Phosphorus and effluent trading discussion

Lower Boise Watershed Council TAC Meeting
April 25, 2013
Scott Koberg, Ada SWCD

Review: What is effluent trading (aka phosphorus trading, aka water quality trading)?

- Market driven, business-like way of helping to solve water quality problems
- Enables point source dischargers that face high pollutant (i.e. phosphorus) reduction costs to purchase less costly reduction credits from other sources
- Other sources can be point sources or non-point sources
- Proposed trading example most widely discussed is between point source (i.e. municipality) and non-point sources (i.e. farmers)

Lower Boise River Effluent Trading Background

- Huge interagency effort from 1998-2000
- Initiated by EPA Region 10 and Idaho DEQ
- Attempt to lower overall cost of meeting TMDL pollutant reduction targets
- Demonstration project first of its kind in the Pacific Northwest

Lower Boise River Effluent Trading Background

- September 2000: Final Document published - *Lower Boise River Effluent Trading Demonstration Project: Summary of Parcticipant Recommendations for a Trading Framework *(*available on EPA Region 10 website)*
  - "DRAFT Best Management Practices with Total Phosphorus Control Capability" for agricultural non-point sources (22 BMPs listed)
  - Appendix E: "Action Plan for Implementation of the Trading Framework"

Key Players

- Farmers
- NRCS
- ARS
- SCC
- ISDA
- USBR
- Private contractors
- Private consultants
- IDEQ
- SW Idaho RC&D
- OSU Extension
- IRU
- Boise City
- City of Meridian
- City of Nampa
- City of Middleton
- Ada SWCD
- Canyon SCD
- Attorneys
- Water District #65
- Micron
- Armour Fresh Meat
- Idaho Power
- HDR Engineering
- BSU Environmental Finance Center
- ACHD
- IWUA
- Simplot
- Ada County
- U of I Extension
- USEPA
- Idaho Farm Bureau

Lower Boise River Effluent Trading Background

- 2000-2002: Efforts from the Agriculture Work Group and BMP Technical Committee (led by Idaho SCC) in response to Appendix E yielded:
  - Updated and comprehensive Proposed Best Management Practices (BMPs) to be Applied in the Lower Boise River Effluent Trading Demonstration Project and other deliverables

Lower Boise River Effluent Trading Background

- Additional work groups included the Ratios Work Group, Trading Framework Work Group, Indirect Dischargers Work Group, and Association Work Group
- Key deliverables included:
  - Reduction Credit Certificate
  - Trade Notification Form
  - Drainage Delivery Ratios
  - Site Location Factors
  - Measured credits vs. calculated credits
  - Proposed “Idaho Clean Water Cooperative” as Association

Agriculture Work Group - BMPs

- Original DRAFT with 22 potential BMPs revised to 9 BMPs
  1. Sediment Basins
  2. Filter Strips
  3. Underground Outlet
  4. Straw in Furrows
  5. Crop Sequencing
  6. Polyacrylamide
  7. Sprinkler Irrigation
  8. Micro-irrigation (drip)
  9. Tailwater Recovery System

Agriculture Work Group - BMPs

- Each of the 9 BMPs were summarized in Dr. David Carter's February 2002 publication, Proposed Best Management Practices (BMPs) to be Applied in the Lower Boise River Effluent Trading Demonstration Project

Agriculture Work Group - BMPs

- Detailed information for each of the 9 BMPs included:
  1) Description
  2) Application criteria
  3) Potential side effects and ancillary benefits
  4) Monitoring
  5) Design features
  6) Installation requirements
  7) Operation & maintenance requirements
  8) BMP effectiveness
  9) Calculating phosphorus retained by the BMP

Proposed “Idaho Clean Water Cooperative”

2.1.4 The Association

As proposed, a private, nonprofit association, comprised of interested participants and all trading parties, will be responsible for trade tracking and the day to day management of trading. The association will help connect buyers and sellers, develop and maintain the trade tracking database, prepare a monthly watershed-wide summary of trades, and provide support to the trading system, as requested and agreed to by its members. As envisioned, the association will provide an important link among trading parties, the environmental agencies who would oversee the trading system, and the public. By maintaining the trade tracking database, the association will ensure that timely information about trades is available to the public and the environmental agencies.

Measured Credits

Measured Nonpoint Source Credits

Any nonpoint source practice on the approved BMP List whose pollutant reduction results can be measured directly may be installed to generate measured credits. The BMP List will specify minimum design, construction and maintenance requirements (generally NRCS standards and specifications) and minimum monitoring requirements for measured credits. If these specifications are followed, then the measured reduction, adjusted by applicable trading ratios and the water quality contribution (described in a later section), can be used by a point source for permit compliance. Trading parties will be responsible for installation inspections to ensure that the BMP is installed according to plans and specifications, maintenance monitoring to ensure the BMP is maintained and repaired to continue its full functioning, and effectiveness monitoring to measure actual phosphorus reductions. Trading parties are also responsible for documenting the results of these monitoring activities to demonstrate that the nonpoint source is achieving the stated reduction, using monitoring methods specified in the BMP List.

In addition, the trading parties will periodically inspect the installation and performance of the monitors to ensure their proper operation, as well as the ongoing implementation and overall effectiveness of the installed BMP and to make adjustments as necessary to maintain its proper functioning in order to achieve its full phosphorus reduction potential.

Calculated Credits

Calculated Nonpoint Source Credits

Calculated nonpoint source credits are those for which the amount of marketable credits will be determined by a calculation because direct monitoring of reductions is technically infeasible or too costly. Calculated credits will only be created from practices on the BMP List. The BMP List will include an equation for estimating pretreatment load,[10] design and construction criteria, monitoring requirements, operation and maintenance requirements, the credit duration, and the *uncertainty discount*. Generally, NRCS standards and specifications for nonpoint source practices will be the minimum requirements for design, construction, operation, and maintenance.

The *uncertainty discount* is a multiplier that will reduce the number of transferable credits generated by a calculated nonpoint source reduction, to account for variability in the effectiveness of the practice. Site conditions and seasonal variations in flow and load are examples of factors that produce variability in the effectiveness of a practice. The design, construction, operation, and maintenance requirements for each practice will help reduce uncertainty and prolong the BMP's effectiveness.

Drainage Delivery Ratios & Site Location Factors

Drainage Delivery Ratios and Site Location Factors: When a reduction is accomplished somewhere in a sub-watershed above the point of discharge to the Boise River, drainage delivery ratios and site location factors will reduce the amount of marketable credits. This will be necessary because a 10 pound reduction at a location up in a drain or tributary from the mouth of the river may not result in a 10 pound reduction at the point of discharge to the Boise River due to the complex fate and transport mechanisms that affect phosphorus. These ratios were developed by the project's Agriculture Workgroup and adopted by the Framework Team (after determining that other models were inappropriate for this watershed) and represent their best professional judgment. Ratios will be located in the Idaho Trading Document, and potentially, in individual NPDES permits (the necessity of including them in the permits has not yet been decided). Irrespective of location, ratios will be subject to public review and comment.

Drainage delivery ratios account for transmission losses (e.g., uptake by vegetation, infiltration to groundwater, etc.) in a drain or tributary. The drainage delivery ratio for any project is calculated as follows:[8]

$$\frac{[100 - (\text{distance in miles to the mouth of the drain from the project's point of discharge})]}{100}$$

Drainage Delivery Ratios & Site Location Factors

Site location factors address the potential for diversion and reuse of water below the point of discharge to the drain or tributary. Proposed site location factors for the Lower Boise River watershed are:

	Site Location Factor
Land runoff flows into a canal, likely to be reused by downstream irrigators	0.6
Land runoff flows into a canal, likely to soon be spilled to a drain or stream	0.7
Land runoff flows to a downstream user and likely to be reused	0.8
Land runoff flows through downstream farms but not likely to be reused	0.9
Land runoff flows directly to a drain or stream through a culvert or ditch	1.0

These drainage delivery ratios and site location factors reflect the portion of the reduction that will be realized at the confluence of the drain or tributary with the river. The factors will have the effect of prioritizing projects in the marketplace by making the most valuable credits the ones most likely to benefit the river. This is because projects closest to the mouth of a drain or tributary will have the highest ratios and therefore result in the greatest number of credits for sale.

Drainage Delivery Ratios & Site Location Factors

Applying Ratios to Trades: The amount of transferrable credit that arises from a point or nonpoint source reduction will be expressed in terms of "Parma Pounds." A Parma Pound is the amount of phosphorus reduction expected in the Boise River at Parma as a result of the reduction at the point or nonpoint source. Parma Pounds will be determined by multiplying the amount of the reduction by the source's river location ratio, delivery ratio and site location factor (if applicable). This creates a common unit for measuring increases and decreases at different locations and will ensure that their effects on water quality offset each other. Trades are converted back into local pounds when they are reported in the Discharge Monitoring Report (DMR) (The DMR is discussed further n Section 2.2.9, Trade Information/Tracking).

When a point source purchases credits, ratios will also be applied to determine the amount by which the point source's effluent limit is increased. The number of purchased credits, in Parma Pounds, will be divided by the purchasing point source's river location ratio to convert to local pounds. The effluent limit will always be expressed in local pounds.

Example Trade

The process of determining equivalent loads in a trade involves these steps:

- Buyer's Need (in local pounds) * Buyer's River Location Ratio = Parma Pounds to purchase
- Seller's Reduction * Seller's Location Ratio * Delivery Ratio * Site Location Factor = Credits in Parma Pounds

Buyer's Effluent Limit Adjustment = Parma Pounds Purchased / Buyer's River Location Ratio

Example:

Boise's Lander Street Plant:

- phosphorus discharge will exceed effluent limit by 10 lbs;
- river location ratio is 0.56.
- Boise needs to buy: 10 lbs * 0.56 = 5.6 Parma Pounds

Mason Creek:

- nonpoint source discharges to Mason Creek immediately upstream of the mouth of Mason, so both the delivery ratio and site location factor = 1.0.[9]
- nonpoint source reduces phosphorus load by 40 lbs
- river location ratio is 0.75.
- Mason Creek source can offer: 40 lbs * 0.75 * 1.0 * 1.0 = 30 Parma Pounds

Trade:

- Boise buys 5.6 Parma Pounds;
- Boise adjusts its effluent limit by 5.6 Parma Pounds / 0.56 = 10 local pounds
- Mason Creek now has 24.4 Parma Pounds still available for sale.

Re-Sale:

Boise's actual discharge of 6 pounds is less than expected, so it purchased more credits than necessary.

Boise re-calculates pounds needed at Parma, and sells the unneeded credits.

- Boise needs: 6 local lbs * 0.56 = 3 Parma Pounds
- 6 Parma lbs purchased - 3 Parma lbs needed = 3 Parma Pounds that can be resold.

What happened next?

- Why didn't a trade ever occur, even as a demonstration?
  - No TMDL target established for phosphorus so no real incentive for a trade (i.e. no existing market)

the ENVIRONMENTAL TRADING NETWORK

- The **ETN** is an international clearinghouse for information on water quality trading projects and other environmental markets. The ETN has led or participated in a variety of market-based environmental market projects since its inception.

Water Quality Pollutant Trading Guidance

Idaho Department of Environmental Quality

July 2010


EPA United States Environmental Protection Agency
Office of Wastewater Management
Water Permits Division
EPA 833-R-07-004
Water Quality
TRADING
Water Quality Trading Toolkit for Permit Writers
Published August 2007
Updated June 2009

Water Quality Trading

Keys to Success

Every trading program should strive to be:

TRANSPARENT

Keep the public informed at every step of the process by:

- ☆ Involving stakeholders in the design of the trading program;
- ☆ Communicating to the public information deemed necessary to maintain stakeholder confidence.

REAL

Show pollutant reductions and water quality improvement by:

- ☆ Measuring reductions;
- ☆ Verifying BMP installation and maintenance, e.g. through a third-party.

ACCOUNTABLE

Manage the program effectively by:

- ☆ Including trade tracking mechanisms in the program design;
- ☆ Periodically reviewing the program's process and results.

DEFENSIBLE

Base the program on sound science and protocol by:

- ☆ Using dynamic water quality models;
- ☆ Requiring credit generators to certify credits;
- ☆ Developing scientifically-based trading ratios.

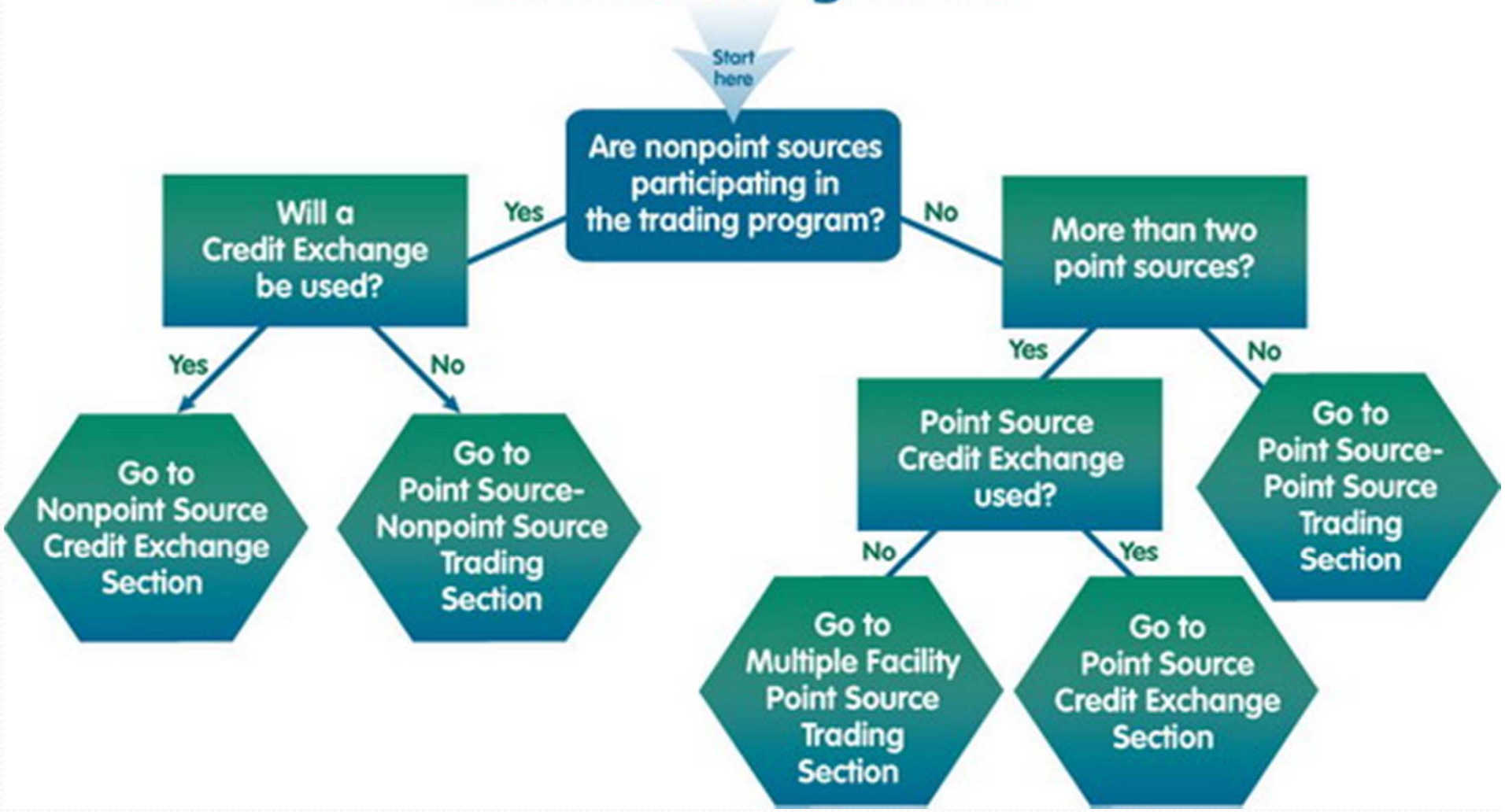
ENFORCEABLE

Establish responsibility for meeting or exceeding water quality standards by:

- ☆ Incorporating clearly-articulated trading provisions in NPDES permits.

EPA United States Environmental Protection Agency
June 2007 833-F-07-005

Toolkit Navigation



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

Conservation Technology Information Center July 2006

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.

What happened?

- Claire Schary – EPA Region 10 Water Quality Trading Coordinator
  - Lower Boise water quality trading framework not implemented due to lack of regulatory driver (i.e. phosphorus TMDL) to create the market
  - No new phosphorus limits in point source permits so no buyers of credits
  - Boise City Dixie Drain project considered pre-TMDL trade or offset
    - not modeled after water quality trading framework
    - purchased land and constructed phosphorus removal system included under NPDES permit for wastewater treatment systems
    - Not what EPA envisions for water quality trading involving farmers implementing BMPs on their land

What happened?

- Claire Schary – EPA Region 10 Water Quality Trading Coordinator
  - EPA office is interested in promoting trading
  - Worked very hard on trading framework for Idaho
  - Not throwing this effort out but building on it through a new effort
  - "People still look at what we did as a model and I'm proud of the work we did on the Boise."

What happens next?

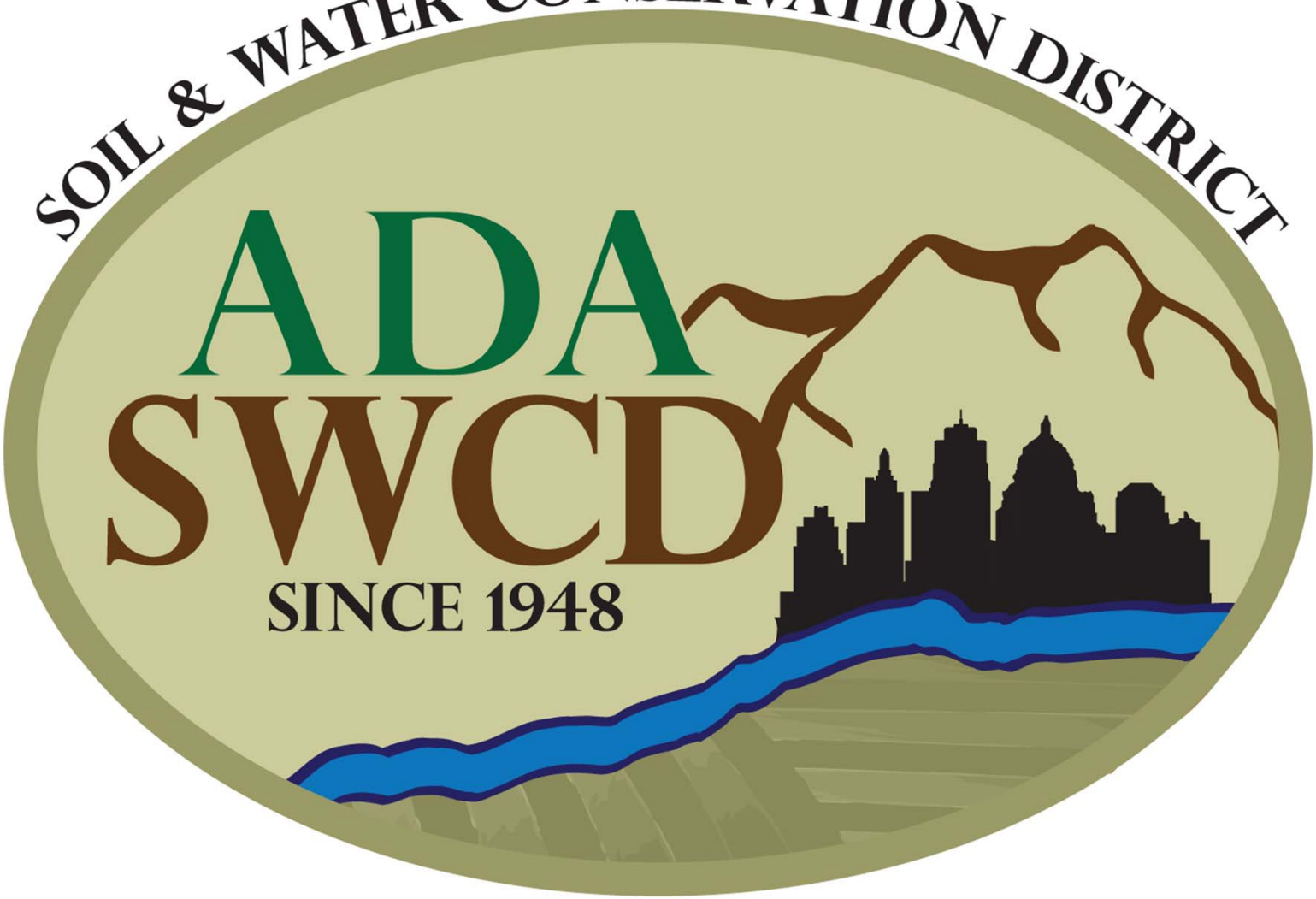
- Claire Schary – EPA Region 10 Water Quality Trading Coordinator
  - Idaho DEQ, along with Oregon, Washington, and Region 10 EPA are participating in a three-year project funded by an NRCS Conservation Innovation Grant awarded to the nonprofit The Willamette Partnership and The Freshwater Trust
  - The project is to develop a set of recommended "best practices" for the design and implementation of the states' water quality trading programs
  - The goal is to agree on what should be consistent across the three states to ensure the credibility and transparency of water quality trading, and what may need to be specific to each state
  - An initial set of best practices should be complete by November 2013 to test in different states, and then they will be revised in late 2014 to complete the project by 2015
  - info@willamettepartnership.org

What happens next?

- These consistent elements may include the following *(Please phrase this as very tentative – nothing has been decided yet, and EPA hasn't taken a position yet)*:
  - a common credit registration system that establishes some basic standards for documenting credits as they are created, verified, registered, and audited on a regular basis.
  - a role for third parties in brokering credit transactions by contracting with individual farmer and aggregating the credits into a larger supply that then is then sold to point source buyers. The broker would be a for-profit or non-profit entity willing to take on the full responsibility of delivering a set number of credits to the point source buyer in a specified schedule that meets their permit needs.

What happens next?

- These consistent elements may include the following *(Please phrase this as very tentative – nothing has been decided yet, and EPA hasn't taken a position yet)*:
  - A contract covering a time period that is negotiated between the broker and the farmer, to satisfy both the farmer's need for flexibility and the broker's need for certainty to be able to sell them to a point source to satisfy their permit obligations.
  - BMPs selected from a pre-approved list with specific installation and maintenance terms, as well prescribed measurement or estimation protocols that are developed in a transparent process with expert input.
  - the establishment of a baseline from which a credit is calculated – i.e., what is surplus to the TMDL's expected reductions to implement the load allocation and therefore available to sell. This baseline needs to be consistent with the assumptions of the TMDL.



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