



**INCREASING THE PACE, EXPANDING THE SCOPE, AND
IMPROVING THE EFFECTIVENESS OF CONSERVATION**

ELEMENTS OF EXCHANGE IN MARKET SYSTEMS: BUILDING A TRADING PLATFORM FOR THE WILLAMETTE ECOSYSTEM MARKETPLACE

INTRODUCTION

This technical memorandum covers these aspects of a market framework for trading:

- A set of 10 elements that represent key functions, features, or arrangements;
- Alternative ways to structure each element providing a menu from which an overall trading program might be assembled;
- Examples of existing and distinctly different market models; and
- Aspects of market administration including tracking, oversight and evaluation.

For the Willamette Basin a uniquely tailored model will be required in order to address both regulated and non-regulated ecosystem services. The Willamette Model will likely begin with a market system and institutional infrastructure that addresses short term needs and opportunities and intentionally evolves into a different program structure for the long term.

The purpose of this TM is to orient the reader with the major market elements and different market models. Selected information from this TM was modified, added to, and incorporated into the PowerPoint presentation given to the Board at the meeting. The section of that PowerPoint presentation devoted to market framework (slides # 35 – 72) is provided as Attachment A to this TM. As a stand alone document, this TM is submitted in partial fulfillment of the deliverables for TO #1, Task 4. Alone, and together with documents developed by Bobby Cochran of Clean Water Services, it satisfies in part the required deliverables identified in the Willamette Partnership's Work Plan for EPA .

Comments from the Board members are documented in the meeting notes under separate cover. Further refinement and elaboration of market elements and models will be presented in a separate TM.

In reviewing the elements and models presented here, consideration should be given to the needs and preferences for each of the elements. This may lead to one of the generalized models, or examples presented here. There can be overlap between the models and the trading program could have elements of more than one. Hybrids are possible and can be effective—but caution should be taken against creating an ineffective model with too much mixing of ill-matched parts.

MARKET ELEMENTS

- The market framework for credit trading can be described using these key elements:

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- Performance Targets
- Program Rules and Policies
- Relationships among Trading Parties
- Information Analysis and Dissemination
- Cost Basis and Pricing
- Decision-making
- Transactions
- Liability
- Resources
- Results

Market Elements General Characterizations

The individual elements can generally be described using three characterizations:

- Centralized
- Facilitated
- Decentralized

Collectively, individual elements will often—but not always—exhibit a predominant characteristic. The predominant characteristic of the elements will determine the market model in effect.

The following walks through the 10 market elements introduced earlier. First, the element is generally described. Then, the element is described how it may appear if

- Centralized,
- Facilitated, or
- Decentralized

The element can be the same on the selling and buying side of the market—e.g., Facilitated for both buyers and sellers. The element also can be different for sellers and buyers, e.g., centralized for buyers, but decentralized for sellers

Performance Targets

With few if any exceptions, overall performance targets are established by state or local regulatory agencies.

For Point Sources:

- Aggregate wasteload allocations for point source category or categories
- Individual WLAs
- “Voluntary” caps or reductions

For Nonpoint Sources:

- Depends on the type of nonpoint source

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- Method for memorializing targets as load allocations varies by source category, state, and locality

Centralized

- Market manager or regulator sets all individual and collective targets
- Depending on program rules, some reallocations are trades, other changes involve redoing WLAs and/or LAs
- Example: Connecticut set a TMDL and individual WLAs with annual step downs to meet a 2014 target.

Facilitated

- Regulator sets aggregate targets and may or may not specify individual allocations
- Trading parties have some discretion to reallocate targets among themselves
- Whether reallocation is a “trade” depends on program rules
- Example: The Virginia Program authorizes two types of trading, one of which involved selling or buying CREDITS

Decentralized

- Regulator sets individual targets
- Parties rely on trades, or other agreements (contracts, MOUs) to reallocate responsibilities
- Example: The Virginia Program authorizes two types of trading, one of which involves selling or buying ALLOCATIONS

Information Analysis and Dissemination

Trading programs rely on a range of analyses to demonstrate potential, provide the basis for program development, and support implementation.

Key areas include:

- Quantification and sourcing of demand for and supply of credits
- Compliance costs, credit cost-effectiveness, and pricing structures
- Pre- and post-trade loading and water quality analysis
- Transactions, including financial aspects and results

A range of options exists for:

- Who conducts the analysis
- Who keeps the results and records
- Who shares the information and how
- Who can gain restricted or unrestricted access to summary or raw data

Centralized

- Market Manager conducts or contracts most analyses—may also consolidate trader- or stakeholder-provided information
- Key information generally readily available (some things may be in summary or aggregated form if necessary)
- Market Manager takes lead, but maybe not exclusive role in dissemination

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- Example: Following a WERF-sponsored study, *Nitrogen Credit Trading in the Long Island Sound Watershed (2000)*, Connecticut DEP conducted the analysis necessary to establish the point-point trading program for nitrogen. DEP is responsible for disseminating ongoing information about the program on its web-site and in annual reports.

Facilitated

- Participants generally conduct some or all of their own analyses and provide to the Facilitator for consolidation and integration
- Analysis may appear centralized, but it is controlled by participants rather than third-party
- Dissemination may be coordinated through a single “portal” but not dictated by Facilitator
- Example: The Virginia Nutrient Credit Exchange Association issued a survey to its members to collect up-to-date cost data for a trading optimization model and has developed an informational brochure about the program.

Decentralized

- Trading and other parties conduct and provide their own information/analyses
- Participant or third-party may consolidate
- Third-parties may conduct additional analyses and disseminate information independently, or as a fee-based service to program participants
- Example: In a system like Pennsylvania is contemplating, where it plans to use an electronic nutrient reduction registry and web-based systems to publicize trading opportunities such as offers to buy and sell, information will be available in a central location, but parties will need to conduct their own analysis with respect to whether a credit is a good value for the proposed price.

Cost Basis and Pricing

The cost of a credit and its price are two different things. The cost basis is the total of the separate cost elements that are eligible for consideration in the pricing scheme, including for example:

- Capital
- Operation and Maintenance
- Monitoring and Reporting

The price is the amount paid per credit, which may be:

- Set by rule or formula
- Negotiated
- Established through market bidding

Depending on program rules, cost and price may be closely related, or relatively independent.

Centralized

- Market Manager sets cost basis and rules for calculating prices
- Prices may be fixed for a period of time, or may vary if cost basis changes over time
- Administrative costs may be included in credit price or added on top as a fee or surcharge

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- Example: Connecticut DEP sets nitrogen credit prices annually, based on an established formula that considers eligible costs. Nitrogen credit prices ranged from \$1.65/lb to \$2.50/lb over the 2000 to 2006 period.

Facilitated

- Participants have discretion to set their own prices
- Potential traders and other stakeholders may collaborate or cooperate on agreeing on the cost basis and pricing scheme
- In some point-point trading models, money has not yet changed hands despite collective actions toward cap compliance
- Example: Trading Associations, such as those in place in North Carolina and Virginia, can generally establish prices for point source credits according to their own internal rules. In these cases, the State may establish prices for selected types of nonpoint source generated credits. In Virginia’s point-point nutrient trading program, credit prices may vary by Basin.

Decentralized

- Rules for cost basis may or may not exist, but would be published if pre-set
- Decentralized markets tend to be price-driven as buyers and sellers make decisions based on price and don’t necessarily need cost information
- Prices may be managed in some way, or may be allowed to fluctuate according to market forces
- Example: Prices may or may not be public in a decentralized system. Trading contracts in the Lower Boise River Program are not submitted to the State or made available for public review. State credit registries, such as those contemplated by Michigan and Pennsylvania, would make offered prices public.

Transactions

Trading transactions include:

- Identifying prospective partners
- Consummating the trade between the partners
- Recording the trade for regulators and/or public per program requirements

This element in different models is distinguished by the degree of contact trading partners have with each other.

Centralized

- Trading partners have little to no contact
- Directions or “offers” to buy or sell credits are collected or consolidated in a central clearinghouse
- Transactions may involve matching offers to each other, or may involve pooled transactions with no explicit matching
- Example: In the Connecticut program, the State buys and sells all credits. Available credits are pooled and redistributed to buyers through the state’s clearinghouse function, under oversight of the Nitrogen Credit Advisory Board. The state’s 79 POTWs do not trade directly with each other, but through the state-run program.

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Facilitated

- Trading partners have some degree of contact with each other
- This contact may be managed or facilitated by a broker or middleman
- The degree of contact will depend on whether the trade goes entirely through the broker (little contact), or if the facilitator's function is only to match partners (more contact)
- Example: The Virginia Nutrient Credit Exchange expects to conduct some, or perhaps all, point-point trades for its members through the Exchange. Various Excel-based tools are being developed to facilitate trading among Exchange members.

Decentralized

- Trading partners usually have direct contact
- It would be possible to have a decentralized system where parties could be represented by agents
- Decentralized transactions involve discrete bi-lateral (or conceivably multi-lateral) deals
- Example: The Lower Boise River Trading Pilot is set up such that buyers and sellers need to have direct contact to identify prospects and consummate trades. Buyers will be point sources and Sellers will be irrigation districts or other landowners with creditable BMPs.

Resources

Financial resources are needed to:

- Develop the program
- Implement the trades
- Oversee the program

Funding for these three general categories can come from different parties. Programs differ in the degree to which they are self-sufficient or subsidized in some aspect. Some functions and activities are more practically and efficiently funded from a central or pooled source. Others are better funded at an individual or trade level.

Centralized

- Program developed and implemented predominantly through Market Manager's funding
- Market Manager may or may not levy general or transaction-based fees on participants, depending on program purpose and available funding sources
- Example: A WERF-funded study, *Nitrogen Credit Trading in the Long Island Sound Watershed* (2000), produced the basic analysis showing that a point-point trading program would be feasible and cost-effective. The Connecticut DEP funded subsequent activities associated with developing and implementing the program.

Facilitated

- Program development likely sponsored by state or facilitator
- Eligible traders contribute to program set up and shared administrative costs through member fees and/or jointly secured third party funding
- Transaction-based fees usually not sufficient to fully support ongoing implementation

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- Example: Legislation creating the Virginia Nutrient Credit Exchange Association was developed with funding from the Virginia Association of Municipal Wastewater Agencies and the Virginia Manufacturers Association. The legislature has provided grant funding to the Exchange for its first years of operation.

Decentralized

- Program development may be partly supported by state or other third party
- Active and potential traders likely contribute significant amount for program set up and implementation
- Ongoing costs may be paid by market entry fee and/or trade-based fees
- Example: The Lower Boise River Trading Pilot was developed with a combination of dischargers', state, and EPA funding. As the program progresses, participants will have to fund their own participation, including paying credit certification and inspection fees.

Program Rules and Policies

As with performance targets, overarching program rules and policies are most typically set by state regulatory agencies within the context of the NPDES program, a TMDL program, or trading policy. The specificity or generality of these characterizes the range of centralization or decentralization.

Centralized

- Market manager or regulator sets all rules and policies
- Participants may have input through stakeholder-based, regulatory, or administrative processes
- Example: Connecticut established its point-point trading program for POTWs through state legislation and a general permit.

Facilitated

- Regulator sets statewide or watershed-specific framework
- Watershed stakeholders and/or traders establish more specific rules and procedures governing relationships and trades among themselves
- Example: The Virginia Legislature authorized a nutrient trading program through legislation and established some basic operating rules and principles. The Virginia Nutrient Credit Exchange Association has the authority to establish trading policies and protocols for its members.

Decentralized

- Regulator may provide only general guidance, or none at all
- Watershed-specific trading programs proposed on an individual basis for state approval
- Parties rely on multi-lateral or bi-lateral agreements to establish trading rules and policies
- Example: In the Lower Boise River Trading Pilot, private contracts define individual trades, subject to state guidelines.

Relationships Among Trading Parties

Buyers and sellers can have different positions vis a vis their potential partners and with other buyers/sellers:

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- Collaborative—proactively working together to reach most strategic, cost-effective program for all
- Cooperative—working together on selected program elements, but perhaps not all
- Independent—making decisions without consultation or consideration of other parties, but in a neutral way
- Competitive—occasional or frequent behavior to “beat” other parties to credits, market share, or on pricing

Centralized

- Collaborative or cooperative for most aspects of the program, from development to implementation
- Because there is a market manager, trading partners may have limited interaction, and may appear to act independently
- Example: Connecticut’s POTWs have no direct interaction with respect to trades. All trades are executed through the DEP-issued “invoices” showing payments from buyers to the state (red) and payments from DEP to the state (green). This process is overseen by the Nitrogen Credit Advisory Board, which provides the participants with a voice in the overall process.

Facilitated

- Collaborative or cooperative for most aspects of the program, from development to implementation
- Collaborative or cooperative with respect to decision-making about who is a seller and who is a buyer
- Example: Members of the Virginia Nutrient Credit Exchange Association are working together to establish the compliance schedule and necessary trades to meet Basin-level nutrient loading caps.

Decentralized

- May be cooperative with respect to program development and/or oversight
- Independent to competitive with respect to information and transactions
- Example: Both the Michigan Trading Rules and the Pennsylvania Trading Policy contemplate that buyers and sellers will find each other and interact through a state-sponsored electronic registry.

Decision-making

This element relates to who decides who will sell and who will buy, and to what degree those decisions are:

- Mandatory
- Dictated but with some voluntary or “opt-out” option
- Made jointly
- Made cooperatively
- Made independently

Centralized

- Trade decisions generally mandated or dictated
- Participants may not be able to opt-out, once in

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- Example: In Connecticut’s program, POTWs’ decisions to upgrade or not (and be a seller or a buyer) are “voluntary”, but the state issues SRF funding according to relative cost-effectiveness.

Facilitated

- Trade decisions collaboratively or cooperatively made—at a minimum with consultation
- Ability to “opt-out” may be limited to certain times at beginning and end of an established period
- Example: When the Maryland Association of Municipal Wastewater Agencies was considering various options, a closed market was favored, where entry and exit was limited to specific windows, and trading decisions made cooperatively under four Basin “bubbles”.

Decentralized

- Trade decisions made independently
- Pre-notification or consultation may or may not exist
- At a minimum, decisions will be posted for participants, regulators, and/or public after the fact, subject to program requirements
- Example: In the Lower Boise River Trading Pilot, and in programs contemplated by Michigan and Pennsylvania, buying and selling are completely voluntary, and traders should generally be acting independently within the buyer and seller groups, similar to a stock or commodity market.

Liability

Without specific agreements or mechanisms to implement another scheme, point source buyers are liable for the validity and performance of credits used for compliance purposes. Sellers’ liability will be established in:

- The NPDES permit for point sources
- Other policies or program documents for nonpoint sources
- As more trading programs come on line, other arrangements may gain favor such as:
- Joint or shared liability for selected actions
- Third-party accepting some/all liability

Centralized

- The Market Manager assumes liability for one or both sides of the transaction
- Buyers are protected if credits are purchased according to rules
- Sellers are subject to oversight and enforcement by Market Manager or a fourth-party for invalid or failed credits
- Example: The point-nonpoint nitrogen credit trading option for the Tar Pamlico Trading Association involved purchasing credits from the State by making payments to the agricultural cost share program. The purchaser’s obligation is then satisfied and he has no future liability with respect to the performance of the cost-share funded BMP.

Facilitated

- Buyers are individually or collectively liable, depending on whether trading is conducted under individual permits or a watershed permit

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- Facilitator, or another third party (the state, contractor, insurer) develop and help implement mechanisms to protect buyers
- Example: Members of the Neuse River Compliance Association are jointly responsible for meeting their aggregate nitrogen cap and individually responsible for their own WLAs.

Decentralized

- Buyer retains liability in its NPDES permit, so far as state regulators are concerned
- Buyers and sellers enter into contracts or other agreements that define seller's liability, assurances, and buyer's recourse for purposeful or accidental credit deficiencies
- Example: Point sources purchasing BMP-generated credits in the Lower Boise River Trading Pilot are liable for the performance of those BMPs through their NPDES permits. Buyers enter into contracts with sellers to establish the seller's liability and remedies for nonperformance.

Results

Results can be measured along several metrics:

- Water quality improvement or maintenance within the trading area
- Attainment of aggregate or group targets
- Compliance with individual WLAs and LAs
- Administrative performance of the trading program or project

The entity responsible for delivering on the different results categories will be determined by the market structure.

Centralized

- As Market Manager has great control over information and decisions, overall environmental and program performance will be measured at its feet
- Individual participants will still have responsibilities for delivering credits and otherwise following program rules
- Example: Connecticut's nitrogen credit trading program is largely judged by DEP's ability to manage the state's SRF program to fund upgrades cost-effectively so that collectively the 79 POTWs stay under the loading cap and meet the 2014 goal. Credit sellers and credit buyers still have individual performance responsibilities. To date, DEP and the POTWs are more than meeting their nitrogen reduction goal.

Facilitated

- Results will be measured at collective or individual levels as established by the program framework
- The Facilitator's performances as a consolidator and/or broker also will be evaluated by participants and stakeholders
- Example: Where point sources form Associations to facilitate point-point trading, compliance is first measured against the collective loading cap. Individual performance is important because the net result depends on the proper balance of credit and debits. Usually, it is only when the cap is breached, that compliance is measured at individual WLAs.

Decentralized

- Performance is measured at the individual level per the contracts and agreements put in place

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- Regulators will look closely at Buyers to evaluate compliance with trading baselines inclusive of credits and delivered benefits of those credits
- Buyers will evaluate seller’s performance per delivery agreement
- Example: In the Lower Boise River Trading Pilot, EPA will measure point source compliance with individual WLAs by looking at its loadings and any credits. Buyers evaluate BMPs generating their credits by direct measurement or estimation, as provided by the trading guidelines, with the help of third party inspectors. (Note that Idaho does not have NPDES delegation so EPA is the permitting authority.)

MARKET MODELS

Market models are made up of or reflect the following:

- Market elements from which they are assembled
- The primary market model manifested
- The broader trading framework for which they are designed and in which they exist

To date, trading programs involving multiple buyers and sellers mostly fall into one of three general models:

- Third-Party Managed or Directed (Centralized)
- Trader Associations (Facilitated)
- Free Market-like (Decentralized)

A fourth model describes markets limited to one buyer with one or more sellers:

- Single Buyer Offset Programs - Centralized on the buying side, variable on the selling side

This TM describes these four models as they have appeared to date in water quality credit trading programs. Additionally, a fifth model was examined specifically for application in the Willamette Basin that has heretofore not yet been seen in the water quality credit arena: a model we call the “Trust.” Features of our “trust” model were described and documented in a separate TM, provided as Attachment B to this TM.

For the Board meeting, as seen in Attachment A, four different model specifications were presented that are related to, but don’t map identically to the four presented in this TM. The four models presented at the Board meeting are: Credit Clearinghouse; Market Facilitator; Market Manager, Market Maker.

Managed Trading

Key Features:

- First, watershed goals are set and schedules for achieving interim and final goals are determined
- Analysis of source-control measures for largest reductions, cost-effectiveness, and ability to implement quickly is carried out

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- The best sequence and timing for upgrades is determined
- Initial upgrades that will produce reductions greater than needed to meet interim goals are chosen
- If state grant funding is available, award priority is based on optimization results
- Non-upgraded facilities must purchase credits from upgraded facilities
- Additional upgrades are added as needed to comply with goals
- Not all facilities may need to be upgraded

Examples:

- The foremost (and so far only) example of this type of program is the Connecticut Long Island Sound Nitrogen Trading Program

Benefits:

- Holistic planning approach taken for point sources
- Upgrades selected based on water-quality benefit
- Most cost-effective upgrades done first
- Not all plants have to upgrade
- Lower overall cost

Trading Association

Key Features:

- Mass-load limits or goals based on achieving water-quality standards or TMDL wasteload allocations are calculated for the existing point source dischargers in a watershed
- The dischargers form a trading association and the state agrees to allow the members (or “co-permittees”) to aggregate their individual allocations into a single association allocation
- The association is free to meet the allocation in any manner it sees fit
- The trading association signs an agreement with the state through which the association becomes the entity responsible for compliance with the allocation
- Membership in the association is voluntary; any WWTP not joining the association would be responsible for complying with its individual wasteload allocation
- Membership in a trading association should not disqualify a WWTP from state cost-share grants if a cost-share program exists; nor should it make it ineligible for low-interest SRF loans from the state
- The ability to acquire nonpoint source credits can be made available to the association if the state has developed a point-nonpoint source trading program

Examples:

- Tar Pamlico Trading Association (nitrogen)
- Neuse River Compliance Association (nitrogen)
- Virginia Nutrient Credit Exchange Association (nitrogen and phosphorus)
- Program proposed by Maryland Association of Municipal Wastewater Agencies in 2004 (nitrogen and phosphorus)

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- Program being considered by Bay Area Clean Water Association (mercury)

Benefits:

- Association has freedom and flexibility in deciding how to meet its allocation
- Most cost-effective upgrades done first
- Not all plants have to upgrade
- Lower overall cost
- Possibly faster compliance

Market-Like Trading

Key Features:

- Dischargers in a watershed are given mass-load limits or goals based on achieving water-quality standards or TMDL wasteload and load allocations
- The dischargers could meet their individual limits or goals either by reducing their own discharged loads or by buying credits from other dischargers or sources, either point or nonpoint
- The buyers and sellers of credits would operate in a market-like environment. They would seek each other out, negotiate terms of the transaction and prices, and hold each other accountable for compliance with the trade agreement or contract
- The market would operate within general rules established by the state
- Buyers and sellers would be free to execute whatever sales and arrangements they desire, as long as they comply with the regulatory requirements established by the state for the trading program

Examples:

Programs envisioned by:

- Michigan Trading Rules
- Pennsylvania's proposed nutrient trading program
- Lower Boise River Trading Pilot

Benefits:

- Most free-market like form of trading
- Market forces may:
 - Encourage creativity and greater pollutant reductions
 - Enhance the attractiveness of trading
 - Lower the overall cost
- As with the other forms of trading:
 - Not all plants have to upgrade
 - Possibly faster compliance

Small Scale Offset Programs

Key Features:

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- Offset programs are defined here as programs where a discharger is required to take some action in return for increasing its discharged load or for not decreasing it to comply with a new wasteload allocation
- There have been a number of small-scale offset programs to date
- Because of their variety, they are difficult to categorize

Examples:

- Rahr Malting Company NPDES permit, MN (CBOD5)
- Wayland Business Center NPDES permit, MA (phosphorus)
- Clean Water Services Watershed Permit, OR (temperature and dissolved oxygen)
- Sacramento Regional County Sanitation District's potential mercury offset program, CA

Benefits:

- Can be tailored to unique needs and opportunity of the single buyer
- Can be implemented through a single NPDES permit
- New statewide policies or programs not necessary
- If it's the first trading project in state or region, it can serve as a pilot demonstration for others
- Can be geared around a single credit source, or multiple sites/sellers

Selecting the Right Features

Important factors in determining which elements and model features are right for a given situation include:

- Number of dischargers/sources
- Number of potential sellers versus buyers
- Geographic layout of the watershed and the sources
- Relationships between and among potential traders
- Relationship between potential traders and state regulatory agencies
- Magnitude of required reductions
- Potential availability of credits
- Number and frequency of anticipated trading transactions
- Transaction costs faced by buyers and sellers
- Resources needed to set up and maintain the trading system
- Market oversight requirements

There are multiple approaches to structuring a market. Options range from simple to complex. Stakeholders must examine market elements and features of models and evaluate the relative costs and benefits of alternative approaches. From that analysis, they can select those that work best for a given watershed and choose an overall approach appropriate for their situation and preferences.

MARKET ADMINISTRATION

The next three sections move beyond the elements and the whole of a market framework and focus on key activities associated with executing trades and implementing a trading program. A trade is usually not a trade until it is documented and verified—for programs with multiple transactions periodic reconciliations also are necessary. Implementation involves three categories of core administrative and oversight activities:

- Tracking
- Oversight
- Evaluation

Tracking

Tracking activities include identifying, documenting, recording, and publicizing (as applicable) the following:

- General trading opportunities
- Credit generation
- Credit use
- Trade transactions
- Other items and post-trade activities

General Opportunities

Some programs elect to document trading opportunities at a conceptual or general level. Such identifications may be:

- the result of studies that supported development of the trading option
- post-implementation attempts to incentivize and support the market

Examples of general opportunities:

- Lists of potentially interested parties from stakeholder meetings
- Feasibility study results
- Eligible credit-generating options in policies or rules
- GIS maps of land use and BMP priority areas
- “ISO” postings on a registry

Credit Generation

Subject to rules for generating credits, their existence, availability, and any limitations must be documented and recorded. Point source-generated credits at a minimum are usually identified in Discharge Monitoring Reports (DMRs). Nonpoint source-generated credits can be identified in trading-specific mechanisms, or in documentation for the program through which a credit is generated.

Examples of important credit generation information:

- Name, address of generator

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- Location of technology, project, or action creating credit
- Description of how credits were generated
- Trading baseline for credit generator
- Duration, life, or other temporal attribute of credits
- Any O&M activities
- Monitoring data, ongoing requirements
- Verification, certification, and/or inspection confirmations

Credit Use

Using credits to meet trading baselines for compliance purposes, or other uses (e.g., retirement) must be documented and recorded, per applicable rules. Point sources using credits toward their WLAs at a minimum must usually identify such use in their DMRs. Additional tracking of credit use can be done in trading-specific mechanisms that may or may not specifically identify the seller, or in documentation for the credit source or seller.

Examples of important credit use information:

- Name, address of user
- Location of technology, project, or action using created credit
- Trading baseline for credit generator
- Amount/number of credits used
- Net pollutant load, or load reductions (load - credits = net)
- Any responsibilities user has for credit validation or certification
- Any liabilities user has for credit performance
- Performance bond or other insurance mechanism

Trade Transactions

As illustrated in the credit generation and use examples, trade transactions can be executed:

- By the process involved in using a credit without any subsequent action
- By the act of using a credit with some additional action
- At a minimum, the trade transaction must:
 - Debit the seller's account
 - Credit the buyer's account

Examples of trade transaction activities:

- Reflecting credit sales and purchases in NPDES permits
- Removing sold or retired credits from the available pool
- Reconciling net results of credits generated and used under a pooled or bubble program
- Matching sales to purchases in whole or partial "lots"
- Providing reports of net results for the compliance period
- "Registering" credit transactions

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- Validating/certifying credit transactions

For point sources, the method a state uses to handle trading in NPDES permits, determines the specific form a trading transaction will take, based on EPA policy:

In some cases, specific trades may be identified in NPDES permits, including requirements related to the control of nonpoint sources where appropriate. EPA also supports several flexible approaches for incorporating provisions for trading into NPDES permits:

- *general conditions in a permit that authorize trading and describe appropriate conditions and restrictions for trading to occur,*
- *the use of variable permit limits that may be adjusted up or down based on the quantity of credits generated or used; and/or,*
- *the use of alternate permit limits or conditions that establish restrictions on the amount of a point source's pollution reduction obligation that may be achieved by the use of credits if trading occurs.*

EPA does not expect that an NPDES permit would need to be modified to incorporate an individual trade if that permit contains authorization and provisions for trading to occur and the public was given notice and an opportunity to comment and/or attend a public hearing at the time the permit was issued.

For point sources, EPA also identifies watershed or general permits as an option in which to track trade transactions:

EPA also encourages the use of watershed general permits, where appropriate, to establish pollutant-specific limitations for a group of sources in the same or similar categories to achieve net pollutant reductions or water quality goals through trading.

Other Items and Post-Trade Activities

Independent of any oversight or evaluation processes, trade-related items and activities beyond credit generation, use, and transactions may be documented and recorded. These may include additional or ancillary documentation that must be submitted or provided for review. These also may include O&M or monitoring reports that document ongoing credit performance or use.

Examples of other items and post-trade activities:

- Copies of contracts or trade agreements
- Information about credit costs and/or prices
- Documentation for programs under which BMPs are created
- Facility O&M manuals and procedures
- Discharge monitoring reports specific to trading
- BMP efficiency reports
- Stream-side monitoring specific to credit creation
- Other monitoring or modeling

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Tracking Wrap Up

Important factors in determining which approaches are right for a given situation are similar to those considered when developing a market framework:

- Number of dischargers/sources, potential sellers versus buyers
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- Market oversight and evaluation requirements

Oversight

For individual trades, oversight activities include the following which may be conducted by traders, state regulatory agencies, and/or third parties as established under the program:

- Credit certification and/or verification - including sellers' compliance with trading baselines
- Trade reconciliation - including buyers' compliance with trading baselines
- Protecting designated uses - including anti-degradation policies
- Conformance with other applicable rules, policies, contractual responsibilities
- Enforcement for non-compliance and non-conformance

For an overall project or program (if applicable), oversight activities will involve these same areas at an aggregate level.

Credit Certification/Verification

As described under "Tracking", rules and procedures are established for generating credits. The oversight function ensures that those rules are followed through one or more of several mechanisms:

- Requirement for general documentation
- Proof of generation (pictures, monitoring reports)
- Signature certifications
- Document audits
- Site inspections

Examples of credit attributes subject to oversight:

- Name/eligibility of generator
- Location
- Type
- Seller's Baseline
- Life/duration/generation period

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- Credit calculation methods
- Application of trading ratios (if required)
- Longevity
- Agreements and contracts (if applicable and if required)

For point source generated credits, most programs require NPDES dischargers to certify/verify credit through monthly Discharge Monitoring Reports (DMRs). DMRs for trading programs may:

- Not need to be modified
- May be modified
- May be accompanied by supplementary documentation

DMRs are signed by the dischargers representative.

Trade Reconciliation

Reconciliation involves matching credit demand to supply for a specified compliance period. Buyers who are not meeting their baselines without credits must have a sufficient number for the period to attain compliance. Credit sales and purchases may be reconciled in two ways:

- Matched 1 to 1, with buyer-seller pairs specifically identifiable
- Pooled and redistributed, such that buyer-seller pairs are not specifically identifiable

Examples of reconciliation periods:

- Annual
- Seasonal
- Monthly
- Daily

Conformance with Other Requirements

Parties' continuing eligibility to participate in trading can depend on meeting requirements beyond those specific to trading baselines, credit generation, and use:

- NPDES permit requirements, general or specific to trading
- BMP cost-share program requirements
- Contractual agreements between trading parties
- Intergovernmental Agreements between traders and regulatory agencies
- Voluntary commitments to stakeholders

Examples of other requirements subject to oversight:

- Special Plans
- Mapping priority BMP areas
- Stakeholder involvement activities
- Audits and inspections

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- Electronic filings
- Compliance with regulatory requirements for non-traded parameters
- Maintenance of financial obligations

Compliance and Enforcement

Trading programs must establish the following:

- What constitutes compliance for the Buyer
- What happens if credits aren't "good"
- What remedies and "back-ups" are available

Examples of compliance and enforcement mechanisms:

- NPDES permit language
- Agreements between buyers and sellers
- Forms, certifications, and implied agreements for non-point sources participating in state-sponsored programs
- Performance bonding and insurance tools
- "Last Resort" pool of ready credits

Oversight Wrap Up

Important factors in determining which approaches are right for a given situation are similar to those considered when developing a market framework:

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Evaluation

The section covers these evaluation activities:

- Individual trades
- Several trades
- A program
- Environmental results
- Economic benefits
- Other performance measures
- Overall success

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Evaluation activities involve periodic, retrospective assessments of (and sometimes future projections of) performance against goals and requirements:

- For individual trades
- For the project (may include several trades)
- For the program (may include many trades)

Evaluations will generally be expected or required to address:

- Environmental results
- Economic benefits
- Overall project or program (as applicable)

Other performance or success measures might address:

- Compliance with administrative or policy requirements
- Traders' satisfaction with program rules and mechanisms
- Meeting stakeholders' expectations for information dissemination
- Integration of trading with other watershed programs

Program Objectives and Benefits

It is important to establish clear and wherever possible quantifiable objectives for a trading program at the outset. There may be some that are more important than others, so any priority order also should be reflected.

EPA Policy examples of benefit objectives for trading:

- Early reductions and progress towards TMDLs
- Reduced TMDL implementation cost
- Economic incentives for voluntary pollution reductions
- Reduced compliance costs
- Offsetting of new or increased discharges
- Long-term improvement (retirement of credits)
- Multiple environmental benefits

Ancillary Objectives and Benefits

Many programs will set a narrow objective to meet or do better than a performance metric for a single parameter. For example, achieve specified load reductions or maintain loadings below a cap. Through the course of trading, it may be possible—accidentally or on purpose—to achieve other benefits. These benefits, sometimes called “ancillary” to trading, can be desirable and important to overall watershed health. Ancillary benefits may or may not have a market value. Where they are sought or occur, they should be included in any evaluation of trades or a trading program.

Examples of ancillary benefit objectives for trading:

- Control for targeted pollutant reduces other pollutants

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- BMPs for nutrients provide erosion control and habitat
- Stream and wetlands restorations provide erosion control and habitat
- Tree and shrub plantings for temperature credits provide carbon sequestration

Environmental Results

Three tests can be applied to environmental results for individual trades and for overall programs. By most policy definitions and regulatory standards, success (and often compliance) depends on passing these two:

- First, do no harm—this relates to the antidegradation requirements discussed in the Oversight section
- Second, attain results at least equivalent to non-trading case
- In some situations, by prescription or good luck, success also means passing this test as well:
- Third, attain results superior to non-trading case

Equivalency means that an individual trade, set of trades, or trading program produces environmental benefits equal to the benchmark, inclusive of:

- Trading ratios
- Margins of safety
- Other risk management techniques

Environmental performance of individual trades or overall program is best measured by looking at:

- Load reduction or other benefit provided at credit generation site
- Lack of adverse impacts at the credit use site
- Benefits and/or lack of impacts upstream of, downstream of, or in-between the credit generation and use sites, as applicable

Results should be measured against absolute metrics and/or ranges of expected values.

Examples of environmental metrics for credit trading:

- Mass load reduction compared to baselines
- Mass loads avoided compared to projected
- Local water quality improvements
- parameter concentrations
- turbidity
- plant communities
- living resources
- Linear measures for stream-related BMPs
- Area measures for land-based BMPs

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Economic Benefits

As with environmental results, economic benefits of trading should be measured against the proper benchmark(s), which will be determined by the objectives of the project or program. Look at cost-effectiveness and/or cost-savings of the trading option versus:

- Non-trading base case
- Expected trading case

Economic benefits can be measured at several levels:

- Unit cost effectiveness
- Single trade (multiple units)
- Series or package of trades
- Annual cumulative results
- Programmatic comparison over multiple years (e.g., permit cycle, longer period)

Economic metric(s) should be selected that make the most sense for a given situation.

Evaluation Wrap Up

Important factors in determining which approaches are right for a given situation are similar to those considered when developing a market framework:

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