Water Quality Trading in the Chesapeake Bay

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United States Department of Agriculture - Office of Environmental Markets
What is Water Quality Trading

- Regulated source purchases credits in lieu of upgrades
- New or expanding source purchases an allocation
- Credits generated by other regulated sources or from unregulated sources like agriculture.
Benefits of WQT

- Reduces cost of compliance
- Accelerates pace of compliance
- Allows for growth under a pollution cap
- Provide incentive for nonregulated sources to meet TMDL allocation
Drivers for WQT in the Chesapeake Bay

- Chesapeake Bay 2000 Agreement
- Chesapeake Bay TMDL
- State-level policies/permits
  - NPDES permits
  - Post-construction Stormwater
  - MS4 permits
Trading Example

Annual discharges into a local stream

Annual Load

- 2,000
- 2,000

Pounds per Year

- 5,000
- 4,000
- 3,000
- 2,000
- 1,000

Farmer WWTP

2,000

2,000
Trading Example

State adopts phosphorus TMDL
Trading Example

Load is allocated among the sources of phosphorus

- Annual Load
  - Pounds per Year
  - Farmer
  - WWTP

- Total Load: 2,400 pounds per year
  - Farmer: 1,200 pounds
  - WWTP: 1,200 pounds
Trading Example

- WWTP can reduce to 1400 lbs at relatively low cost
- Next 200 lbs would be very expensive for WWTP.
- Farmer can get cost-share to reduce to 1,200 lbs.
- Farmer can use private dollars to reduce an additional 200 lbs to sell as credits.
Trading Example

Farmer reduces load to 1000 lbs, has 200 credits to sell
Trading Example

Net Result

<table>
<thead>
<tr>
<th>Pounds per Year</th>
<th>Farmer</th>
<th>WWTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>1,000</td>
<td>2,400</td>
</tr>
<tr>
<td>1,000</td>
<td>1,400</td>
<td></td>
</tr>
</tbody>
</table>

Annual Load
Offsetting new growth

A proposed development in the watershed will discharge an estimated 300 lbs.
Offsetting new growth

Agriculture generates 300 lbs of offsets below its TMDL obligation. The new development is granted a permit.
State Trading Programs in the Chesapeake Bay

• Virginia
• Maryland
• Pennsylvania
Virginia

- Nutrient trading law signed in 2005
  - To provide flexibility for point sources to meet compliance schedules and cost-effectively meet upcoming loading caps
- Program expanded in 2012 to authorize MS4s, other sectors to trade
- Trading for P allowed to offset post-construction requirements
Virginia

- PS-PS trades for compliance; PS-NPS trades for new/expanded growth.
- Virginia Nutrient Credit Exchange established for PS-PS trades
- Credits selling for under $5/lb N
- No trades to offset new or expanded growth
Virginia

- Post-construction stormwater offsets for P only
- Offsets must be permanent
- Credits generated through land conversion/easements
- Permanent P credits trading for up to $18,000/lb
Virginia

- Virginia only state to add numeric N and P goals to Phase I MS4 permits
- Arlington county currently exploring a trade with its WWTP to ensure compliance for next 5 year permit
Maryland

- PS-PS and PS-NPS programs established in 2008
  - To maintain point source loading caps under Tributary Strategies
- Currently developing Accounting for Growth policy
- Draft cross-sector trading guidance released in 2014
- Currently revising WQT guidance and including MS4
Maryland

- WWTPs cannot trade to comply only to offset new and expanding growth
- No trades conducted to date
- MD working on “Accounting for Growth” policy for post-construction stormwater
- MD released a policy in 2015 to allow non-phase I MS4s to trade
Maryland

- MD currently redrafting trading guidance
- New guidance proposes Phase I MS4 trades.
- MS4 trades would require a translation between impervious acres and nutrient loads.
Pennsylvania

- Nutrient trading policies and guidance issued in 2006
  - To meet regulatory obligations and offset new loads from wastewater
- Trading regulations passed in 2010
- Trading program under revision
- Trading options for MS4s and development stormwater are under consideration
Pennsylvania

- Trades for permit compliance
- 54 facilities purchased credits in 2015
- Credits traded through MARKIT registry using auctions to match buyers/sellers
- Prices vary between $3 and $0.50
- Credits generated from PS and NPS
### Allowable Trading Scenarios

<table>
<thead>
<tr>
<th>When can trading occur?</th>
<th>Who can sell?</th>
<th>Who can buy?</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Comply</td>
<td></td>
<td>Wastewater</td>
</tr>
<tr>
<td>Point sources</td>
<td>VA, PA</td>
<td>VA, MD*</td>
</tr>
<tr>
<td>Nonpoint sources</td>
<td>PA</td>
<td>VA, MD*</td>
</tr>
<tr>
<td>To Maintain/Offset</td>
<td></td>
<td>Wastewater</td>
</tr>
<tr>
<td>Point sources</td>
<td>MD, PA</td>
<td>VA, MD*</td>
</tr>
<tr>
<td>Nonpoint sources</td>
<td>VA, MD, PA</td>
<td>VA, MD*</td>
</tr>
</tbody>
</table>
## Trading Ratios

<table>
<thead>
<tr>
<th></th>
<th>Maryland</th>
<th>Pennsylvania</th>
<th>Virginia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delivery Ratio</strong></td>
<td>Chesapeake Bay Watershed Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reserve Ratio</strong></td>
<td></td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td><strong>Retirement Ratio</strong></td>
<td>5% for PS 10% for NPS</td>
<td></td>
<td>5% for NPS*</td>
</tr>
<tr>
<td><strong>Uncertainty Ratio</strong></td>
<td>≥ 10%, in some cases</td>
<td></td>
<td>2:1 for NPS to PS</td>
</tr>
</tbody>
</table>

* proposed

Source: Sara Walker, WRI
Agricultural Baseline

• A level of environmental performance that must be achieved before being eligible to trade.
• Because agriculture is not regulated, baseline is used to determine trading eligibility.
**Agricultural baseline**

<table>
<thead>
<tr>
<th>Maryland</th>
<th>Pennsylvania</th>
<th>Virginia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet a per-acre annual loading rate (e.g., lbs TN/acre) calculated from</td>
<td>(1) Implement a 100-foot manure setback, (2) implement a 35-foot vegetative buffer, or (3) reduce</td>
<td>Implement, as applicable: 1) Soil conservation plan 2) Nutrient management plan 3) Cereal</td>
</tr>
<tr>
<td>the Bay or local TMDL, whichever is more restrictive</td>
<td>the farm’s total nutrient balance by additional 20%</td>
<td>cover crops 4) Fencing 5) Riparian buffers</td>
</tr>
</tbody>
</table>

**Performance-based**

EPA: TMDL

**Practice-based**

EPA: TMDL

**Practice-based**

EPA: TMDL

Source: Sara Walker, WRI
Tools for estimating credits

- Chesapeake Bay Nutrient Tracking Tool (CBNTT)
- Maryland Urban Offset Calculator
- Lookup values based on the CBWM
- Spreadsheet tools
- BayFAST
Project review & certification

1. Submit project proposal
2. Administrative review
3. Project implementation

4. Onsite verification
5. Project certified & registered
6. Credits issued
Registry

- Spreadsheet (VA)
- MARKIT (PA)
- Chesapeake Bay WQT Registry (MD + others?)
# Virginia registry

## 2014 Total Nitrogen Credit Transfers

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Potomac Front Royal STP</td>
<td>VA0062812</td>
<td>VAN010010</td>
<td>48,720</td>
<td>0.67</td>
<td>32,648</td>
<td>144,154</td>
<td>76,483</td>
<td>43,835</td>
<td>43,835</td>
<td>VNCEA</td>
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<tr>
<td>Potomac Strasburg STP</td>
<td>VA0020311</td>
<td>VAN010102</td>
<td>11,930</td>
<td>0.67</td>
<td>7,999</td>
<td>36,772</td>
<td>24,637</td>
<td>16,638</td>
<td>16,638</td>
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<tr>
<td>Potomac Massanutten PSC STP</td>
<td>VA0024732</td>
<td>VAN010039</td>
<td>18,273</td>
<td>0.44</td>
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<td>25,338</td>
<td>11,149</td>
<td>3,109</td>
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<tr>
<td>Potomac Merk (Outfall 101)^a</td>
<td>VA002178</td>
<td>VAN010007</td>
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<td>0.44</td>
<td>19,287</td>
<td>16,921</td>
<td>7,445</td>
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<td>1,013</td>
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<tr>
<td>Rappahannock Fredericksburg WWTF</td>
<td>VA0025127</td>
<td>VAN020005</td>
<td>54,620</td>
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<td>62,088</td>
<td>7,258</td>
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<tr>
<td>Rappahannock Urbanna WWTP</td>
<td>VA0026263</td>
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<td>Rappahannock Reedville S.D. WWTP</td>
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<tr>
<td>James So. Central Wastewater Authority WWTF</td>
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<td>James Lake Monticello STP</td>
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<td>37,466</td>
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<td>James Covington STP</td>
<td>VA0025542</td>
<td>VAN040055</td>
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<td>16,446</td>
<td>73,300</td>
<td>21,990</td>
<td>5,544</td>
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<tr>
<td>James Buena Vista STP</td>
<td>VA0020991</td>
<td>VAN040023</td>
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<td>0.30</td>
<td>12,335</td>
<td>48,586</td>
<td>14,576</td>
<td>2,241</td>
<td>2,241</td>
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<td>Eastern Shore Tangier Island WWTP</td>
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<td>1,218</td>
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<td>2,397</td>
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<td>Eastern Shore Shore Memorial Hospital</td>
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<td>1.00</td>
<td>1,218</td>
<td>2,042</td>
<td>2,042</td>
<td>824</td>
<td>824</td>
<td>VNCEA</td>
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</table>

**Total** 162,703 163,716
Questions?

http://www.usda.gov/oce/environmental_markets/

e-mail: mselman@oce.usda.gov