NUTRIENT TRADING ASSESSMENT

MATERIAL MATTERS
Nutrient Trading Assessment

- Background in Pa Nutrient Trading Program (PANTP)
- Municipal Survey Results
- Factors to Consider to Participate in PANTP
- Credit Generating Potential from NPS Dischargers
- Nutrient Trading Costs
- Likelihood of Nutrient Trading
- Summary
Background

- 2005 Pennsylvania Chesapeake Bay Tributary Strategy
- PADEP set up the PANTP
- Voluntary program for PS/PS or NPS/PS nutrient trading
- Market-based program to produce and purchase nutrient reduction credits
- Offset nutrients (N & P) discharged by PS:

Big Supply

Little Demand

- RESULT = Limited Trading Taking Place
Contributions to Nitrogen Load

- Agriculture: 49%
- Forest: 21%
- Point Sources: 11%
- Developed: 7%
- Mixed Open: 7%
- Septic Systems: 4%
- Open Water: 1%

Source: PADEP, 2006
Crop Need vs Nutrient Production/Use

Fertility Balance, Susquehanna Watershed

- Estimated N crop need
- Manure N produced
- Fertilizer N used
- Fertilizer + Manure N

DEP: Agriculture 27,000 tons N to the Bay
(Point Sources: 6,000 tons N to the Bay)

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Agricultural Loadings to the Bay

Fertility Balance, Susquehanna Watershed

DEP: Agriculture 27,000 tons N to the Bay
(Point Sources: 6,000 tons N to the Bay)
Chesapeake Bay Tributary Strategy
Compliance Cost Study

PA Nutrient Trading Program

NutrientNet, Online Trading Marketplace

Pennsylvania’s Nutrient Trading Program is a voluntary program that can be used by point and non-point sources that exceed their environmental obligation to generate credits that may be traded to those seeking nutrient reduction credits.

NutrientNet has two components:

Trading Marketplace: For trading nutrient credits.
Calculation Tools: For calculating credits generated by agricultural management practices and activities.

Interested in trying NutrientNet?

Try Demo View Screencast
Screencast presented at the trading workgroup meeting (6/15/07).

Please feel free to Contact Us for more information.

http://pa.nutrientnet.org/

Material Matters, Inc.
Municipal Survey Results

- Surveyed municipal representatives via web-based tool
- Municipal operators, managers, engineers participated
- 42 responses were recorded (>20% response rate)
- Respondents from Phase I, II, and III Dischargers
- Also, different regions of the CB watershed
- Variety of questions related to:
  - Understanding
  - Costs
  - Risk
  - Trading
Chesapeake Bay Tributary Strategy
Compliance Cost Study

Survey Monkey

Pennsylvania Nutrient Trading Survey

1. What is your level of awareness of the PA Nutrient Trading Program (PANTP)?
   - a) Aware but don't know details
   - b) Aware and considering trades
   - c) Aware but not considering trades
   - d) Not aware

   If you answered (d), please skip to question 6.

2. Where did you get your information about the PANTP?

3. What do you think are typical prices offered for N and P credits in your experience?

<table>
<thead>
<tr>
<th>N ($/lb/yr)</th>
<th>&lt;2</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>&gt;10</th>
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</thead>
<tbody>
<tr>
<td>P ($/lb/yr)</td>
<td></td>
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</tbody>
</table>

4. Where did you get your information about credit costs?

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Survey Results – Areas of Focus

- Program Awareness and Understanding
- Avoidance of Uncertainty
  - Supply uncertainty
  - Regulatory uncertainty (TMDL changes)
- Prices for Credits (and Perceived Prices)
- Perceived Reliability of Program
- Timelines for Nutrient Decisions
  - Farmers: 1 – 2 growing seasons
  - WWTP operators: 10 – 20 year periods
- Information Availability

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Understanding of PANTP

Level of Awareness of the PANTP among WWTP Managers

- Aware, but don’t know details: 26%
- Considering trades: 17%
- Aware, but not considering trades: 57%

Level of Understanding of the Way the Program Works

- Very Good: 5%
- Good: 19%
- Little to No: 18%
- Moderate: 58%
Perceived vs Actual Costs for N Credits

What do You Think are Typical Prices for Credits?

Highest Price You Would be Willing to Pay

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Factors for Purchase of Credits

Score Factors from Not Important to Very Important in considering purchase of credits.

- Perceived stability/reliability
- Cost of credits
- Perceived future value of credits

- All Other
- Very Important

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Method of Generating Credits

Does it Matter to You How Credits are Generated?

- Yes: 39%
- No: 50%
- Don't know: 11%

Preferred Methods of Generating Credits

- Don't Care: 39%
- Reduction of use or release of nutrients into the watershed: 58%
- Transport of nutrients out of watershed: 3%
Perceived Stability of PANTP

How Well Established do you Perceive the PANTP to be?

- Incomplete with Unproven Success: 57%
- Somewhat Incomplete: 26%
- Somewhat Well: 11%
- Don't know - Very Well: 3%

How Certain and Stable do You Perceive the PANTP to be?

- Don't know: 6%
- Somewhat certain: 6%
- Highly uncertain and unstable: 44%
- Somewhat uncertain and unstable: 44%
Survey - Agree/Disagree

- Information about costs and availability of credits is well documented. **Disagree: 77%**

- Purchase of credits is not necessary because nutrient effluent reduction modifications are planned to coincide with other necessary plant upgrades already scheduled. **Agree: 47%** **Disagree: 35%**
Survey – Agree/Disagree

• It is valuable to have the option of buying credits whether or not those purchases finally get made.
  Agree: 71%

• The number of credits available in future years is undefined, resulting in a risk of future non-compliance.
  Agree: 91%

• We have used the PADEP NutrientNet website to view credits currently available.
  No: 60%
Factors to Consider for PANTP

- Cost – both present & future
  - Most dischargers do not know current price of credits
  - Participants hesitate when uncertain
- Regulatory changes & future uncertainty
  - TMDLs
  - Agricultural BMP efficiencies
- Risks & stability of PANTP
  - Fear of program failure
  - Concern for compliance
Factors to Consider for PANTP (cond’t)

- Availability of credits & timing – time horizon differences
- Guidance & sources of information – real lack of good information
- Influence from advisors – poor understanding of PANTP can result in heightened concern for risk
Credit Generating Potential of NPS Dischargers

- PADEP E3 scenario = 21M lbs N & 1.9M lbs P
- Upper limit of N & P loads that could be removed
- Everything, everywhere, by everybody…..
- E3 estimate subtracted from Pa Nutrient Strategy loading goal
- Maximum allowable nutrients that can be traded =

  Maximum: 5.6 M lbs of N    Maximum: 0.4 M lbs of P
“Potential” NPS Nutrients Available

- **Nitrogen**
  - 9 million available
  - 4 million from BMPs

- **Phosphorus**
  - 1 million available
  - 0.3 million from BMPs
# Chesapeake Bay Tributary Strategy Compliance Cost Study

## Land Use

<table>
<thead>
<tr>
<th>Crops</th>
<th>Acres in Watershed</th>
<th>No-Till</th>
<th>Cover Crop</th>
<th>No-Till and Cover Crop</th>
<th>Water Control Structure</th>
<th>No-Till, Cover Crop, and Water Control Structure</th>
<th>Theoretical Maximum BMP</th>
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<tbody>
<tr>
<td>Crops</td>
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## N Credits (lbs) for BMPs (all acres implementing BMPs)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Acres in Watershed</th>
<th>No-Till</th>
<th>Cover Crop</th>
<th>No-Till and Cover Crop</th>
<th>Water Control Structure</th>
<th>No-Till, Cover Crop, and Water Control Structure</th>
<th>Theoretical Maximum BMP</th>
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<tbody>
<tr>
<td>Corn (Grain and Silage)</td>
<td>817,000</td>
<td>570,000</td>
<td>1,700,000</td>
<td>2,100,000</td>
<td>1,800,000</td>
<td>3,300,000</td>
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<td></td>
<td>856,000</td>
<td>2,500,000</td>
<td>3,000,000</td>
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<tr>
<td>Soybeans</td>
<td>236,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Wheat</td>
<td>103,000</td>
<td>38,000</td>
<td>115,000</td>
<td>140,000</td>
<td>130,000</td>
<td>220,000</td>
<td>400,000</td>
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</tr>
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<td>57,000</td>
<td>174,000</td>
<td>210,000</td>
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<tr>
<td>Forage &amp; Hay</td>
<td>1,060,000</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>Na</td>
<td>na</td>
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</table>

## P Credits (lbs) for BMPs (all acres implementing BMPs)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Acres in Watershed</th>
<th>No-Till</th>
<th>Cover Crop</th>
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<th>Water Control Structure</th>
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<th>Theoretical Maximum BMP</th>
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<tbody>
<tr>
<td>Corn (Grain and Silage)</td>
<td>817,000</td>
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<td>33,000</td>
<td>120,000</td>
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<td>500,000</td>
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<td>to</td>
<td>to</td>
<td>to</td>
<td>Not defined</td>
<td>Not defined</td>
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<td></td>
<td></td>
<td>190,000</td>
<td>71,000</td>
<td>230,000</td>
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<tr>
<td>Soybeans</td>
<td>236,000</td>
<td>22,000</td>
<td>7,000</td>
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<td>Not defined</td>
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<td>44,000</td>
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<tr>
<td>Wheat</td>
<td>103,000</td>
<td>14,000</td>
<td>5,000</td>
<td>17,000</td>
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<td>Not defined</td>
<td>71,000</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>27,000</td>
<td>11,000</td>
<td>34,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forage &amp; Hay</td>
<td>1,060,000</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>Not defined</td>
<td>Not defined</td>
<td>na</td>
</tr>
</tbody>
</table>

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*PMAA 2009*
Agricultural BMP Efficiencies

- Currently accepted efficiencies published on PADEP website, based on recent data for the Chesapeake Bay Program Watershed Model, however…………

- Agricultural BMP efficiencies may be revised in the future
Agricultural Compliance

- If the Department determines that BMP failure is due to uncontrollable or unforeseeable circumstances such as extreme weather conditions (and timely notice is provided to the Department), the Department does not plan to take action against the credit generator or third parties. The Department expects that it will be able to credit failures through use of the Credit Reserve, and other mechanisms described in the Policy.
# N & P Credits Certified by PADEP – “Supply”

<table>
<thead>
<tr>
<th>Point Sources</th>
<th>Non-Point Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BMPs</td>
</tr>
<tr>
<td>N (lbs)</td>
<td>P (lbs)</td>
</tr>
<tr>
<td>46,000</td>
<td>6,000</td>
</tr>
</tbody>
</table>

**Total lbs of N**: 1,695,542

**Total lbs of P**: 202,557
## N & P Credits Purchased – “Demand”

<table>
<thead>
<tr>
<th>Buyer</th>
<th>Seller</th>
<th>Region</th>
<th>Date of Agreement (signature date)</th>
<th>Length of Agreement</th>
<th>N Credits*</th>
<th>P Credits*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount Joy Borough Authority</td>
<td>Brubaker Farms</td>
<td>SC</td>
<td>2/26/2007</td>
<td>3 years</td>
<td>11,718</td>
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</tr>
<tr>
<td>Dunn Lake</td>
<td>Red Barn Trading Company</td>
<td>NE</td>
<td>10/17/2006</td>
<td>5 years</td>
<td>223</td>
<td>3</td>
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<tr>
<td>Hamm Equities LLC</td>
<td>Red Barn Trading Company</td>
<td>SC</td>
<td>2/2/2007</td>
<td>5 years</td>
<td>1,592</td>
<td>73</td>
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<tr>
<td>Fairview Township, York County</td>
<td>Red Barn Trading Company</td>
<td>SC</td>
<td>4/10/2008</td>
<td>15 years</td>
<td>20,000</td>
<td></td>
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<tr>
<td>Quail Creek Homeowner's Association</td>
<td>Chesapeake Nutrient Management, LLC</td>
<td>SC</td>
<td>7/14/2008</td>
<td>20 years</td>
<td>538</td>
<td>40</td>
</tr>
<tr>
<td>Airy View Heights</td>
<td>Red Barn Trading Company</td>
<td>SC</td>
<td>2/20/2009</td>
<td>5 years</td>
<td>635</td>
<td>48</td>
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<tr>
<td>Camp Iroqoina</td>
<td>Red Barn Trading Company</td>
<td>NE</td>
<td>3/17/2009</td>
<td>5 years</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

* Credits are listed as the quantity purchased each year over the length of the contract.

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### Why so few trades?

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Nutrient Trading Costs

- Credits published as certified and available on PADEP website from:
  - 1 Point Source
  - Farm BMPs
  - Manure Export
  - Manure Treatment
- Small number of credits purchased
- Represent developers and WWTPs
- Contracts from 3 to 20 years
- No Phase I Dischargers to date
Actual Municipal Trades

- **BMPs** - 11,000 lbs of N in 3 years
  - Cost: $3.81 per lb

- **Manure Export** - 20,000 lbs of N in 20 years
  - Cost: $5 to $7.56 per lb
Likelihood for Nutrient Trading

• Structural Issues
  – Regulatory framework & uncertainties
  – PANTP implementation policies
  – Reliance on market-based approach
  – PANTP guidelines & support
  – Agricultural credits restrictions and support

• Non-Program Issues
  – Farming demographics & culture
    • Voluntary program
    • BMPs may be modest
  – Discharger (WWTP) culture
    • Limited understanding of technical advisors
    • Control of own risk
“Clearinghouse” for Buying & Selling Credits

• PENNVEST commissioned study for nutrient trading program – to develop concept of trading clearinghouse

• Propose to purchase and sell credits through a PENNVEST Nutrient Credit Clearinghouse

• Lessons transaction costs for PS

• Tools being considered – credit auction

• Senate Bill reintroduced in 2009 supports idea of clearinghouse
Summary

- **Barriers**
  - Uncertainty
  - Costs
  - Regulations

- **Agricultural**
  - Exporting manure vs BMPs
  - Meeting baseline
  - Changing BMP efficiencies

- **Improve Success**
  - Better support & information
  - Fully consider least costly option

*Without careful study of structural issues and barriers, followed by structural changes to the PANTP and accompanied by a concerted education and outreach effort, participation is unlikely to increase.*