Water Quality Credit Trading in Washington and Puget Sound: One Tool in the Toolbox

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Agenda

- Trading in Washington and Puget Sound
- Trading 101
- Two Relevant Case Studies:
  - Chesapeake Bay
  - Clean Water Services, Oregon
- Lessons Learned for Puget Sound
Trading in Washington and Puget Sound
Within Washington State, water quality credit trading has been evaluated in the Chehalis, Puyallup, Yakima, and Spokane areas—All freshwater—Drivers included nutrient issues (phosphorus, BOD, ammonia)

Spokane River process farthest along—TMDL process for Long Lake—Includes point and non-point source trading
Ecology’s Water Quality Trading Framework

- (2009-2011) = ongoing evolution based on Spokane as a test case
- **Timing:**
  - Applies to post-TMDL situations
  - Allows pre-TMDL trading so long as it makes significant progress toward meeting standards
- **Application:**
  - Limited to meeting TMDLs / NPDES (phosphorus/nitrogen and other oxygen-related pollutants, and sediments)
  - No toxics or fecal coliform
  - “Ecosystem services” seen as secondary benefit

Water quality trading, sometimes called pollution trading, allows the market to help achieve water quality goals. Timing: Applies to post-TMDL situations, allows pre-TMDL trading so long as it makes significant progress toward meeting standards. Application: Limited to meeting TMDLs / NPDES (phosphorus/nitrogen and other oxygen-related pollutants, and sediments), no toxics or fecal coliform, “Ecosystem services” seen as secondary benefit.
Trading and Puget Sound

- So far, trading has not been a major part of the discussion for Puget Sound cleanup efforts

Why?
- WQ problems complex technically
  - Point and non-point sources
  - Freshwater and estuarine
  - Multiple regulatory drivers, including ESA
- Numerous sources with varying responsibilities/mandates and jurisdictions
- Numerous agencies with varying responsibilities/mandates and jurisdictions
- Uncertainty in future regulatory requirements

- More stringent water quality standards and fewer resources are part of our future
Nitrogen and Dissolved Oxygen in Puget Sound

- South sound is impaired

Graphics from Ecology (2011)
Trading 101
Trading 101: What are Water Quality Credits?

- Water quality credits are created when sources (sellers) perform better than required – buyers can apply to offset exceedences or shortfalls.
Trading is Not New Anymore

- National guidance and resources clarify preferred approaches and detail options

“The United States Environmental Protection Agency believes that market-based approaches such as water quality trading provide greater flexibility and have potential to achieve water quality and environmental benefits greater than would otherwise be achieved under more traditional regulatory approaches.”

Final Water Quality Trading Policy, January 2003
Real initiatives showcase alternative market development processes, transaction models, and strategic lessons.

Pollutants being traded or considered:
- Nitrogen
- Phosphorus
- Dissolved Oxygen
- BOD/CBOD
- Sediment
- Temperature
- Flow
- Copper
- Mercury
- Selenium

Trading is Not New Anymore
Trading Offers Important Benefits

- **Cost-Effectiveness**
  - Compliance more cost-effective, when credits less expensive than on-site options
  - Credit purchases let buyers optimize sizing and scheduling their own projects

- **Targeting Improvements**
  - Can encourage pollutant reductions in priority locations where they might not otherwise occur
  - Can create incentives for desired projects that might not otherwise be economical

- **Speeding Results**
  - Helps regulated parties and voluntary actors produce load reductions and water quality improvements on faster schedule than without trading
  - Creditable projects can have shorter permitting and/or construction schedule and/or require less financial investment

- **Leverage State Funds**
  - Helps optimize state investments in public programs via cost-share for credit generation, or direct credit purchases
Cost-effectiveness and Cost-savings Key Drivers for Most Programs

**Point-point examples**

- Virginia municipal and industrial phosphorus and nitrogen credit exchange
  - $2.2B no trading
  - Save $410M with trading
- Connecticut POTW nitrogen exchange:
  - Estimated savings = $300M to $400M (33% original basis)

**Point-nonpoint examples**

- Clean Water Services temperature:
  - $50M+ effluent cooling
  - $4M riparian shading
- Lower Boise River phosphorus control
  - POTWs $5-200/lb
  - Agriculture $5-50/lb
Basic Conditions for Water Quality Credit Trading
Opportunities and Success

1. **Driver for action**: desired or required water quality improvements

2. **Understanding of water quality**: knowledge about causes, sources, and relative load contributions

3. **Alternative feasible solutions**: more than one combination of enhanced treatment, best management practices, and/or restoration projects

4. **Greater cost-effectiveness**: sufficient differences in relative cost-effectiveness across the various options among the feasible solutions

5. **Market warrants investment**: scale and scope of the expected credit market and potential cost-savings sufficient to warrant proportional investment development and operation

6. **Equal or better results**: science-based assessments and program rules ensure net benefits compared to not trading

7. **Stakeholder-endorsed framework**: if 1-6 met, regulatory, policy, administrative framework for trading can be developed and implemented
Two Relevant Case Studies
Chesapeake Bay

- 4 state trading programs in Chesapeake Bay

- Separate trading areas in each state:
  - Virginia 5
  - Maryland 3
  - Pennsylvania 2
  - West Virginia 1

Graphics from USGS (2006)
Chesapeake Bay

- TMDL incorporated nutrient trading provisions to accommodate growth, incorporate cost-effective and affordable actions, and provide backstop provisions

An Extra $13 Billion Needed in 2002 for All Tributary Strategies by 2010

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<th>The Big Picture</th>
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<td>Total projected cost</td>
<td>$18.7 billion</td>
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<tr>
<td>Total projected income</td>
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<td>Unfunded gap</td>
<td>$12.8 billion</td>
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Unfunded Gap by State

- Maryland: $2.9 billion
- Pennsylvania: $4.8 billion
- Virginia: $5.1 billion

Virginia Nutrient Credit Exchange

- Drivers
  - State implementation of regional Chesapeake Bay Program nutrient reduction goals
  - New N and P limits for major point sources depending on watershed
    - N range = 3 mg/l – 8 mg/l
    - P range = 0.18 – 1 mg/l
  - Individual WLAs derived from new limits and design flow

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120 facilities in 5 watersheds affected by WLAs
Virginia Nutrient Credit Exchange

- **Discharger Education and Recruitment Process**
  - Membership/trading participation voluntary
  - New concept for many
  - Critical to explain benefits and obligations
  - Multiple meetings/workshops

- **Compliance Plan Options Analysis and Constructability Evaluation**
  - Estimated compliance costs with and without trading
  - Additional savings/avoided premiums associated with construction market peak impacts without trading

**Annual Construction Spending with Market Volume Premium**

*Trading Case vs. Non-Trading Case*

- Savings with trading estimated at >$410M
Trading began 2011

 Credits normalized to Bay Pounds

 Credit Exchange Policy and Member Services Agreement spell out rules and obligations

 Credit prices set annually on rolling 5-yr basis

 Prospective trading ledgers project rolling 5-yr basis
Clean Water Services: First in the Nation Watershed Permit

- 4 WWTPs with River Discharge
- Stormwater for WWTPs
- Stormwater MS4 for 13 Communities

Graphics from Clean Water Services
Point-Nonpoint Trading: Temperature Compliance Alternatives

- Reduce influent wastewater temperature
  - No viable options

- Remove discharge from Tualatin
  - Would result in greatly reduced summer flows (50-66%)
  - Significant negative WQ impacts

- Chill/Refrigerate discharge
  - High capital cost, $50 million
  - High energy cost, $1-2 million/yr
  - No ancillary environmental benefits, in fact creates negative environmental impacts because of higher carbon footprint
Temperature Trading

- CWS’ point-nonpoint trading program science-based
  - Need 332 M kcal/day in shade credits
  - Use DEQ “Shade-a-lator” model to calculate effective shade
  - Apply 2:1 trading ratio (accounts for time to maturity)

- Coordinated through local Soil and Water Conservation District via “Enhanced CREP”

- Can also offset thermal load with river flow augmentation and effluent reuse

CWS reports kilocalorie credits in an annual report.
Anticipated Implementation Process for Updated TMDLs

- Temperature TMDL
  - Adds Forest Grove and Hillsboro WWTFs
  - Trading extended and updated
  - Includes NTS: Reduces temperature with emergent vegetation

- Oxygen-Demand/TP TMDL
  - Adds Forest Grove and Hillsboro WWTFs
  - Bubble permit with trading:
    - BOD and Ammonia
    - Total Phosphorus
  - Includes Natural Treatment Systems: Further polishing
Lessons Learned for Puget Sound: Can it Work Here?
Lessons Learned

- Each involves mostly the same basic building blocks and design elements, just assembled differently
  - Baselines, credit definitions
  - Reconciliation periods, ratios
  - Trading rules and policies

- They represent a varied set of arrangements and market structures
  - Bi- and multi-lateral
  - Managed or free(r) market
  - Centralized, decentralized
  - Facilitator and broker roles

- At their inception, or by implementation, they had important conditions for success
  - Drivers, knowledge, opportunity
  - Benefits, stakeholder endorsement
Can it Work Here?

1. Driver for action
2. Understanding of water quality
3. Alternative feasible solutions
4. Greater cost-effectiveness
5. Market warrants investment
6. Equal or better results
7. Stakeholder-endorsed framework

Graphics from Puget Sound Partnership
Drivers for Action

- Pollutant load reductions mandated by on-going TMDLs for Puget Sound WRIsAs
- WWTF permit requirements for wastewater
- MS4 permit requirements for pollutant reduction in urban storm water
- ESA requirements for salmonid population improvements
Understanding Water Quality

- Ecology studies
- USGS studies
- EPA studies
- NMFS studies

Graphics from Ecology (2011)
Alternative Feasible Solutions

- Multiple permitted WWTPs
- Multiple MS4 regulated communities
- Significant loads of nitrogen from point sources, urban areas, and rural sub-watersheds offer a variety of ways to reduce phosphorous loading
  - This is usually one of the tasks in the assessment of a potential credit trading market
Greater Cost Effectiveness

- Are there sufficient differences in cost effectiveness for pollutant removal among or within the source categories (P-P, P-NP) to attract buyers and sellers?
- This is usually one of the tasks in the assessment of a potential credit trading market.
Market Warrants Investment

- The scale of the cost savings is sufficient to warrant the development and operation of the credit market – there will be transactional costs.
- The physical and demographic scale of the market is favorable. The Puget Sound watershed is 2,458 square miles with 14 major sub-watersheds.
- Plus, there are 3.5 million people in the Puget Sound region.

Graphics from Puget Sound Partnership
Equal or Better Results

- Program rules need to be developed for the credit trading market to ensure a net benefit to the environment relative to not trading.
- This is usually accomplished with trading ratios.
- “Puget Pounds?”
Consistent with the existing missions to improve the integrity of Puget Sound through education, community outreach, WQ monitoring and implementation of conservation and restoration practices.
Can it Work Here?

- Driver for action
- Understanding of water quality
- Alternative feasible solutions
- Greater cost-effectiveness
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Graphics from Puget Sound Partnership
Discussion