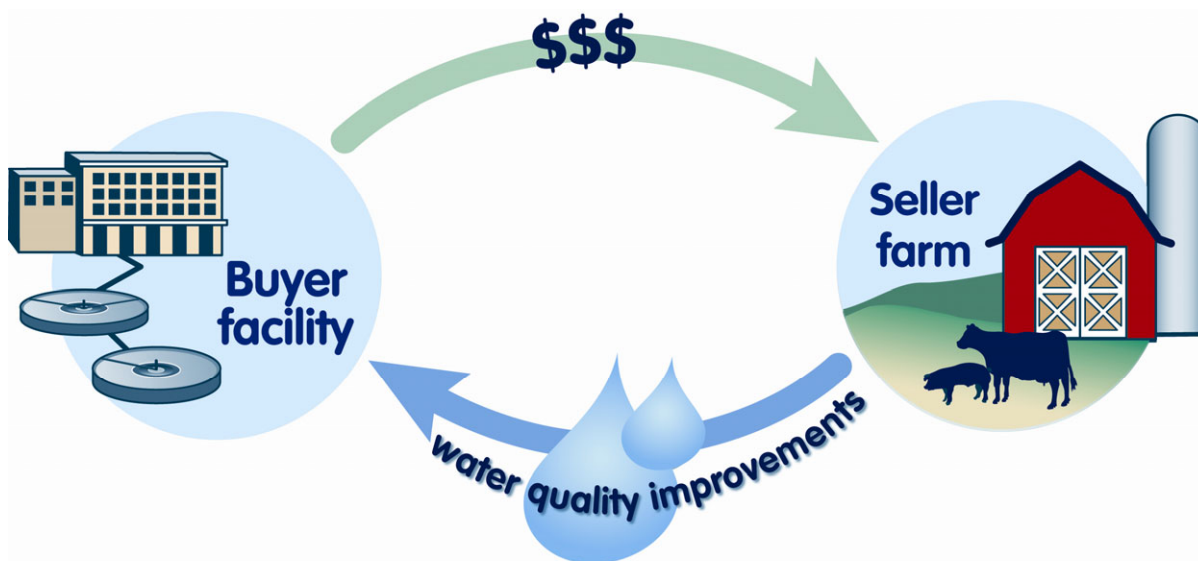


Figure 1. Water Quality Trading

Many pilot projects have explored trading activities and several states have established, or are actively considering, trading programs. For more information on the current status of trading across the country, go to EPA's water quality trading web site at www.epa.gov/owow/watershed.trading.htm.

How can producers benefit from trading?

Water quality trading provides an opportunity for producers to receive compensation for implementing conservation practices on their lands. Trading provides additional resources that supplement existing conservation program funding. For example, the producers in Washington County, Oregon, participating in the enhanced CREP program are receiving an additional \$128 per acre per year for riparian tree planting. Another way producers can benefit is by receiving funding for conservation practices where funding does not currently exist. For example, conservation programs in Barron County, Wisconsin, are beginning to phase-out compensation for no till; therefore, producers participating in this trading program receive funding for this conservation practice where current funding sources are diminishing.

Farmers and ranchers implement conservation practices to, among other reasons, save and improve soils, provide clean livestock watering sources, protect grazing lands, increase the value of their land, and conserve wetlands, fish and wildlife habitat. Producers know that conservation practices that protect the land and water can help to ensure the long-term viability of their farms, not to mention protect the health of their families and livestock and provide recreational opportunities for their families and neighbors.

Producers can finance conservation practices either by direct capital investment, through cost share provided by various programs, or both. Conservation practices implemented using cost share provided by Farm Bill conservation programs might be eligible to generate pollutant reductions for sale to permitted industrial or municipal facilities, however, this will vary based on the state and trading program rules. Where state and trading program rules allow the trading of pollutant reductions generated by cost-shared conservation practices, USDA considers the pollutant reductions (measured in pounds or credits) generated by the conservation practice to be the property of the producer – regardless of the cost-share dollars invested. (For additional resources regarding cost-share programs, see Appendix D.)

What are the potential challenges associated with trading that producers should consider?

Water quality trading might sound like a promising venture, but you should understand and encourage producers to consider potential challenges associated with trading. The liabilities associated with trading, which could present a challenge, will depend on the requirements of a trading program and the terms of a trade negotiated between trading partners (e.g., an agricultural producer and a wastewater treatment plant). Participating in trading, however, does not mean producers will be subject to the same regulatory requirements as the industrial and municipal facilities with whom they trade. Producers can address liability in trading by working with their trading partners to enter into a trade agreement that is transparent and has clearly delineated roles and responsibilities. In the end, a trade agreement between a producer and a trading partner might have stipulations and liability issues similar to contracts used in existing conservation programs.

Other potential challenges include:

- **Potentially high transaction costs due to time-consuming, trade-related activities.**
There are certain activities associated with trading that could result in unanticipated costs,

such as having to seek out potential trading partners, obtaining technical assistance to estimate the amount of nutrients or sediment coming from an operation, or completing lengthy or complex reporting requirements. If too high, these transaction costs could serve as barriers to producer participation. Trading programs that involve producers in the development process are likely to take these transaction costs into account and design a streamlined, cost-effective program. For example, trading programs can promote the use of third parties that buy water quality improvements generated by conservation practice implementation from several producers. This approach prevents individual producers from having to identify permitted industrial and municipal facilities interested in participating in trading.

- **Complicated procedures that might result in potential delays of payment from trading partners.** The process of trading can become complicated if the rules governing trading include an inordinate number of requirements for trade verification and reporting. As a result, these requirements could delay when producers receive a payment from their trading partners, particularly if payment is contingent upon trade verification and reporting. Careful consideration of verification and reporting requirements during the trading program design process might highlight potential issues that could delay payments to producers.
- **Concerns that government employees might want to access land for purposes of verifying conservation practices.** Some producers might not want to participate in trading if it means that they will have to allow government employees periodic access to their land. Overcoming this challenge will require trading programs to respect this concern and identify options for verifying conservation practices that do not involve government employees. For example, a trading program might consider training and certifying producers to perform third-party verification of conservation practice implementation.
- **Fear that the rules of trading are subject to change.** Producers need to know the rules governing trading to determine the potential costs and benefits of participating. If the rules are likely to change, producers will consider trading a risky venture that might be too costly to warrant participation. Given that trading rules are set at the state or local levels, producers might feel as if they have little control over what the rules stipulate and for how long. Rules might evolve due to changes in policy, available information, financial resources, or priorities. Producers can address the issue of stability in trading rules by participating in their development and stating up front what aspect of the trading rules cannot be compromised without affecting participation. With this information, policy makers affecting trading rules may be able to guarantee no changes to key aspects of trading.

Why is trading a hot topic now?

Water quality trading has emerged as an important tool to consider for improving water quality in **impaired waters**, and its use is most often driven by more stringent regulatory requirements for permitted facilities. The Clean Water Act requires that state regulatory agencies develop **total maximum daily loads (TMDLs)** for impaired waters as a roadmap for meeting **water quality standards**. TMDLs contain a maximum pollutant budget, or load, that impaired waters can assimilate and still meet applicable water quality standards. In addition, TMDLs allocate portions of the total load to permitted facilities and other sources contributing to the pollutant load. If permitted facilities do not achieve their pollutant reduction requirements according to the TMDL

wasteload allocation, they are in violation of state and federal law. However, installing additional pollutant control technologies can be very expensive, often prohibitively so. For this reason, permitted facilities are searching for less-expensive ways to achieve an equivalent pollutant reduction and fulfill their permit requirements. Farming operations that reduce pollutant runoff through conservation practices can provide what these permitted facilities need.

Clean Water Act Basics

The goal of the Clean Water Act is to restore and maintain the chemical, physical and biological integrity of the nation's waters. The act provides for the development and implementation of programs to control point and nonpoint sources of pollution to achieve this goal. Some programs are regulatory, while others are voluntary.

Under the National Pollutant Discharge Elimination System (NPDES) permit program, EPA and its state partners issue wastewater discharge permits to permitted industrial and municipal facilities that include **discharge limits**. These limits are either technology-based effluent limits (TBELs), which are determined by the treatment technology available for point sources, or are water quality-based effluent limits (WQBELs), which are based on state water quality standards.

When waters are impaired, which means that water quality standards are not being met, EPA and state permitting agencies are required to develop a TMDL for the specific pollutants identified as causing the water quality impairment. A TMDL describes the maximum pollutant load that the waterbody can assimilate from all pollutant sources in the watershed and assigns a portion of the load to the contributing sources. These portions of the load, referred to as load allocations, are determined for point and nonpoint sources alike, although only the point source wasteload allocations may be enforced.

There are several conditions under which a point source might be interested in trading. These include the following:

- To meet discharge limits, based on water quality standards, specified in NPDES permits (in unimpaired waters).
- To minimize pollutant loads in impaired waters before developing a TMDL (perhaps precluding the need for a TMDL altogether).
- To achieve more stringent discharge limits based on a wasteload allocation derived under a TMDL for the waterbody (in an impaired waterway).
- To accommodate an increase in discharge due to growth.

As more permitted facilities face increased costs to control pollutants, especially pollutants like excessive phosphorus, nitrogen, and sediment, the market demand for pollutant reductions generated by agricultural conservation practices is likely to increase. Members of the regulatory and conservation communities have promoted and supported water quality trading for more than 10 years. EPA's *Trading Policy* highlights continued support of water quality trading and provides guidance to interested parties. To encourage water quality trading, EPA has produced two documents that provide specific guidance on starting a trading program and incorporating

trading into water quality discharge permits. (For additional resources regarding trading, see Appendix D.)

Who are the players in trading and what are their roles?

Water quality trading typically involves a variety of stakeholders including agricultural producers, permitted industrial and municipal facilities, government agencies at the federal, state, and local levels, nongovernmental organizations, and citizen groups. The role of each stakeholder group will vary from trading program to trading program, depending on the structure and functionality of the program. A brief discussion of the roles often found in water quality trading, and the stakeholders who fulfill them, is below.

Sellers and Buyers. Producers in water quality trading most often play the role of a *seller* because they typically implement conservation practices that generate pollutant reductions bought by permitted facilities. Therefore, the term *buyer* is often used to describe the role of permitted facilities in water quality trading. These are the basic roles of producers and permitted facilities, but trading programs might expand these roles and provide opportunities for producers to participate in trading program design and operation. For example, some trading programs employ producers to perform trade verification activities, such as conservation practice inspections for other producers.

Trading Policy Makers. EPA's *Trading Policy* document establishes broad guidance regarding trading; however, it is up to state governments to establish specific policies as deemed necessary. Not all states will provide a trading framework by developing trading rules and regulations. Some states have developed guidance documents and other tools to assist those interested in trading. You can determine if there are statewide regulations, policies or guidelines for water quality trading by contacting the state permitting authority, conservation department, or EPA regional water quality coordinator (see Appendix E).

USDA and EPA Work Together to Support Water Quality Trading

There is strong support for water quality trading at the national level. Both USDA and EPA have issued statements and policies supporting participation in water quality trading programs by industries, agriculture, and other entities. In May 2006, USDA and EPA announced that they are working together to develop a Memorandum of Understanding that will formalize a partnership between the two agencies to expand environmental progress through water quality trading.

Idaho Trading Rules and Regulations

The Idaho Department of Environmental Quality (Idaho DEQ) produced the draft *Pollutant Trading Guidance* that establishes the procedures to be followed for pollutant trading in Idaho. The draft document specifies the conditions under which pollutant trading may take place, establishes record keeping and reporting procedures, and prescribes how conservation practices are to be developed for each watershed. Idaho DEQ and EPA will use this document to convey information to stakeholders about the state's ground rules for trading, and to ensure consistency between trading projects across the state. In addition, a nonprofit group is using the information in the guidance to help in its role of recording trades and making this information available to trading participants, EPA, Idaho DEQ, and the general public.

Credit Exchanges. A credit exchange is a third party that facilitates the exchange of credits between buyers and sellers. There are several variations of credit exchanges, including brokers, aggregators, and central exchanges. Who can perform the function of a credit exchange is dependent on the state trading policy or a trading program. However, a wide range of stakeholders should be given the opportunity to fulfill this role, including state agencies, local conservation districts, nongovernmental organizations, private industry, or individual entrepreneurs. You should explore the possibility of how you might play this role in the context of water quality trading.

Financial and Technical Service Providers. Many existing trading programs rely on a certain amount of public and private financing to cover initial start-up and operating costs. In addition, trading programs often rely on credible sources of technical information related to conservation practice implementation and verification, economic analysis, and watershed management. Federal agencies, such as the NRCS, U.S. Forest Service, Agricultural Research Service (ARS), the Cooperative State, Research, Education, and Extension Service (Extension), and EPA or state regulatory agencies play an important role in providing financial and technical assistance to producers who wish to participate in trading. Research conducted by these agencies can assist in developing technical trading procedures, and they can provide important water quality information and some financial assistance to support trading programs.

Other important roles in water quality trading provide verification, evaluation, and public involvement activities. It is up to the trading program to define specific roles in water quality trading and create opportunities for all stakeholders to participate.

By taking an active role in the process, you will have the opportunity to influence how water quality trading works in your area and ensure this market-based conservation opportunity will attract and benefit the producers you serve.

Trading Facilitated by a Local Government

The Barron County, Wisconsin, Soil and Water Conservation Department served as a third-party facilitator (broker) for the Red Cedar River Nutrient Trading Pilot Program. The department negotiated with farmers and established trade agreements between participating nonpoint sources and the city of Cumberland.

“What else do we need to do to help make trading happen? We don’t have all the answers, but that shouldn’t stop us from moving forward. In its new Strategic Plan, NRCS has focused on traditional goals and venture goals. We want to be on the cutting edge—and that means embracing market-based approaches to conservation, like water quality credit trading.”

– Bruce Knight, Chief, USDA-NRCS, from comments made at the Second National Water Quality Trading Conference, Pittsburgh, Pennsylvania, May 25, 2006

“The number one thing we [Farm Bureau] can do is to bring farmers to the table, but we can’t keep them there. . . The only way to keep farmers at the table is to make it worth their while—to keep progressing and not get bogged down in bureaucracy. If we lose farmers at the table, we lose them in the watershed, and we lose them as trading partners.”

– Don Parrish, American Farm Bureau Federation, from comments made at the Second National Water Quality Trading Conference, Pittsburgh, Pennsylvania, May 24, 2006

Elements for Conducting Water Quality Trading

To help producers participate in water quality trading, you should have a general understanding of the elements involved in the process. This section provides basic information about each element of water quality trading, as well as a few questions that you can help answer for producers with an interest in trading. In addition, this section highlights what role you might play in each of these elements:

- Element 1: Assessing the potential for water quality trading
- Element 2: Determining what a producer can trade
- Element 3: Determining how much a producer can trade
- Element 4: Determining when a producer can trade
- Element 5: Finding a trading partner
- Element 6: Developing trade agreements and addressing liability
- Element 7: Verifying and certifying conservation practice implementation
- Element 8: Tracking and reporting pollutant reductions and trades

Every trading program is likely to have a specific process and a set of technical guidelines designed with stakeholder participation. If a trading program exists in your state or watershed, you might consider obtaining information about that program so that as you continue through this guide, you will fully understand how your local trading program actually operates. If trading programs do not exist, or are under development in your state or watershed, read this section to see the *big picture* of water quality trading. This information can help you establish the basic foundation necessary to either initiate the development of a trading program, or actively participate in the development process initiated by other key stakeholders.

It is important to keep in mind that there is no one right approach to water quality trading. Each trading program reflects the unique characteristics and conditions of a local watershed, as well as the unique social issues and concerns of potential trading partners and other key stakeholders. Therefore, this Guide cannot present every possible permutation of how to conduct water quality trading. To demonstrate the variability in approaches to water quality trading, this section presents brief case study examples that illustrate how existing trading programs address each element. Also keep in mind that while this Guide presents the elements sequentially, water quality trading is likely to be a dynamic, iterative process that might not involve conducting each element in the order presented here.

Element 1: Assessing the potential for water quality trading

Trading is not suitable for every watershed. So, how will you know if the opportunity for water quality trading exists where you live and work? First, find out whether there is an opportunity for trading in a watershed. The catalyst for trading could stem from very specific, measurable goals to reduce the amount of pollutants entering the watershed. If these types of water quality goals exist, the catalyst for water quality trading might also exist. This element focuses on conducting preliminary research to determine the potential need for water quality trading. Remember, this research can be conducted by any watershed stakeholder with an interest in trading. This could include government agencies, industries, nongovernmental organizations, such as watershed or conservation groups, agricultural producers or landowners, or agricultural advisors like you.



Elements of Water Quality Trading

Assessing the potential for water quality trading

- Determining what a producer can trade
- Determining how much a producer can trade
- Determining when a producer can trade
- Finding a trading partner
- Developing trade agreements and addressing liability
- Verifying and certifying conservation practice implementation
- Tracking and reporting pollutant reductions and trades

Does a TMDL or other type of pollutant reduction goal exist?

Water quality trading is used most often as a tool to improve water quality when the goal is to achieve a budget for or a cap on the amount of a pollutant that can enter a local waterbody. The pollutant budget or cap is linked to state water quality standards and might be found in a document, such as a municipal or industrial facility's wastewater permit, a TMDL, or a watershed management plan. The driver for water quality trading—whether it is a TMDL, a wastewater permit limit, or a watershed management plan—will determine which pollutants need reductions and are likely to be the focus of a trading program. You can contact your state water pollution control agency to obtain information on TMDLs, wastewater permits, and watershed management plans in your area. If you cannot easily identify a catalyst for trading, you can contact an EPA or NRCS trading contact (see Appendix D for contact information), agricultural service center, local watershed organization, soil and water conservation district, local Extension office, state permitting authority or local government to determine the local water quality issues that might serve as a potential catalyst for trading.

What are the pollutants of concern for the waterbody?

You can use a TMDL, a wastewater permit, or a watershed management plan to determine the pollutants of concern for a waterbody. The pollutants of concern identified in such documents usually will serve as the focus of water quality trading. For example, if a TMDL for nitrogen exists for a waterbody, water quality trading activities will likely focus on nitrogen. You should know that not all pollutants of concern are suitable for trading. According to EPA's *Trading Policy*, EPA generally supports trading for total nitrogen, total phosphorus, and sediment. Other pollutants, such as temperature, might also be suitable for trading as long as the trading program appropriately considers the water quality impact. You might live in a state with a water quality trading framework that has additional guidelines for what types of pollutants are or are not eligible for trading. TMDLs and watershed management plans that focus on nutrients, sediment,

and possibly temperature might provide the best opportunity for agricultural producers interested in water quality trading.

How much reduction in the pollutants of concern is necessary?

The TMDL, wastewater permit, or watershed management plan that defines the goals for trading will not only specify the pollutants of concern, but also the amount by which the pollutants must be reduced to meet water quality standards. TMDLs, for example, include an overall pollutant budget for the waterbody and specific pollutant budgets for point and nonpoint sources that contribute the pollutant to the waterbody. This information will help you understand what pollutants and pollutant sources trading will address, as well as the amount of pollutants a producer or a group of producers might be able to reduce over time.

Defining the Goal for Trading Through a TMDL

Clean Water Services (CWS) is a public utility that operates four municipal wastewater treatment facilities, has two industrial NPDES permits, and is a co-permittee in a Municipal Separate Storm Sewer System (MS4) permit in Oregon. These facilities discharge to the Tualatin River, which has TMDLs for ammonia and phosphorus, temperature, bacteria and tributary dissolved oxygen. In February 2004, the Oregon Department of Environmental Quality issued a single watershed-based, integrated municipal permit to CWS that covers all of its treatment facilities and the MS4. The permit includes provisions for water quality credit trading involving temperature (thermal load), biochemical oxygen demand, and ammonia. CWS's permit serves as the basis for trading in the Tualatin watershed by describing the pollutants of concern, identifying the pollutant reductions needed, and specifically allowing trading to meet the permit limits.

Help producers answer these questions. . .

1. Does a recent water quality analysis (e.g., watershed management plan, wastewater permit, or TMDL) specify the type of pollutants causing water quality issues in the watershed?
2. Is the pollutant suitable for trading according to EPA's *Trading Policy* and the specific guidelines of the trading program?
3. What is the overall watershed goal for reducing the pollutants of concern?

Element 2: Determining what a producer can trade

Another important element in conducting water quality trading is understanding the commodity or service a producer can trade. By understanding the potential variations among trading programs, you will be able to help producers understand the different commodities and services that might attract potential trading partners.

Elements of Water Quality Trading



Assessing the potential for water quality trading

Determining what a producer can trade

Determining how much a producer can trade

Determining when a producer can trade

Finding a trading partner

Developing trade agreements and addressing liability

Verifying and certifying conservation practice implementation

Tracking and reporting pollutant reductions and trades

What commodity or service can a producer trade?

Water quality trading can involve a variety of commodities and services measured in units, such as pounds, acres, or credits. You are probably familiar with the idea of selling pounds and credits. Most trading programs use pounds of pollutant removed (i.e., a pollutant reduction) or pollutant reduction credits as the commodity a producer will sell to permitted industrial and municipal facilities. In general, a producer will implement a conservation practice and then sell the pounds of a specific pollutant removed or reduced by implementing the conservation practice. Trading programs that address the buying and selling of pollutant reduction credits use a calculation that involves the number of pounds of pollutant reduced and other factors established by the program to account for issues, such as pollutant fate and transport or uncertainties with conservation practice effectiveness. The calculation translates pounds into pollutant reduction credits eligible for trading. Each of these approaches usually involves a producer implementing a conservation practice before trading and receiving payment at a later date for the pollutant reductions—measured either in pounds or as credits—generated through the conservation practice. So the commodity that the producer is selling is the actual reduced amount of a pollutant achieved by implementing a conservation practice.

Instead of focusing on trading credits or pounds of pollutants reduced, some trading programs provide compensation for the actual implementation and maintenance of conservation practices. This is especially true when a permitted industrial or municipal facility is required to take some action to offset its pollutant discharge. For example, a permitted industrial or municipal facility might pay a producer a one-time fee for implementing a conservation practice. The permitted facility might even implement a conservation practice on a producer's land in exchange for a commitment by the producer to regularly maintain the practice. In this case, the producer is selling a service instead of a commodity—the service of implementing and/or maintaining a conservation practice to help a permitted facility meet its permit requirements.

Compensation for Implementation of Conservation Practices

To be authorized to build a new wastewater treatment plant that would discharge to the Minnesota River, the Rahr Malting facility in Shakopee, Minnesota, needed to offset the pollutant load from the new plant. To do this, Rahr Malting provided funding to compensate agricultural producers to implement conservation practices at four upstream agricultural operations. Two of the projects used easements to set aside farmland and convert it back to vegetated floodplain. For the other two projects, Rahr Malting paid for structural streambank stabilization; one of these also included a livestock exclusion. The farmers who implemented the streambank erosion control project had been actively seeking financial assistance to address severe riverbank erosion that was threatening their agricultural land, fences, and buildings (Bretz et al. 2004).

Keep in mind that there are different forms of the same pollutant, for example organic nitrogen and total nitrogen. A producer might have one form of pollutant reduction available for sale and a potential trading partner needs another form of that same pollutant. In these instances, a trading program might recommend the use of a factor to convert different forms of a pollutant to the same form (e.g., a conversion factor used to convert organic nitrogen to total nitrogen). More information on the use of such factors can be found in the section on Trade Ratios, page 23.

It is important to know that one conservation practice, or a system of practices, might generate more than one commodity or service and might have the potential to earn a profit through other types of environmental trading programs, if available in your state or watershed. For example, a conservation system that generates reductions in sediment and phosphorus might also (1) lower carbon emissions, (2) provide essential habitat for protected wildlife, and (3) lower water temperature to promote increased fish populations. It is possible that a producer could generate and trade multiple types of credits from this one conservation system through water quality trading, carbon trading programs, and wetland banking programs. The approach of using one conservation practice to generate a variety of credits for trading is referred to as **multi-credit trading** or **credit stacking**.

What conservation practices are eligible for trading?

Conservation practices eligible for trading will vary from trading program to trading program. Some programs might compile a list of approved or eligible conservation practices. Other trading programs might not specify approved or eligible conservation practices and allow a producer to decide which practice is most appropriate according to the nature of the operation, the amount of pollutant removal desired, cost, and other factors. It is a good idea to consider a range of conservation practices to address the multiple pathways that pollutants might enter a waterbody from an operation (e.g., soil loss, runoff from a surface manure application, volatilization from fertilizer and manure).

Even if a trading program provides a list of conservation practices, a producer will make some potentially challenging decisions about which practice is best. You can play an important role in helping producers select appropriate practices that provide conservation benefits and enable the producer to enter into water quality trading. In many cases, water quality trading is intended to build on existing conservation programs, such as the various Farm Bill conservation programs implemented by NRCS, in which producers participate. This is done, among other reasons, to simplify the water quality trading process from the perspective of producers and to use the existing accepted assumptions for conservation practice performance. As a result, you are probably very familiar with the conservation practices and related programs that producers might use to participate in water quality trading. With this knowledge, you can help producers through potentially challenging aspects of the water quality trading process, such as determining the type and amount of pollutants entering a waterbody from an agricultural operation and estimating the effectiveness of specific conservation practices at reducing those pollutants leaving a producer's operation. For additional resources for information on specific agricultural conservation practices, see Appendix D.

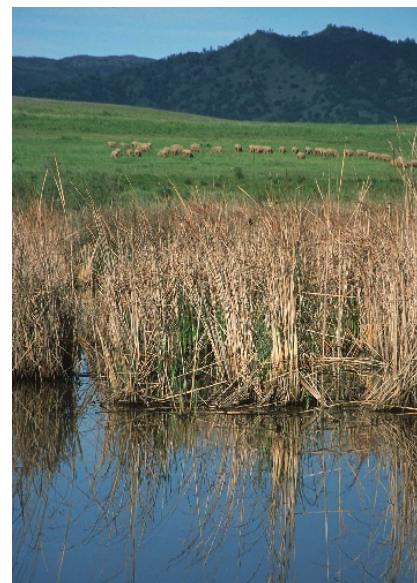


Photo courtesy of USDA NRCS

Credit Stacking

Water quality trading markets are not the only game in town. There are other environmental markets that agricultural producers can participate in. These include:

- Carbon markets. Carbon markets are probably the most developed of the environmental markets. There are large, global carbon markets, carbon investment funds, carbon brokers, and carbon hedge funds. The Chicago Climate Exchange is an active carbon market available to U.S. farmers. The Regional Greenhouse Gas Initiative is a carbon market being developed for the northeastern and mid-Atlantic states. Local carbon markets are also being developed in the Pacific Northwest and the southwestern U.S.
- Biodiversity markets. Wetlands mitigation banking and conservation banking are two examples of active biodiversity markets in which agricultural producers can participate.

Some water quality trading programs encourage *credit stacking* or using one conservation practice to generate credits for multiple environmental markets. For example, the Great Miami River Watershed Water Quality Credit Trading Program encourages farmers to implement conservation practices like no-till farming to generate phosphorus credits to sell through the Water Quality Trading Program and carbon credits for sale through the Chicago Climate Exchange.

Credit stacking within a water quality trading program might be possible, as well. For example, producers might be able to use a single conservation practice, or system of conservation practices, to generate credits for reduction of phosphorus, sediment, and pathogens.

The issue of whether conservation practices funded through cost-share programs are eligible for water quality trading is of special interest to producers. Producers will also want to know if conservation practices they have already installed are eligible for trading. The answers to these questions vary from trading program to trading program. Some programs allow unrestricted trading using cost-shared conservation practices; others do not allow the use of cost-shared practices in trading at all. Some programs allow producers to trade using only the portion of a conservation practice that is not cost shared. Where state and trading program rules allow the trading of pollutant reductions generated by cost-shared conservation practices, USDA considers the pollutant reductions (measured in pounds or credits) generated by the conservation practice to be the property of the producer – regardless of the cost share dollars invested. However, state and trading program rules will ultimately determine the eligibility of cost-shared conservation practices. Some trading programs allow trading using existing conservation practices while others require implementation of new practices to be eligible for trading. You should encourage producers to check with their local NRCS field office, soil and water conservation districts, or Extension agents to find out if the use of cost-shared conservation practices or existing conservation practices is possible.

Help producers answer these questions. . .

1. Will water quality trading in the watershed involve the sale of a commodity (pollutant reduction pounds or credits) or a service (implementation and/or maintenance of a conservation practice)?

2. Are the approved or eligible conservation practices appropriate for the producer's operation?
3. Can a producer participate in trading using cost-shared or existing conservation practices?

Element 3: Determining how much a producer can trade

It is not only important for you to know what a producer can trade, but how much of the pollutant reduction, pollutant reduction credit, or conservation practice implementation the producer can trade. The issue of how much a producer can trade is dependent on a number of factors, including eligibility requirements for trading, the amount of a pollutant reduced through conservation practice implementation, and discounts (trade ratios) established by a trading program to account for challenges and characteristics unique to a trade, such as uncertainty in conservation practice performance.

Elements of Water Quality Trading



Assessing the potential for water quality trading

Determining what a producer can trade

Determining how much a producer can trade

Determining when a producer can trade

Finding a trading partner

Developing trade agreements and addressing liability

Verifying and certifying conservation practice implementation

Tracking and reporting pollutant reductions and trades

What is the baseline a producer must first meet to be eligible for trading?

You are probably familiar with the eligibility requirements for producers in existing conservation programs. In water quality trading, producers must first meet a baseline, or a minimum requirement, to be considered an eligible participant in water quality trading. Using a baseline provides equity among producers and other entities wishing to sell pounds of pollutant removed, pollutant reduction credits, or conservation practice implementation. Baselines also help to ensure a certain level of water quality improvement in the watershed.

Trading programs use a variety of approaches to express a baseline, including a specific pollutant reduction (in pounds), a percentage of a pollutant reduction, or a minimum required level of conservation practice implementation. For example:

- **Specific pollutant reduction:** A producer is assigned a baseline phosphorus reduction of 20 lbs/day that implementation of a conservation practice must achieve before the conservation practice generates pollutant reduction credits. A producer generating any phosphorus reductions beyond 20 lbs/day can participate in trading by selling the excess phosphorus reductions or by receiving compensation to implement conservation practices that achieve the excess phosphorus reductions.
- **Percentage of a pollutant reduction:** A producer is assigned a baseline sediment reduction of 20 percent from the current discharge before conservation practices generate pollutant reduction credits. A producer generating any sediment reductions greater than 20 percent of the current discharge can participate in trading by selling the excess sediment reductions or by receiving compensation to implement conservation practices that achieve the excess sediment reductions.
- **Minimum level of conservation practice implementation:** A producer is assigned a baseline for nitrogen reduction, for example, that requires the establishment of 100-foot setbacks

from all surface waters for all land application of manure or commercial fertilizer. A producer cannot use the nitrogen reductions achieved through implementation of this conservation practice for purposes of trading and cannot receive compensation through the trading program to implement the baseline requirement. However, a producer can participate in trading by selling nitrogen reductions achieved through the implementation of additional conservation practices or by receiving compensation to implement conservation practices in addition to the baseline requirement.

Photo courtesy of USDA NRCS



Photo courtesy of USDA

Trading Baselines

Pennsylvania is developing a state water quality trading policy to support trading between point sources and nonpoint sources. The Pennsylvania Department of Environmental Protection (PADEP) is currently developing a formula to address trading baselines for over 50,000 farming operations. Pennsylvania is considering the following options for establishing a nonpoint source trading baseline. An agricultural operation should meet state regulatory requirements and implement ONE of the following:

- 1) A 100-foot mechanical setback. This is achieved when manure is not mechanically applied within 100 feet of a stream; there are no surface waters on or within 100 feet of the operation; or, the operation uses no manure application and applies commercial fertilizer at or below the Pennsylvania State University recommended agronomic rates.
- 2) A 35-foot buffer. This is achieved when a minimum of 35 feet of permanent vegetation is established and maintained between the field and the stream. The area can be grazed or cropped, however, permanent vegetation must be maintained at all times.
- 3) Reduction in nutrients beyond baseline. This is achieved when the operation reduces nutrients beyond baseline compliance. Pennsylvania is currently discussing the feasibility of a 20 percent beyond-baseline reduction option (PADEP 2006).

Some trading programs might use a combination of these baseline approaches to provide producers with some flexibility in achieving their baseline.

When you consider the baseline and how to achieve it, you will likely encounter again the measurable goal that serves as the basis for trading. This is particularly true where a TMDL is the driver for water quality trading. Where a TMDL for a certain pollutant exists, trading programs that address the same pollutant will most likely express the baseline for producers as the load allocation portion of the TMDL. Where a TMDL load allocation does not exist, the trading program will probably express the baseline as a minimum level of conservation practice implementation. Additional information on establishing trading baselines for producers and other nonpoint sources is available in EPA's *Water Quality Trading Toolkit for Permit Writers* (Appendix D includes reference information).

How does a producer calculate how much is available to trade?

Each trading program determines the steps involved in calculating how much pollutant reduction, pollutant reduction credits, or conservation practice implementation a producer has to trade (see Appendix C for a detailed example of a pollutant reduction calculation). When discussing water quality trading with producers, you should have a fundamental understanding of the how to calculate a trade. The basic equations presented below can be used to determine the number of pounds of pollutant reduction that a producer can trade.

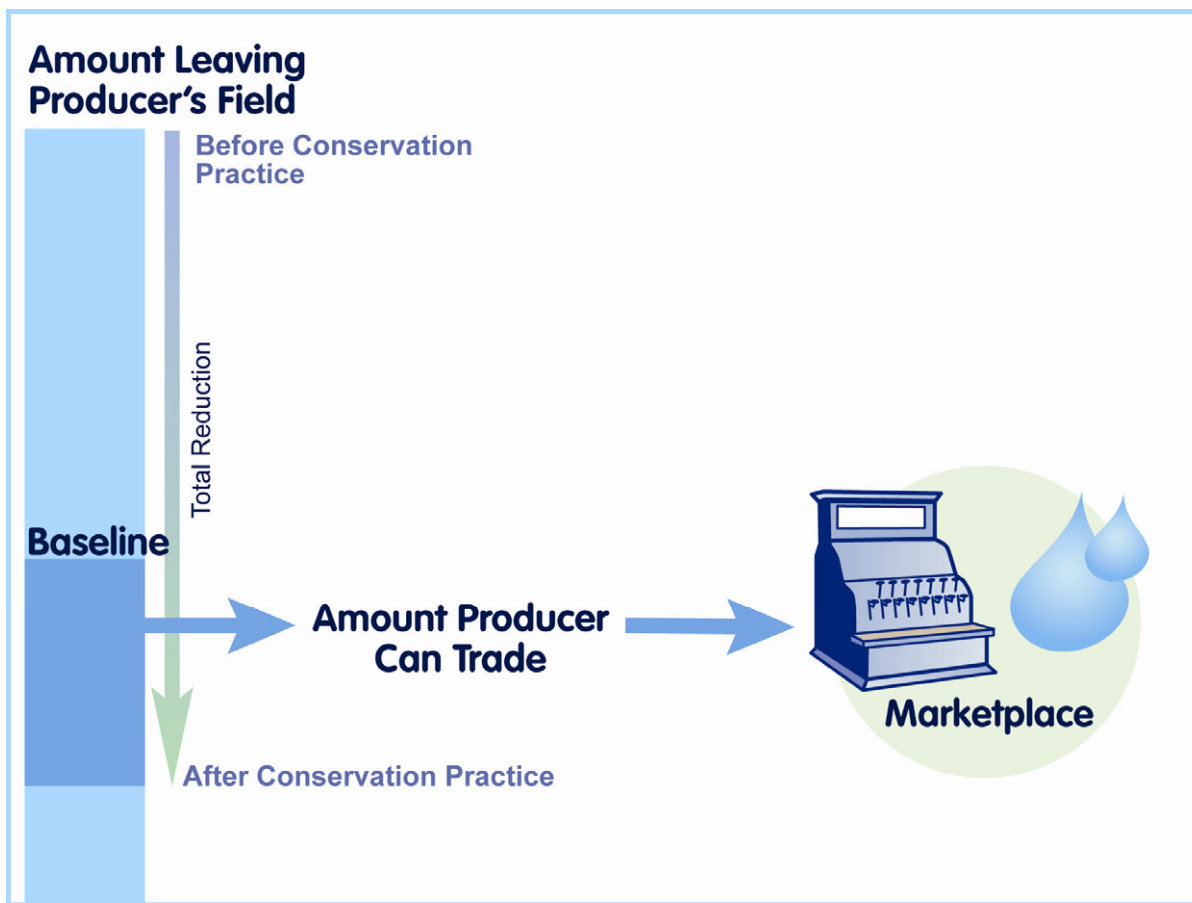


Figure 2. Determining how much a producer can trade

Basic Equations for Calculating How Much a Producer Can Trade

If baseline is expressed in pounds or percent reduction:

[Total pollutant reduction achieved (pounds) – Baseline pollutant reduction requirement* (pounds)] × Trade ratio(s) (if applicable) = _____ Pounds of pollutant reduction eligible for water quality trading

** If the baseline is expressed as a percent reduction, convert the percent to pounds:*

Baseline percentage reduction requirement x current pollutant discharge (pounds)

If baseline is expressed as a minimum level of conservation practice implementation:

Total pollutant reduction achieved through conservation practices in excess of the baseline requirement (pounds) × Trade ratio(s) (if applicable) = _____ Pounds of pollutant reduction eligible for water quality trading

Total pollutant reduction. In the above equation, the total pollutant reduction is the amount of pollutants reduced through conservation practice implementation after achieving the baseline. You can provide a producer with assistance in determining the pollutant removal efficiencies of conservation practices or how much of a pollutant a conservation practice can be expected to remove. Trading programs might provide this information with a list of approved conservation practices and associated pollutant removal efficiencies. If not, you might have this information through existing conservation programs or tools, such as the NRCS electronic Field Office Technical Guide (eFOTG). You might even know of other existing technical tools, such as field and watershed-scale loading models, to estimate conservation practice pollutant reductions based on the specific characteristics of an operation (e.g., soil, slope, land cover). If available, you can recommend these tools to estimate the pollutant reductions associated with the most suitable conservation practices.

Trade ratios. Water quality trading presents challenges in how to address unique environmental features, such as pollutant fate and transport through a certain type of waterbody and how to estimate pollutant reductions from agricultural operations using conservation practices. As a result, most trades incorporate a factor called a trade ratio to account for these features and challenges. The trade ratio affects how much pollutant reduction or pollutant reduction credits a producer has available to trade because it usually has a discounting effect.

Trading programs use different terms to describe trade ratios. Commonly used trade ratios account for the location of the trading partners, the location of the impaired waterbody in relation to the trading partners, the type of pollutant being traded, and the uncertainty associated with pollutant reductions achieved by conservation practice implementation. The latter is referred to as an uncertainty ratio and is likely the type of trade ratio producers will most frequently encounter when participating in water quality trading.

An uncertainty ratio compares the amount of pollutant reduction that a permitted industrial or municipal facility must buy from a producer to the amount of pollutant reduction the permitted

Modeling to Estimate Expected Pollutant Reductions

In the Red Cedar River Nutrient Trading Pilot Program in Wisconsin, the total phosphorus reduction credits associated with a conservation practice were modeled to estimate reductions from well-established and well-understood practices. Soils from fields were tested to calculate the total phosphorus delivery to the stream from the field where the conservation practice was used (Breetz et al. 2004).

facility can actually use. So, an uncertainty ratio of 2:1 means that a permitted industrial or municipal facility will buy either 2 pounds of a pollutant reduction or 2 pollutant reduction credits if it needs to actually use 1 pound or 1 credit to meet its permit requirements. Uncertainty ratios might range from 2:1 or as high as 5:1, depending on the rules of a trading program. The higher the uncertainty ratio, the more expensive it is for a permitted industrial or municipal facility to trade with a producer. The better the understanding of a conservation practice's pollutant removal efficiency, usually through direct monitoring, the more likely it is a trading program will use a lower uncertainty ratio.

Trading programs might use more than one type of trade ratio, either separately or combined into one factor. See the *Water Quality Trading Toolkit for Permit Writers* for more information on trade ratios (Appendix D includes reference information).

Help producers answer these questions. . .

1. What is the baseline that must be met before generating pollutant reduction credits?
2. What is the current total amount of pollutants entering a waterbody from the operation?
3. What conservation practices are available to reduce the amount of pollutants entering a waterbody from the operation?
4. Can the producer implement conservation practices to achieve the baseline and reduce pollutants further so the producer will have pollutant reductions to sell?
5. Do any trade ratios apply to the credits generated?

Element 4: Determining when a producer can trade

Many factors affect the time frame in which a producer can implement conservation practices, generate eligible pollutant reductions, and sell the pollutant reduction, pollutant reduction credits, or conservation practice implementation. The issues affecting timing will ultimately influence when a producer will receive payment for participating in water quality trading.

Elements of Water Quality Trading



To what extent does the timing of pollutant reduction affect when a producer can trade?

The period of time during which a producer generates pollutant reductions to trade and a permitted industrial or municipal facility can use those pollutant reductions to offset its pollutant discharge is referred to as a **reconciliation period**. A producer cannot sell pollutant reductions or pollutant reduction credits before the conservation practice actually generates them or after the reconciliation period ends. For example, if a permitted industrial or municipal facility must offset a pollutant discharge during the month of April, the facility must purchase pollutant

Photo courtesy of USDA



reductions actually achieved during the month of April. Each trading program will specify the appropriate reconciliation period and the process for ensuring trading partners trade during that time frame. It is likely that trading programs will use reconciliation periods appropriate for the pollutant of concern and the timing of permit discharge limits for a permitted industrial or municipal facility. If a point source trading partner is required to meet a monthly discharge limit, the trading program might also use a monthly

reconciliation period. Permits can express discharge limits on a monthly, seasonal, or annual basis; therefore, a trading program might use one or more reconciliation periods. You can help producers understand the function of a reconciliation period and determine if it is possible to generate pollutant reductions during the reconciliation periods established by a trading program. In situations where a producer sells conservation practice implementation, a reconciliation period is not necessary because this type of transaction focuses on a one-time purchase of a service as opposed to the purchase and use of regularly generated pollutant reductions quantified as pounds or credits.

How can seasonal variability affect when a producer can trade?

Some conservation practices installed on agricultural lands are designed to control pollutants that leave an operation during wet seasons. A trading program might limit a producer's ability to trade during dry weather if a conservation practice intended to operate during wet seasons is not generating pollutant reductions. Wet seasons produce runoff as a result of rainfall or snow melt. Irrigation practices might also generate runoff from an operation. For conservation practices designed to address runoff during wet seasons or from irrigation practices, a trading program might specify that a producer cannot generate a pound of pollutant reduction or a pollutant reduction credit when no runoff leaves the operation. For example, a farmer might implement a nutrient management system, including testing soil and manure to avoid applying excess nutrients to cropland, and immediately incorporating manure into soils to minimize nitrogen volatilization and surface runoff of nitrogen and phosphorus. The positive impact of this conservation practice will be realized primarily during wet weather because that is when much of the volatilized nitrogen and surface-applied nutrients would have been transported to surface water before the conservation system was implemented.

Limitations on a producer's ability to trade due to seasonal variability are dependent on state and trading program rules. A trading program will specify if a producer has anything to trade during irrigation and how to quantify associated pollutant reductions. For example, the trading program might describe an irrigation schedule that is considered normal for your area and allow a producer to trade using pollutant reductions generated during those irrigation events.

Another consideration related to seasonal variability focuses on the timing of conservation practice implementation. Some conservation practices are appropriate for implementation only during certain times of the year. For example, producers in most parts of the country cannot establish

vegetated buffer strips during the winter months. Keep in mind the potential for seasonal variability when helping producers determine when they can participate in water quality trading.

How can the life span of conservation practices and time lags related to implementation affect when a producer can trade?

Conservation practices might not generate pollutant reductions eligible for trading indefinitely. Some have a limited life span, and most require some type of maintenance to ensure their effectiveness over time. Trading programs might specify the assumed life span for each type of conservation practice, or technical resources, such as NRCS's eFOTG might contain the information you need. You can help producers estimate the life span of conservation practices and select those that will generate the most pollutant reductions over the greatest period of time for the least cost.

A producer should also understand the potential time lags between when he or she initially implements a conservation practice and the time when the conservation practice is considered fully functional. Conservation practices that are not yet fully functional cannot generate the full amount of expected pollutant reduction or pollutant reduction credits. If a lag time does exist, a producer still might have the opportunity to generate a prorated pollutant reduction eligible for trading before the conservation practice has reached its maximum pollutant removal efficiency.



Photo courtesy of USDA

For **nonstructural conservation practices**, you should consider how long it will take to develop the practice and how long it will take to implement. For example, if the selected conservation practice is to develop and implement a nutrient management plan, a producer might have to train employees and wait for an appropriate time to make necessary improvements to the operation's manure handling and storage structures or to sample soil and manure.

Help producers answer these questions. . .

1. What is the required reconciliation period for trades?
2. How will seasonal variability in the effectiveness of a conservation practice affect the producer's ability to trade?
3. What are the expected life span and maintenance requirements of the conservation practice(s) the producer is considering?
4. Will there be a time lag between when the producer implements the conservation practice and when it will begin generating pollutant reductions eligible to trade?

Element 5: Finding a trading partner

Knowing what and how much a producer can trade is an important part of water quality trading, but no trades can happen unless a producer has found a trading partner with the appropriate set of needs. This element of water quality trading can seem overwhelming to producers who don't know how to find potential trading partners or don't want to deal directly with them.

You will likely play an important role in this element of water quality trading because you have established trust and credibility with producers. It's important that you understand the characteristics of an appropriate trading partner for producers, the different ways producers can find potential trading partners, and how you can assist them in getting their pollutant reductions from the field to a buyer.



What are the characteristics of an appropriate trading partner for a producer?

Not every permitted industrial and municipal facility looking to buy pollutant reductions is an appropriate trading partner for a producer. You have to consider the type, amount, and timing of pollutant reductions generated by the producer and determine if they match the type, amount, and timing of pollutant reductions needed by a permitted industrial or municipal facility. For example, a producer might be selling pollutant reductions for a different form of the pollutant than the permitted facility needs to buy. Or, a potential trading partner might need to offset its pollutant discharge with pollutant reductions in quantities that a single producer cannot provide. Instead, a group of producers together could provide pollutant reductions in the needed quantities and be a more suitable trading partner. Timing is also another important characteristic to match between a producer and a potential trading partner. Keep in mind the time constraints of the specified reconciliation period. Also know that some potential trading partners might want producers to enter into a long-term agreement and guarantee that they can provide pollutant reductions for an extended period of time. This period of time might be at least five years because industrial and municipal discharge permits have a five-year term.

What mechanisms can producers use to find potential trading partners?

Producers can use many mechanisms to find potential trading partners. The most obvious is independently researching and contacting permitted industrial and municipal facilities. While this does not seem like a realistic option for most producers, it is possible with assistance from you or the state's NPDES permitting authority. With assistance, producers can obtain information on permitted industrial and municipal facilities in their area, including the type of pollutants these facilities must control and whether the facilities are authorized to trade to meet their wastewater permit limits. The NPDES permitting authority might know which of these facilities is interested in trading, or for assistance you can consult with a regional EPA or NRCS contact (Appendix E contains contact information).

Other mechanisms for finding potential trading partners focus on the use of a **credit exchange** where a third party facilitates the exchange of pollutant reduction credits between buyers and sellers. There are several mechanisms you can consider under the category of credit exchange, including brokers, aggregators, and central exchanges.

- Brokers are third parties that bring together potential trading partners. Brokers can work independently or as part of a trading program, and they may charge a fee for their services. A broker does the footwork and research necessary to match buyers and sellers based on pollutant type, amount, and timing. Buyers and sellers negotiate the terms of the trade directly, although the broker might facilitate the negotiation process. The broker does not actually transfer pollutant reductions or pollutant reduction credits between trading partners, however a broker might participate in evaluating and ranking bids or proposals from producers who apply for financial compensation for implementing conservation practices.

Brokers can help to facilitate trades and develop the necessary documentation to serve as a trade agreement between producers and their trading partners. You might consider serving as a broker in water quality trading to help producers find appropriate trading partners. Alternatively, some trading programs use a *virtual* broker that advertises the needs of permitted industrial and municipal facilities using a Web-based tool so producers can easily identify potential trading partners. Existing trading resources, such as the Environmental Trading Network or the World Resources Institute can provide examples of brokers and brokering tools (e.g., NutrientNet) to help establish a third-party broker in a watershed (for additional trading resources, see Appendix D).

- Aggregators are also third parties that collect pollutant reduction credits from several producers to sell in bulk to permitted industrial and municipal facilities. You might be familiar with the concept of an aggregator through existing carbon credit trading programs like the Chicago Climate Exchange. Unlike a broker, an aggregator actually buys pollutant reductions or pollutant reduction credits from producers. As a result, trade agreements exist between producers and the aggregator. There are no agreements between producers and permitted industrial and municipal facilities. Aggregators will enter into separate agreements with the facilities that purchase the pollutant reductions compiled from several producers. Conservation partners, such as state Farm Bureaus and soil and water conservation districts function as aggregators for carbon credit trading programs. You might consider playing the role of an aggregator in water quality trading. Aggregators benefit the water quality trading process by eliminating the need for a permitted industrial or municipal facility to contact several producers to find enough pollutant reductions to buy and by allowing producers to participate in trading without having to establish a relationship with permitted industrial or municipal facilities. Aggregators also might charge producers a fee for their services, but this cost is likely to be less expensive than the transaction costs of independently finding trading partners and negotiating trade agreements.
- Central exchanges involve a third party that purchases pollutant reduction credits from one or more producers and then distributes the credits among buyers. The sellers and buyers who trade through the central exchange do not meet or negotiate trades directly with one another. A central exchange can buy pollutant reduction credits directly from producers and other entities that generate credits and then sell those credits to permitted industrial and municipal facilities during the appropriate reconciliation period. A producer does not

negotiate directly with permitted facilities wanting to buy credits, only with the central exchange. The central exchange will likely have its own eligibility requirements and enter into separate agreements with each seller and buyer. The central exchange might also charge a service fee to help defray administrative and transaction costs.

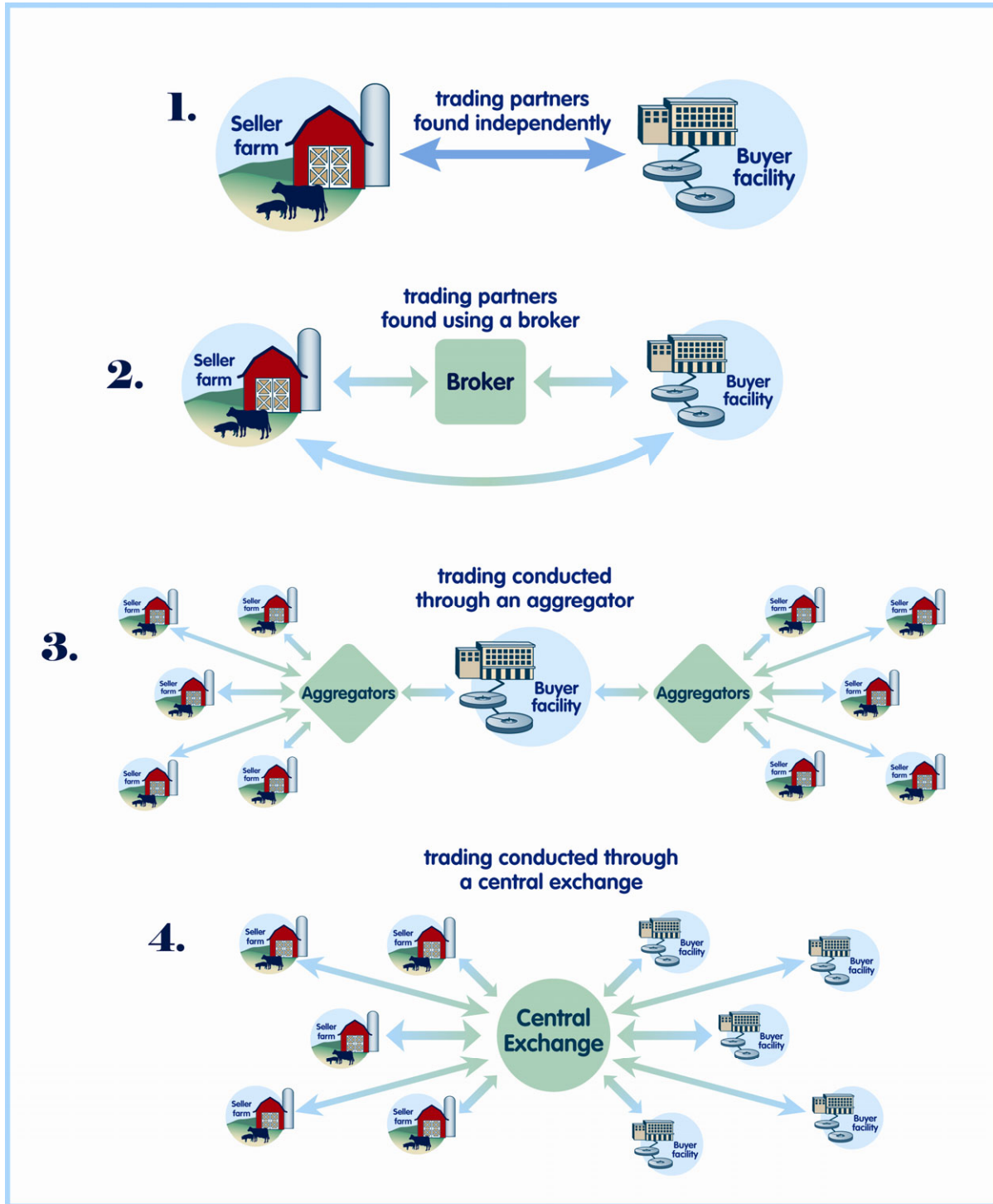


Figure 3. Finding a trading partner

From a producer's standpoint, a central exchange will perform the same function as an aggregator in terms of purchasing pollutant reductions from producers and selling them to permitted facilities. The primary difference between a central exchange and aggregators is that typically there will be only one central exchange in a trading program, and the trading program will be structured around the central exchange. In contrast, multiple aggregators may operate within a trading program. The aggregators operate as free agents, and no one aggregator is central to the functionality of the trading program.

Help producers answer these questions. . .

1. Does the producer want to independently locate individual trading partners themselves? If yes, where can they get more information about potential trading partners?
2. If the producer does not want to independently locate potential trading partners, does a credit exchange (e.g., broker, aggregator, central exchange) exist in the state or watershed? If so, does the credit exchange offer the services that the producer needs and wants?
3. What other services does the producer need and want related to finding and communicating with potential trading partners?

Element 6: Developing trade agreements and addressing liability

This element of trading is extremely important because trade agreements are the documents that specify all the terms of a trade agreed to by a producer and trading partners—either permitted industrial and municipal facilities, an aggregator, or a central exchange. The trade agreement will formally spell out liability between trading partners and associated consequences for a failed trade. It is important that you understand what information a trade agreement should contain so that you can help address any concerns that producers might have related to this element of water quality trading.

Elements of Water Quality Trading

Assessing the potential for water quality trading

Determining what a producer can trade

Determining how much a producer can trade

Determining when a producer can trade



Finding a trading partner

Developing trade agreements and addressing liability

Verifying and certifying conservation practice implementation

Tracking and reporting pollutant reductions and trades

What are the terms of the trade contained in a trade agreement?

The terms of the trade contained in a trade agreement should specify technical, liability, financial, and administrative aspects of the trade agreed upon by both trading partners.

Technical issues. The trade agreement will spell out technical issues related to a trade, such as the type and form of the pollutant and the quantity and timing of pollutant reductions. Other technical issues a trade agreement might address include the following:

- Type and location of conservation practices generating credits
- Procedures for conservation practice operation and maintenance and responsible party
- Reconciliation period for pollutant reduction generation and use
- Applicable baselines for both sellers and buyers
- Applicable trade ratios
- Expected pollutant load reductions from conservation practices
- Current water quality contribution for sellers and buyers
- Schedule for inspecting, verifying, and certifying conservation practice implementation
- Ability to estimate pollutant contributions from the farm or ranch
- Lag time between conservation practice implementation and water quality improvement

Liability issues. Determining liability in water quality trading is a significant concern for producers. The trade agreement is the instrument for assigning liability and specifying the consequences for not upholding the terms of the trade. Many producers are accustomed to entering into contracts related to conservation practice implementation through existing conservation programs. These types of contracts address liability by stating that if a producer fails to adequately implement and maintain a conservation practice, the producer will either (1) not receive reimbursement for the conservation practice from cost-share funding, or (2) pay back the cost-share funds received for the conservation practice. Trade agreements might use the same approach for failed or inadequate implementation of a conservation practice intended to generate a pollutant reduction.

Liability is another issue that will vary from trading program to trading program. However, no trading program can transfer regulatory liability from a permitted industrial or municipal facility to a producer; this transfer of liability is not authorized under the Clean Water Act. Even though the requirements and consequences of a trading partner's discharge permit will not apply, a producer should recognize that conservation practice implementation will impact a trading partner's ability to comply with their discharge permit requirements. Therefore, a producer should be prepared to accept a certain level of liability and an associated penalty for failing to fulfill the terms of the trade agreement.

Financial issues. How much a producer will receive for a pound of pollutant reduction, a pollutant reduction credit, or implementation of a conservation practice is a key trading issue documented in the trade agreement. Trading programs use different approaches for determining price. Some trading programs use a competitive approach, allowing producers to submit proposals with conservation partners that specify the cost of conservation practice implementation and maintenance and

Determining the Cost of Credits

According to the *Great Miami River Watershed Water Quality Credit Trading Program Operations Manual*, "The cost of a water quality credit is determined by the market. In general, the cost of a water quality credit is likely to be the sum of expenditures for a nutrient reduction project (including applicable capital, operating, administrative and ongoing maintenance costs) divided by the number of credits" (Miami Conservancy District 2005).

the resulting estimated price per pound of pollutant reduced. Other trading programs might employ very detailed costing formulas to determine a uniform cost for a pound of pollutant reduction or a pollutant reduction credit. In other instances, a trading program might use the current pricing structure of existing conservation programs and ask potential buyers and sellers for input on what price would motivate them to participate. You can help producers understand a trading program's approach to establishing the price for a pound of pollutant reduction, a pollutant reduction credit, or conservation practice implementation.

Administrative issues. Trade agreements should address administrative issues, such as responsibilities for both trading partners related to trade tracking and reporting, including schedules, formats, and report submittal processes. Other administrative issues the trade agreement might address include the following:

- A schedule and process for making payments
- A list of required documentation and an associated schedule of when each is due and to whom
- Requirements for public notification and participation

What type of trade agreement is appropriate?

Once the trading partners have negotiated all the terms of the trade, this information will become part of a formal trade agreement. A trading program might specify the type of information trading partners should provide in a trade agreement and the appropriate format. In some instances, a trading program might recommend that trading partners develop and sign a memorandum of agreement. In other instances, the trading program might supply a standard trade agreement form for trading partners to complete and submit. Some trading programs might not recommend or provide any specific type of trade agreement, leaving it up to the trading partners to determine what type of trade agreement is most appropriate. Central exchanges and aggregators might use standard trade agreements to reduce transaction costs. Where a trading program does not provide recommendations or supply a standard form, using a written trade agreement in some form is highly recommended.

Help producers answer these questions. . .

1. Is there a standard trade agreement that all trading partners must use?
2. If a standard trade agreement is not used, is there a required or recommended trade agreement mechanism (e.g., memorandum of agreement or understanding)?
3. If developing a trade agreement with a trading partner, does the producer know what technical, liability, financial, and administrative issues need to be addressed?
4. Is the producer comfortable with the technical, liability, financial, and administrative terms of the trade expressed in the trade agreement? If not, is there an opportunity to negotiate these terms with the trading partner?
5. Does the producer have all the information needed to complete the trade agreement? If not, does the producer know where to get assistance in compiling this information?

Element 7: Verifying and certifying conservation practice implementation

Successful conservation practice implementation and maintenance is paramount to a successful trade. Therefore, it is imperative that all trades include a process for verifying and certifying that producers are properly implementing and maintaining conservation practices to generate the expected pollutant reductions. With an understanding of how this element works and why it is important to successful trading, you should be able to communicate this information to producers to alleviate their potential concerns about allowing trading partners or third parties to come onto their land to verify conservation practices.

Elements of Water Quality Trading

Assessing the potential for water quality trading

Determining what a producer can trade

Determining how much a producer can trade

Determining when a producer can trade

Finding a trading partner

Developing trade agreements and addressing liability



Verifying and certifying conservation practice implementation

Tracking and reporting pollutant reductions and trades

Why is it necessary to verify and certify conservation practice implementation and maintenance?

It is difficult to measure actual pollutant reductions from conservation practice implementation. Many trading programs use models or other calculations to estimate pollutant reductions from conservation practices. These procedures are inherently less certain than direct measurement. As a result, trading programs often incorporate mechanisms to compensate for uncertainty related to quantifying conservation practice pollutant removal efficiencies. This is often accomplished by including requirements for conservation practice inspections and certification in trade agreements. Information from inspections will help determine if conservation practices are achieving the expected pollutant reductions. Trading programs often assume that as long as the conservation practices are properly implemented and maintained, they will achieve the expected pollutant reductions predicted by models or other tools. For such programs, it is necessary to verify conservation practices to help refine the estimation methodology as the trading program matures. In other words, if the predicted pollutant reductions were not achieved, the trading program needs to know whether it was due to improper implementation or maintenance of conservation practices or incorrect estimates of pollutant removal efficiencies.

How frequently will verification of conservation practice implementation and maintenance occur?

The schedule for inspections will vary according to the types of conservation practices implemented by a producer and, where pollutant reductions or pollutant reduction credits are traded, the reconciliation period for the trade. In addition to verification of conservation practice maintenance, producers might also have to allow for the verification of conservation practice implementation before a trading partner can purchase pollutant reductions.

Who conducts the verification and certification process?

Trade agreements should define who is responsible for verifying and certifying conservation practice implementation and maintenance. This could be the producer, the permitted industrial and municipal facility, or a conservation partner. You might have an interest in conducting this activity for water quality trades taking place in your area. For example, a soil and water

conservation district might agree to verify conservation practice implementation through a mechanism, such as a memorandum of understanding with both trading partners. It is important for you to communicate with producers about the necessity of providing periodic access to their property and conservation practices for purposes of verification.

In addition to regular inspections to verify adequate implementation and maintenance, the trade agreement might also specify the need to certify the pollutant reductions generated by conservation practices. The trading program will specify who is responsible for making this certification and the associated certification process. In some cases, a producer might self-certify by stating that all conservation practices are still functional. In other cases, the permitted industrial and municipal facilities or a third party might have to periodically inspect conservation practices to certify that they are still functional and that, over time, the conservation practice design and specifications remain appropriate for the site.

How can a producer address a failed or compromised conservation practice?

Factors like severe storms, drought, natural disaster, or other events outside of a producer's control might impact the performance of a conservation practice. In selecting conservation practices and developing a trade agreement, it is important to carefully consider what contingencies are needed to deal with such events. Some trading programs establish means to ensure that producers generate more pollutant reductions for a watershed than what permitted facilities actually need. If a trading program purchases surplus pollutant reductions, it might allow a permitted facility to purchase from the surplus in the event one producer's conservation practices fail due to unforeseen circumstances. In any case, a producer should develop a plan for repairing or reestablishing conservation practices damaged by severe weather or other catastrophic events.

Help producers answer these questions. . .

1. Has the producer considered the operation and maintenance requirements necessary to ensure the conservation practice or system of conservation practices is effective throughout the time frame of the trade agreement?
2. Does the producer know what verification and certification activities are required and who is responsible for them?
3. Is the producer willing to allow an agent of the trading partner or another third party to come onto his or her property to inspect the conservation practices?
4. Does the producer have a contingency plan in place to address failed or compromised conservation practices?

Element 8: Tracking and reporting pollutant reductions and trades

Trade agreements might require specific tracking and reporting requirements to ensure that all trades are valid. The practice of tracking trades is particularly important to permitted industrial and municipal facilities because they will have to demonstrate to the NPDES permitting authority that they have purchased the required amount of pollutant reduction to offset their excess pollutant discharge. Some trading programs use existing conservation program tracking and reporting mechanisms, while others employ unique tracking and reporting processes.

Elements of Water Quality Trading

Assessing the potential for water quality trading

Determining what a producer can trade

Determining how much a producer can trade

Determining when a producer can trade

Finding a trading partner

Developing trade agreements and addressing liability

Verifying and certifying conservation practice implementation



Tracking and reporting pollutant reductions and trades

What type of information is tracked and reported for each trade?

To generate pollutant reductions eligible for trading, a producer will likely need to provide adequate documentation about conservation practice implementation and maintenance. In addition, trading programs might require tracking and reporting of all financial transactions with a trading partner. This type of tracking will help trading program administrators develop annual reports on the progress water quality trading has made toward achieving overarching pollutant reduction goals and at what cost. The trade agreement might also specify the need to complete and submit a certification form (see Appendix B) or a conservation practice pollutant reduction calculation form. This type of tracking and reporting will require detailed information on the producer's operation and the conservation practices implemented at that operation to generate pollutant reductions. For more information on trade tracking and reporting, see EPA's *Water Quality Trading Toolkit for Permit Writers* (Appendix D includes reference information).

How often is information reported for each trade and who is responsible?

The frequency for tracking and reporting will vary from trading program to trading program, depending on the designated reconciliation period and the time frame necessary to review trade related forms and reports, develop required annual reports for the public, and conduct an accounting of pollutant discharges and pollutant load reductions. Depending on details of the trade agreement, tracking and reporting activities might be the responsibility of the producer, the producer's trading partner, or the third party performing verification and certification services.

Help producers answer these questions. . .

1. Does the trade agreement specify how trades are tracked over time?
2. Does the trade agreement indicate who is responsible for tracking trades and what information is necessary to report?

3. Does the trade agreement specify the reporting frequency?
4. When are trade tracking reports due and to whom is the information sent?

Conclusion

Water quality trading holds great promise as an effective market-based tool for achieving America's clean water goals. You and the agricultural producers you serve are integral to the success of water quality trading, particularly now. Although water quality trading has been the focus of discussion for over a decade, in reality, it is just getting started. Momentum is growing, critical discussions are happening, and pivotal decisions are shaping the future of water quality trading programs and policies across the country. Your early involvement in water quality trading will allow you to participate in the critical discussions and pivotal decision-making processes, ensuring that future water quality trading programs will meet the needs of agricultural producers and address their concerns.

As water quality trading success stories grow, demand for expertise in the area of water quality trading will also grow. Innovators in water quality trading will have unmatched expertise to offer producers interested in getting paid for their conservation efforts. Expanding your services to include water quality trading will not only help producers realize new economic opportunities, but also result in more conservation on the ground.

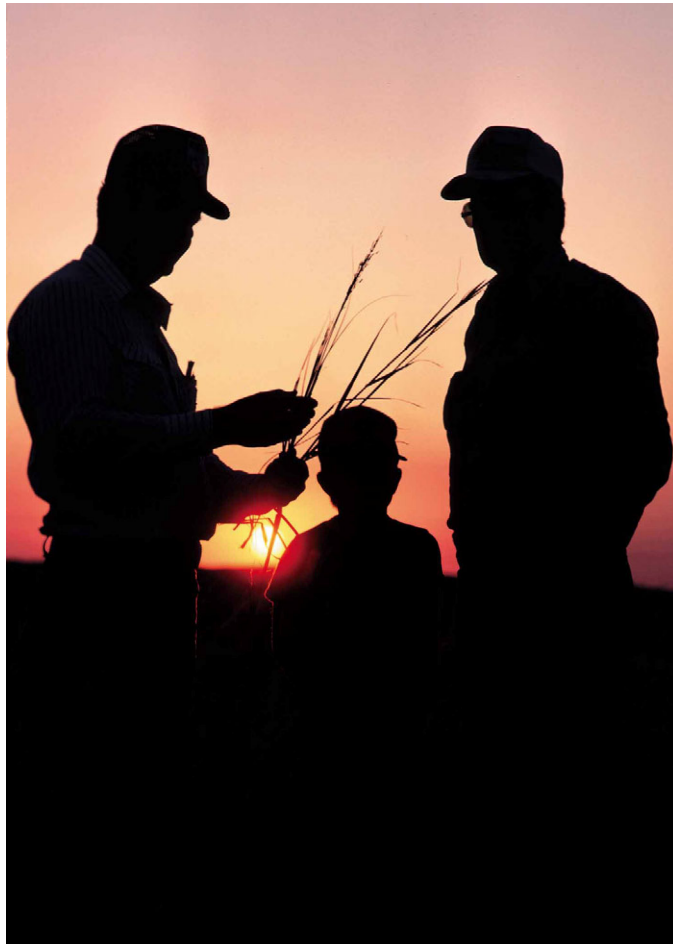


Photo courtesy of USDA

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Glossary

baseline. The minimum pollutant control requirement that a credit seller must meet before it can enter the trading market.

conservation practice. Method, measure, or practice selected by an agency to meet its nonpoint source control needs. Conservation practices include but are not limited to structural and nonstructural controls and operation and maintenance procedures. Conservation practices can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters. Also called best management practices (BMPs).

credit exchange. A third party acting to facilitate the exchange of pollutant reduction credits between buyers and sellers. Several mechanisms are included under the category of credit exchange, including brokers, aggregators, and central exchanges.

credit stacking. Currencies in trading, such as a credit, that reflects more than one type of environmental value (e.g., habitat protection, carbon sequestration, wetlands mitigation, water quality improvements) generated by one conservation practice. See also **multi-credit trading**.

impaired water. A waterbody is impaired when water quality standards are not being met, and EPA and state permitting agencies are required to develop total maximum daily loads (TMDLs) for the waterbody.

discharge limits. Under the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) permit program, EPA and its state partners impose discharge limits on point sources, such as wastewater treatment plants and industrial facilities. These limits are either technology-based discharge limits (TBELs), which are determined by the treatment technology available for particular point sources, or are water quality-based effluent limits (WQBELs), which are based on state water quality standards. Also called effluent limits or permit limits.

load allocation. The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loads should be distinguished (40 CFR 130.2).

multi-credit trading. Exchange of credits that reflect more than one type of environmental value (e.g., habitat protection, carbon sequestration, wetlands mitigation, water quality improvements). See also **credit stacking**.

nonpoint source. A diffuse pollution source (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet) that does not have regulated wastewater discharges. Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, and other

waters. Common nonpoint sources include runoff from agriculture, forestry, urban environments, mining, construction, land disposal, and saltwater intrusion.

nonstructural conservation practice. A measure or management practice that does not require physical construction used to improve runoff quality. Examples of nonstructural conservation practices include irrigation water management, nutrient management, conservation crop rotation, and field strip cropping.

National Pollutant Discharge Elimination System (NPDES). The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Clean Water Act (40 CFR 122.2). NPDES permits regulate discharges of pollutants from point sources to waters of the United States. Such discharges are illegal unless authorized by an NPDES permit.

permitting authority. A permitting authority for a state is either the EPA, a Regional Administrator of the EPA, or an authorized representative. Under the Clean Water Act, most states are authorized to implement the NPDES permit program. State NPDES permitting authority contacts can be found at: <http://cfpub.epa.gov/npdes/contacts.cfm?type=allstate>

point source. A facility with permitted wastewater discharges. EPA's regulations define a point source as any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff. (40 CFR 122.2)

reconciliation period. The period of time during which the seller generates trading credits and a buyer may use those credits to offset its pollutant discharge load.

structural conservation practice. A constructed facility or measures used to help control runoff quantity and improve runoff quality. Examples include storage structures, vegetative filter strips, irrigation tailwater recovery systems, and sediment control basins.

total maximum daily load (TMDL). The sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source's WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. If conservation practices or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs (40 CFR 130.3).

trade ratio. A ratio that accounts for the distance between buyer and seller, the different forms of pollutant discharged from buyer and seller (e.g..nitrogen and organic nitrogen), and the uncertainty associated with conservation practice effectiveness in controlling pollutants.

wasteload allocation. The proportion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution (40 CFR 130.2).

water quality standards. Provisions of State or Federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (40 CFR 131.3).

water quality trading. A tool that may enable some parties to more cost-effectively achieve equivalent or increased reductions of the pollutant than would otherwise be realized through traditional treatment approaches.

watershed. A geographic area in which water, sediments, and dissolved materials drain to a common outlet, such as a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. Watershed boundaries can transcend local, state, and national political boundaries.

Appendix A – Water Quality Trading Information Sheet for Farmers and Ranchers

What is Water Quality Trading?

Water quality trading is a market-based approach to water quality improvement that uses the implementation of water quality pollutant controls to achieve the best results for the least cost.

Farmers and ranchers participate in water quality trading by implementing conservation practices to generate pollutant reduction credits that can be sold in a water quality trading market. The credits are purchased by industries, wastewater treatment plants, and other entities regulated under the Clean Water Act to help them more cost-effectively meet their pollutant reduction requirements.

Water Quality Trading *is*:

- ✓ *Market-based*—Similar to greenhouse gas trading through programs like the Chicago Climate Exchange, participants in a water quality trading program buy and sell water quality pollutant reductions in a local or regional market.
- ✓ *Voluntary*—No laws or regulations require industries or landowners to participate in water quality trading programs. Participation is voluntary for facilities that can benefit from water quality trading.
- ✓ *Gaining in popularity*—Water quality trading enjoys broad support at the federal level from the U.S. Department of Agriculture (USDA), the U.S. Environmental Protection Agency (EPA), and other agencies. Active water quality trading programs exist in several states including Connecticut, Pennsylvania, North Carolina, Colorado, Idaho, and Oregon. For more information on the current status of trading across the country, go to EPA's water quality trading web site at www.epa.gov/owow/watershed.trading.htm.

Water Quality Trading *is not*:

- ✗ *A way to regulate agricultural operations*—Some members of the agricultural community fear that water quality trading will extend regulatory requirements to farms and ranches that normally would not be regulated under the Clean Water Act. This is not the case. The Clean Water Act clearly exempts most agricultural activities from regulation—to ignore this exemption would be a violation of the statute. Farmers and ranchers who voluntarily participate in water quality trading programs are required to fulfill only the terms of the contracts that they negotiate with their trading partners.

- ✗ *A circumvention of Clean Water Act requirements*—Some opponents of water quality trading claim that it is a way for regulated facilities, such as wastewater treatment plants, to shirk their pollution control requirements under the Clean Water Act. This is not true. Water quality trading simply allows regulated facilities to achieve pollutant controls equivalent to or better than their regulatory requirements more economically by using conservation practices installed by farmers and ranchers.

How can you benefit from Water Quality Trading?

Farmers and ranchers implement conservation practices to achieve a variety of benefits, including saving and improving soils, providing clean livestock watering sources, protecting grazing lands, as well as conserving wetlands, fish, and wildlife habitat. Farmers and ranchers know that conservation practices that protect the land and water can help to ensure the long-term viability of their farms, not to mention protect the health of their families and livestock, and provide recreational opportunities for their families and neighbors.

Water quality trading is an alternative funding source that farmers and ranchers can tap into to offset the cost of implementing and maintaining conservation practices to achieve agronomic, economic, environmental, and health benefits. The payment received will depend on the structure of the trading program. Farmers and ranchers might receive a one-time payment to cost-share or reimburse the cost of implementing a conservation practice. This payment would be based on the amount of pollutant reduction the conservation practice is expected to generate over its lifespan. Alternatively, farmers and ranchers might receive ongoing monthly, seasonal, or annual payments for the pollutant reduction that is achieved by the conservation practices they implement. Regardless of the payment method, water quality trading will allow farmers and ranchers to implement conservation practices more economically and will improve and protect water quality at the same time.

Frequently Asked Questions

What conservation practices must I implement to participate in water quality trading?

If a trading program has been developed for your area, the program might provide a list of approved practices that you can choose from. Otherwise, you

will need to work with the trading program administrator, local Natural Resources Conservation Service (NRCS) field office, Extension agent, Certified Crop Adviser, or other technical service provider to determine what conservation practices will generate pollutant reductions that you can sell in a trading market. The suitability of a conservation practice will depend on a number of factors specific to your operation and location, including the type of pollutant reduced, the lifespan of the practice, the time lag between practice installation and achievement of necessary pollutant reductions, and the amount of data available to help estimate the effectiveness of the practice.

Can conservation practices I've implemented in the past be used to generate credits?

This will depend on the trading program developed for your area. Some trading programs specify a conservation practice or set of practices that a farmer or rancher must implement to become eligible to participate in trading. In this situation, credits can be generated for all additional conservation practices, whether they are new practices or were implemented in the past. Other programs might establish a baseline year and allow credits to be generated for any conservation practices that were implemented after that year. On the other hand, some trading programs may only allow credits to be generated and sold for newly implemented conservation practices. You will need to talk to the trading program administrator to determine whether existing conservation practices can be used to generate credits.

Can I generate credits for conservation practices implemented through another cost-share program?

Conservation practices implemented using cost-share provided through Farm Bill programs might be eligible to generate credits, however, this will vary according to the state and trading program rules. Each individual state policy or trading program will need to establish what, if any, restrictions apply to conservation practices installed using cost-share funding. Some programs allow the use of all cost-shared practices to generate credits; some allow use of only the portion of a practice that

is not cost-shared to generate credits; some programs do not allow credits to be generated with cost-shared practices at all.

What if a regulated facility refuses to pay me for credits I generate?

You will negotiate a trade agreement or contract with your trading partner(s). The details of the credit transaction will be included in the agreement. It is important to remember that if a regulated facility (e.g., wastewater treatment plant) does not meet its pollutant reduction obligations or purchase the necessary credits to remain in compliance with its regulatory requirements, the facility is in violation of the Clean Water Act, and this is a powerful tool to require the facility to meet trading obligations. However, if the regulated facility does not need all of the credits it agreed to purchase from you, and can remain in compliance without trading, it is possible that the facility might try to renege on contractual obligations established through the trade agreement. This is why the trade agreement must contain adequate recourse for you in the event the facility does not meet its trading obligations to you.

What if I default on my obligations?

Most farmers and ranchers are not regulated by Clean Water Act requirements, however, their trading partners likely will be. For that reason, it is critical that farmers and ranchers fulfill the terms of their trade agreements or contracts so that regulated trading partners will maintain compliance with Clean Water Act requirements. The trade agreement should specify what recourse is to be expected if you default on the agreement. The ramifications could include not being allowed to participate in the trading program any longer, payment of a default fee to the discharger or trading program, civil recourse by the regulated facility to recover damages incurred, or other actions established in the trade agreement.

For more information, contact:

[Insert Contact Name]
[Insert Agency/Organization]
[Insert Address]
[Insert Telephone number]
[Insert E-mail address]

[Insert Agency/Organization Logo]

Appendix B – Example Pollutant Reduction Certificate

Pollutant Reduction Certificate
EXAMPLE

VALID FOR POLLUTANT REDUCTION ACTIVITY FOR MONTH(S): _____ YEAR: _____
NAME OF FACILITY GENERATING CREDITS:
CONTACT NAME:
ADDRESS:
PHONE NUMBER:
BEST MANAGEMENT PRACTICE (BMP) IDENTIFIER: - Type of BMP: - Location of BMP:
VERIFICATION METHOD:
VERIFICATION FREQUENCY:
VERIFICATION RESULTS (POUNDS OF POLLUTANT REMOVED*) (A): *Not to include pollutant required by, or resulting from, trading baseline requirement
TRADE RATIO (B): $\frac{\text{Trade Ratio}}{\text{(if applicable)}} = \frac{\text{Ratio \#1}}{\text{(if applicable)}} \times \frac{\text{Ratio \#2}}{\text{(if applicable)}} \times \frac{\text{Ratio \#3}}{\text{(if applicable)}}$
AMOUNT OF MARKETABLE CREDITS: Total Reduction Amount in Pounds Removed x Trade Ratio (A x B) = _____

CERTIFICATION:

I certify that the above information is accurate and truthful to the best of my knowledge and is in accord with the state's trading program.

Signature of Authorized Representative of Buyer:

Signature of Authorized Representative of Seller:

Appendix C – Example Pollutant Reduction Calculation

Estimating Pollutant Reductions

It is critical for agricultural producers who are interested in trading to understand the process for generating credits and how to do the necessary calculations. This appendix provides a hypothetical example of how an agricultural producer might estimate the pollutant reductions from conservation practices implemented on a farm or ranch. Much of the technical information and details described here have been simplified for the purposes of calculation and example.

Bill owns a farm on the Rushing River, which empties into Placid Lake. The lake is polluted with excess phosphorus, and Bill's farm is 1 mile upstream of the lake. The state has developed a TMDL that requires that all sources of phosphorus discharge must reduce their phosphorus discharge by 78 percent. This has created a perfect environment for a new trading market. The state has developed guidelines, an approved Conservation Practice List, and a guidance document to help producers learn how they can participate in trading.

Bill wants to generate credits to sell by reducing the phosphorus loading from a 300-acre flood irrigated field on his farm. He wants to install a sprinkler system capable of eliminating all sedimentation loss from his field. The trading program's Conservation Practice List estimates that the sprinkler system Bill has chosen is 100 percent effective at preventing sediment loss, however, the Conservation Practice List also requires that a 10 percent uncertainty discount be applied to credit reductions associated with this conservation practice due to the importance of proper installation and maintenance for maximum effectiveness.

Bill will follow these steps to estimate the pollutant reductions from the sprinkler system at his farm.

1. Determine current pollutant contribution from the farm
2. Estimate conservation practice pollutant reduction
3. Determine baseline for trading
4. Determine conservation practice pollutant reduction
5. Use ratios to adjust available pollutant reduction eligible for trading
6. Determine pollutant reductions needed by a buyer

Step 1: Determine current pollutant contribution from the farm

To determine how much pollutant reduction is eligible for trading, Bill will first determine his current phosphorus contribution before implementing the conservation practice. The list of eligible conservation practices available from the local trading program includes average base soil loss factors for the watershed that are part of the Surface Irrigation Soil Loss (SISL) load equation. Bill determines that 7.3 tons of sediment per acre are lost annually, for a total of 2,190 tons of soil loss per irrigation season for the 300-acre field. The list of eligible conservation practices also indicates that 2 pounds of phosphorus are typically lost per ton of soil that washes away.

Current Phosphorus Discharge from Bill's 300-Acre Field:

$$\begin{aligned} \text{Soil loss (tons/year)} \times \text{lbs P/ton} &= \text{Estimated Phosphorus loss} \\ 2,190 \text{ tons/year} \times 2 \text{ lbs P/ton} &= \mathbf{4,380 \text{ lbs P/year}} \end{aligned}$$

Step 2: Estimate conservation practice pollutant reduction

Bill will then estimate how much of his current phosphorus contribution he can remove using the conservation practice he has chosen. The list of eligible conservation practices estimates that the sprinkler system he wants to install is 100 percent effective at removing sediment from runoff, but has a 10 percent uncertainty discount. (As stated earlier, to simplify the calculations used to demonstrate this step, only one conservation practice and one ratio are assumed.)

Conservation Practice Phosphorus Removal Capability

$$\begin{aligned} \text{Current Phosphorus Discharge} \times (\text{Conservation Practice Effectiveness} - \text{Uncertainty Discount}) \\ = \text{Estimated Conservation Practice Phosphorus Reduction} \\ 4,380 \text{ lbs P/year} \times (1.0 - 0.10) &= 3,942 \text{ lbs P/year} \end{aligned}$$

Step 3: Determine baseline for trading

A phosphorus TMDL developed for Placid Lake requires that all point and nonpoint sources of phosphorus reduce their discharge by 78 percent. Therefore, Bill will first reduce his phosphorus contribution by 78 percent before participating in trading because that is his baseline. Bill cannot generate pollutant reductions eligible for trading until he first meets that baseline of a 78 percent reduction in his phosphorus contribution.

Bill's Baseline (Phosphorus Removal Requirement)

$$\begin{aligned} \text{Current Phosphorus Contribution} \times \text{Required Reduction} &= \text{Required Reduction for TMDL} \\ 4,380 \text{ lbs P/year} \times 0.78 &= 3,416.4 \text{ lbs P/year} \end{aligned}$$

The conservation practice that Bill installs must remove 3,416.4 pounds of phosphorus, which is 78 percent of his current phosphorus contribution, to meet his baseline. After removing 3,416.4 pounds of phosphorus, any additional phosphorus reductions are eligible for trading.

Step 4: Determine conservation practice pollutant reduction

Bill then determines if the conservation practice he wants to implement will remove enough phosphorus to satisfy the TMDL requirement and generate a surplus removal that he can sell to point sources in the trading program.

Bill's Phosphorus Reduction That Can Be Traded

Estimated Conservation Practice Phosphorus Reduction – Baseline Requirement =
Phosphorus reduction eligible for trading

$$3,942 \text{ lbs P/year} - 3,416.4 \text{ lbs P/year} = 525.6 \text{ lbs P/year}$$

After removing the necessary phosphorus to meet the baseline of 3,416.4 pounds the conservation practice will remove an additional 525.6 pounds of phosphorus per year. These pounds of phosphorus can be used to generate credits for sale.

Step 5: Use ratios to adjust available load reduction eligible for trading

Bill will then use established trading ratios to determine the actual impact the discharge from his 300-acre field will have on the river. The state has developed a set of location ratios to account for how far the discharge is located from the lake. Basically, the closer the farm is to the lake, the more phosphorus running off the farm fields actually reaches the lake. As a result, removing phosphorus from a source near the lake improves water quality more than removing phosphorus from a farm farther from the lake. Therefore, phosphorus removal from a source near the lake is more valuable financially.

According to the ratios contained in the guidance document developed by the state, Bill determines that the trade ratio for his farm's discharge is 1:0.95. In other words, for every one pound of phosphorus discharge that runs off his field, 0.95 pound will actually make it to Placid Lake.

Bill's Tradable Phosphorus Reduction Adjusted for Location

Phosphorus Reduction eligible for trading × Location Ratio = Phosphorus Reduction adjusted
for distance

$$525.6 \text{ lbs P/year} \times 0.95 = 499.32 \text{ lbs P/year}$$

Step 6: Determine pollutant reduction needed by a buyer

Bill locates a wastewater treatment plant (WWTP) that would like to purchase 100 lbs/month of phosphorus reduction during the irrigation season. The WWTP needs to purchase credits on a monthly basis. Bill has 499.32 lbs. of phosphorus to trade during the year. For purposes of the trade, a year equals the 3-month irrigation season (June–August) because this is when credits can be generated. The conservation practice guidance document provides a weighted, flow-loss factor for every month to account for different numbers of irrigation events and different sediment loss. Less sediment runs off the fields after vegetation has been established and soils become more stable (IDEQ 2003)¹. Bill uses the flow-loss factors to determine how much phosphorus reduction he can sell to the WWTP for each of the irrigation months:

¹ Indiana Department of Environmental Quality. 2003.

Monthly Phosphorus Reductions Eligible for Trading

Yearly Phosphorus Reduction (lbs P/year) × flow-loss factor = monthly Phosphorus Reduction eligible for trading (lbs P/month)

Flow-loss factors:
June: 35 percent July 45 percent August 20 percent

June: $499.32 \text{ lbs P/year} \times 0.35 = 174.8 \text{ lbs P/month}$
July: $499.32 \text{ lbs P/year} \times 0.45 = 224.7 \text{ lbs P/month}$
August: $499.32 \text{ lbs P/year} \times 0.20 = 99.9 \text{ lbs P/month}$

Bill and the WWTP agree to the amount of pounds needed, the price per pound sold, and finalize a trade agreement.

Appendix D – Additional Water Quality Trading Resources

Additional Water Quality Trading Resources

Agricultural Advisors

Certified Crop Advisers (CCAs)

“The Certified Crop Adviser Program (CCA) is one of the professional certification programs offered by the American Society of Agronomy (ASA). It is a voluntary program providing a base level of standard through testing and raising that standard through continuing education. The program is administered locally by 37 state/regional/provincial boards called “Local Boards” throughout the United States and Canada. The only states and provinces not yet directly involved are Alaska, Quebec, Northwest Territories and the Yukon.”

<http://www.agronomy.org/cca/>

Certified Technical Service Providers

These providers offer technical assistance including conservation planning and design, layout, installation, and inspection of approved conservation practices. NRCS and conservation districts have traditionally provided these technical services, and will continue to do so. Under the 2002 Farm Bill, USDA will reimburse producers for technical assistance provided by certified Technical Service Providers.

<http://techreg.usda.gov/CustLocateTSP.aspx>

Cooperative Extension System Offices

“The Cooperative Extension System is a nationwide, non-credit educational network. Each U.S. state and territory has a state office at its land-grant university and a network of local or regional offices. These offices are staffed by one or more experts who provide useful, practical, and research-based information to agricultural producers, small business owners, youth, consumers, and others in rural areas and communities of all sizes.”

<http://www.csrees.usda.gov/Extension/index.html>

Cooperative State Research, Education, and Extension System (CSREES)—Land-Grant Universities

“By definition, CSREES cooperates with many institutions, or partners. The most prominent among our many partners are the more than 100 colleges and universities that comprise the nation’s Land-Grant University System. A land-grant college or university is an institution that has been designated by its state legislature or Congress to receive unique federal support. This map provides links to the land-grant institutions and their key constituent units, most notably the state Cooperative Extension Services.”

http://www.csrees.usda.gov/qlinks/partners/state_partners.html

Soil and Water Conservation Districts

This web site links to the National Association of Conservation Districts and provides information on the nation’s 3,000 local conservation districts.

<http://www.nacdnet.org>

State Farm Bureaus

“Farm Bureau is an independent, nongovernmental, voluntary organization governed by and representing farm and ranch families united for the purpose of analyzing their problems and

formulating action to achieve educational improvement, economic opportunity and social advancement and, thereby, to promote the national well-being. Farm Bureau is local, county, state, national and international in its scope and influence and is non-partisan, non-sectarian and non-secret in character. Farm Bureau is the voice of agricultural producers at all levels.”

<http://www.fb.org/state/>

Conservation Practice Resources

Animal Feeding Operations (AFO) Virtual Information Center

This is a tool to facilitate quick access to livestock agricultural information in the United States. This site is a single point of reference to obtain links to state regulations, web sites, permits and policies, nutrient management information, livestock and trade associations, federal web sites, best management practices and controls, Extension Service and land grant universities, research, funding, and information on environmental issues.

<http://www.epa.gov/npdes/afovirtualcenter>

CNMP Watch

“This site is the complete web source for manure and nutrient management planning information. It is designed to get you started and assist you with helping livestock producers prepare their nutrient management plans.”

<http://www.cnmpwatch.com/>

National Management Measures for the Control of Nonpoint Pollution from Agriculture

This is a technical guidance and reference document that state, local, and tribal managers can use when implementing nonpoint source pollution management programs. It contains information on the best available, economically achievable means of reducing pollution of surface and ground water from agriculture.

<http://www.epa.gov/nps/agmm/>

NRCS Conservation Practice Standards

This is the current list of national conservation practices. It contains links to the practice standard (available in either Portable Document Format (PDF) or MS-Word format), a conservation practice information sheet and the Conservation Practice Physical Effects (CPPE) worksheet for most practices, and to job sheets for a limited number of conservation practices.

<http://www.nrcs.usda.gov/Technical/Standards/nhcp.html>

NRCS Electronic Field Office Technical Guide (eFOTG)

This guide provides electronic access to geographic-specific guides containing technical information about the conservation of soil, water, air, and related plant and animal resources.

<http://www.nrcs.usda.gov/Technical/efotg/>

Information on Cost-Share and Financial Assistance Programs

Financial Assistance Summaries for AFOs

This is EPA's reference source for owners and operators of animal feeding operations (AFOs) and concentrated animal feeding operations (CAFOs) to learn about the federal financial and technical assistance programs available to address environmental concerns. This Guide

includes summaries of information from various sources describing the federal programs that provide grants and loans available to AFOs and CAFOs.

http://www.epa.gov/npdes/pubs/financial_assistance_summaries.pdf

NRCS's Farm Bill Programs Web Site

This site contains information from NRCS on the various programs available through the 2002 Farm Bill.

<http://www.nrcs.usda.gov/programs/farmbill/2002/products.html>

U.S. EPA's Nonpoint Source Funding Opportunities Web Page

This is a collection of links to EPA and non-EPA resources describing funding programs available for BMP implementation.

<http://www.epa.gov/owow/nps/funding.html>

National Pollutant Discharge Elimination System (NPDES) Regulations and Permit Development

Permit Writers' Guidance Manual

This is a detailed guidance document for permit writers that describes the elements that they must include in NPDES permits and how to develop those elements.

http://cfpub.epa.gov/npdes/writermanual.cfm?program_id=45

Revised: Managing Manure Guidance for Concentrated Animal Feeding Operations (CAFOs)

This guidance provides additional technical information for owners, operators, technical service providers, consultants, and permit authorities on how to carry out EPA's revised regulatory requirements for NPDES permitting of CAFOs.

http://www.epa.gov/npdes/pubs/cafo_manure_guidance.pdf

The State Compendium: Programs and Regulatory Activities Related to AFOs

This is a compilation of AFO-related state program and state initiative information intended to illustrate how states are regulating AFOs, with a specific focus on the use of permits or similar mechanisms.

<http://cfpub.epa.gov/npdes/afo/statecompend.cfm>

U.S. EPA's Concentrated Animal Feeding Operation (CAFO) Web Site

CAFOs are the only type of agricultural operations regulated under the NPDES program. This site provides general information on the NPDES requirements for CAFOs and links to state contacts.

<http://www.epa.gov/npdes/caforule>

U.S. EPA's NPDES Web Site

The web site provides general information on the NPDES program and links to state NPDES contacts.

<http://www.epa.gov/npdes>

Trading Resources

Chicago Climate Exchange

The first U.S. voluntary pilot program for trading of greenhouse gases.

<http://www.chicagoclimatex.com/>

Ecosystem Marketplace

The Katoomba Group's Ecosystem Marketplace web site provides information on global and U.S. environmental markets including carbon markets, biodiversity markets, and water markets.

<http://www.ecosystemmarketplace.com/>

Environmental Trading Network's Water Quality Trading Web Site

This site offers a collection of links to information on existing and developing water quality trading programs.

<http://www.envtn.org/wqt/index.htm>

NutrientNet

This is a web site used to broker nutrient trades for the Kalamazoo watershed in Michigan and the Potomac watershed in Maryland, Virginia, West Virginia, Pennsylvania, and the District of Columbia.

<http://www.nutrientnet.org/>

U.S. EPA 2003 Water Quality Trading Policy

<http://www.epa.gov/waterqualitytrading/tradingpolicy.html>

U.S. EPA Water Quality Trading Web Site

This site provides general information on water quality trading.

<http://www.epa.gov/waterqualitytrading/>

Water Quality Trading and Offset Initiatives in the U.S.: A Comprehensive Survey

A document prepared by Dartmouth College that "summarizes water quality trading and offset initiatives in the United States, including statewide policies and recent proposals."

<http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>

Water Quality Trading Assessment Handbook

This is a guidance document EPA developed to help water quality managers and watershed stakeholders determine if trading can be used in their watershed to make cost-effective pollutant reductions that achieve water quality standards.

<http://www.epa.gov/waterqualitytrading/handbook/>

Water Quality Trading Toolkit for Permit Writers

EPA's *Water Quality Trading Toolkit for Permit Writers* (Toolkit) provides NPDES permitting authorities with the tools they need to facilitate trading and to authorize and incorporate trading in NPDES permits. Although the Toolkit primarily targets state and EPA NPDES permitting authorities, it may also be useful to other stakeholders interested in water quality trading and the NPDES permitting process.

<http://www.epa.gov/npdes/tradingtoolkit> (future website expected August 2006)

Appendix E – Water Quality Trading Contacts

Water Quality Trading Contacts at EPA

At the Office of Water in Washington, DC:

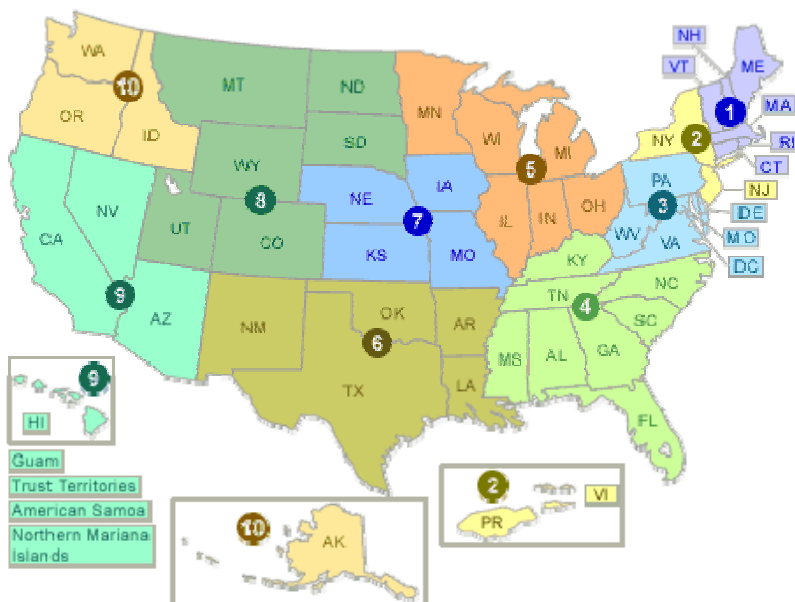
Chris Lewicki, 202-566-1293, lewicki.chris@epa.gov

Virginia Kibler, 202-564-0596, kibler.virginia@epa.gov

Katharine Dowell, 202-564-1515, dowell.katharine@epa.gov

At EPA Regional offices:

Region 1	Erik Beck	617-918-1606
Region 2	Jeff Potent	212-637-3857
Region 3	Patricia Gleason	215-814-2097
Region 4	Curt Fehn	404-562-9335
Region 5	Peter Swenson	312-886-0236
Region 6	Paul Kaspar	214-665-7459
Region 7	Mark Z. Matthews	913-551-7635
Region 8	Brad Crowder	303-312-6396
Region 9	Matthew Mitchell	415-972-3508
Region 10	Claire Schary	206-553-8514
Chesapeake Bay Program Office	Richard Batiuk	410-267-5731
Long Island Sound Program Office	Mark Tedesco	203-977-1541

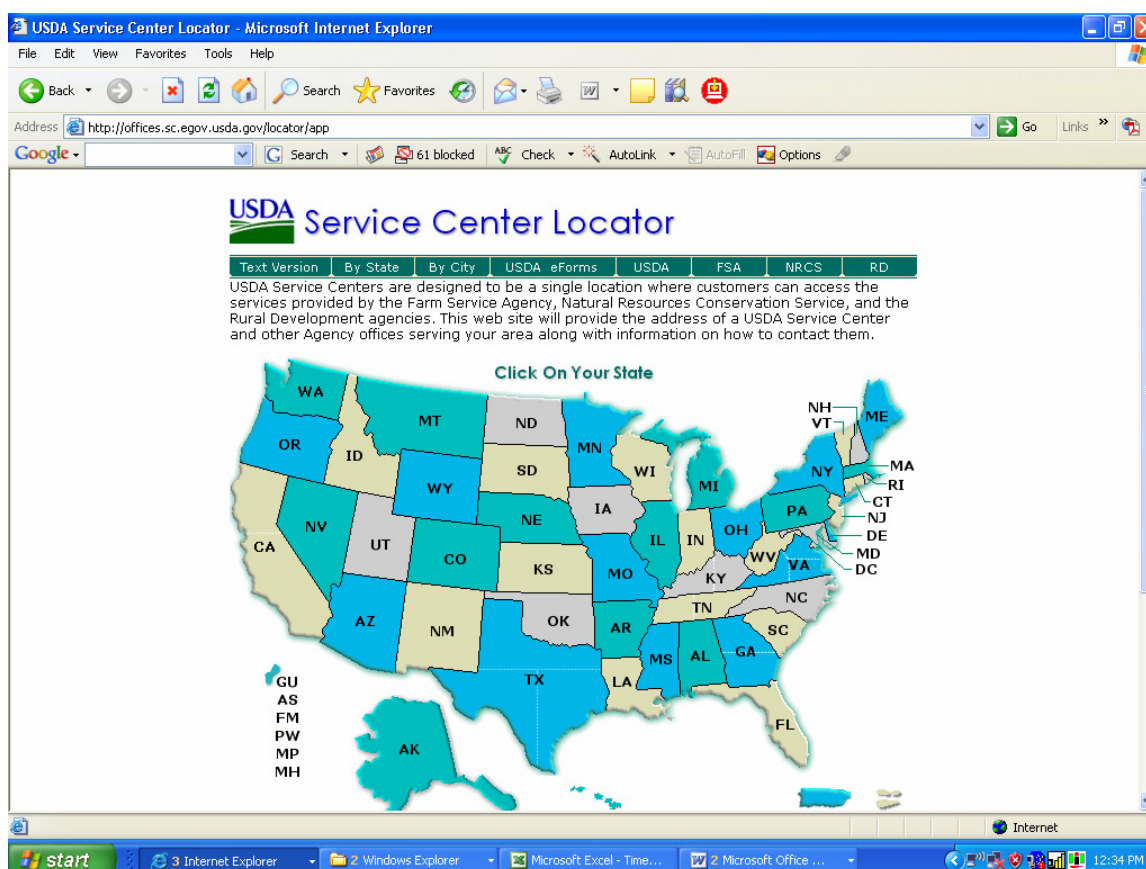


Water Quality Trading Contacts at USDA

States, tribes and other jurisdictions interested in establishing water quality trading programs are encouraged to contact USDA officials in Natural Resources Conservation Service, Cooperative State Research, Education, and Extension Service, and Agricultural Research Service (ARS) in their locality.

USDA Service Centers are designed to be a single location where customers can access the services provided by the Farm Service Agency, NRCS, and the Rural Development agencies. The following web site will provide the address of a USDA Service Center and other agency offices serving your area along with information on how to contact them.

<http://offices.sc.egov.usda.gov/locator/app>



In addition, the following web site will help locate the nearest local Cooperative Extension office:
<http://www.csrees.usda.gov/Extension/index.html>