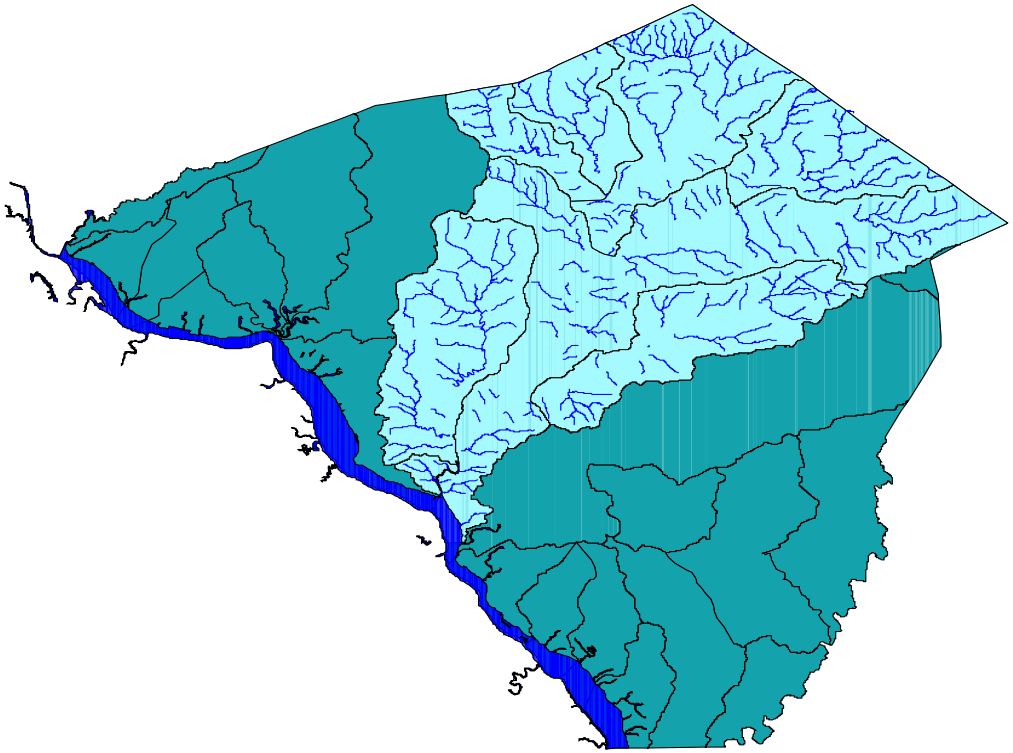
Nutrient Trading Pilot, MultiCredit Trading & Reverse Auction Projects



Chesapeake Bay Foundation – Save the Bay

e

Environmental Defense – finding the ways that work

Pennsylvania Environmental Council

CH2MHILL

The Conservation Fund

Conestoga River Watershed, Pennsylvania

Presentation Outline:

- Conestoga Pilot Project
- PA Trading Policy Development/Tributary Strategy
- Conestoga River Reverse Auction Project

Environmental Setting

CWA → Point Source permitting → improved water quality

- **Technology → ↓ nutrients from POTWs**
- **1/3 of assessed waters don't meet standards**
  - **most pollution from NPSs**
  - **Nutrients are one of top causes for impairments**
  - **NPSs = farms, urban development, septic**
- **PA, 88% nutrients from NPSs**

Conventional Effluent Management

Regulator sets discharge limits for PSs

↓

Installation of technology/end-of-pipe measures

↓

High compliance costs
Little flexibility

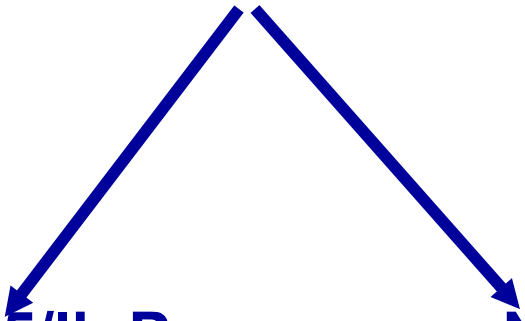
What is Nutrient Trading?

Trading:

- **Allows PS options:**
  1. **Adapt facility OR**
  2. **Pay for reductions elsewhere**
     - ***Buyer: pays another to meet/exceed its effluent limit***
     - ***Seller: exceeds its environmental obligation and benefit from it by selling its "credits"***
- **Describes the re-allocation of effluent loads (nutrients) among sources to meet water quality goals**
- **Bottom line → Get cleaner water at a cheaper price**

Hypothetical:

PS1: Exceeds limit:
New technology @ $26/lb P?
Or buy reductions?



PS2: $15/lb P

NPS: $10/lb P

Nutrient Trading:

- **Market driven approach to environmental management that can enhance options available to reduce pollutant loadings.**

- **Takes advantage of the fact that some pollution sources are easier (and less expensive) to reduce than others.**

Advantages:

Economic Benefits:

- Increased flexibility by ↑ compliance options
- Generates market demand for new, innovative technologies
- Reduces compliance costs:
  - WRI Study:
    - Best available technology → 24% cut in P = $26/lb
    - Trading: 50% cut = $10/lb

Advantages:

Environmental Benefits:

- Encourages sources to reduce discharges to create credits that can be sold, banked for future use or retired
- Target reductions to priority areas
- Potential for broader environmental benefits from ecological restoration, etc.

Who Is Looking at Water Quality Trading?

16 “active” programs
Few trades

WQ Trading Policy Chronology

- Chesapeake Bay Program Nutrient Trading Fundamental Principles & Guidelines, March 2001
- EPA Office of Water: Water Quality Trading Policy, January 2003
- PA DEP – Water Quality Trading Policy Discussion Paper, April 2003
- PA DEP – Nutrient Trading Program Assumptions, spring 2004
- PA DEP – Pennsylvania's Chesapeake Bay Tributary Strategy, December 2004

The Conestoga Pilot Project

- **Why the Conestoga**
- **Project development**

Conestoga Project Sponsors & Partners

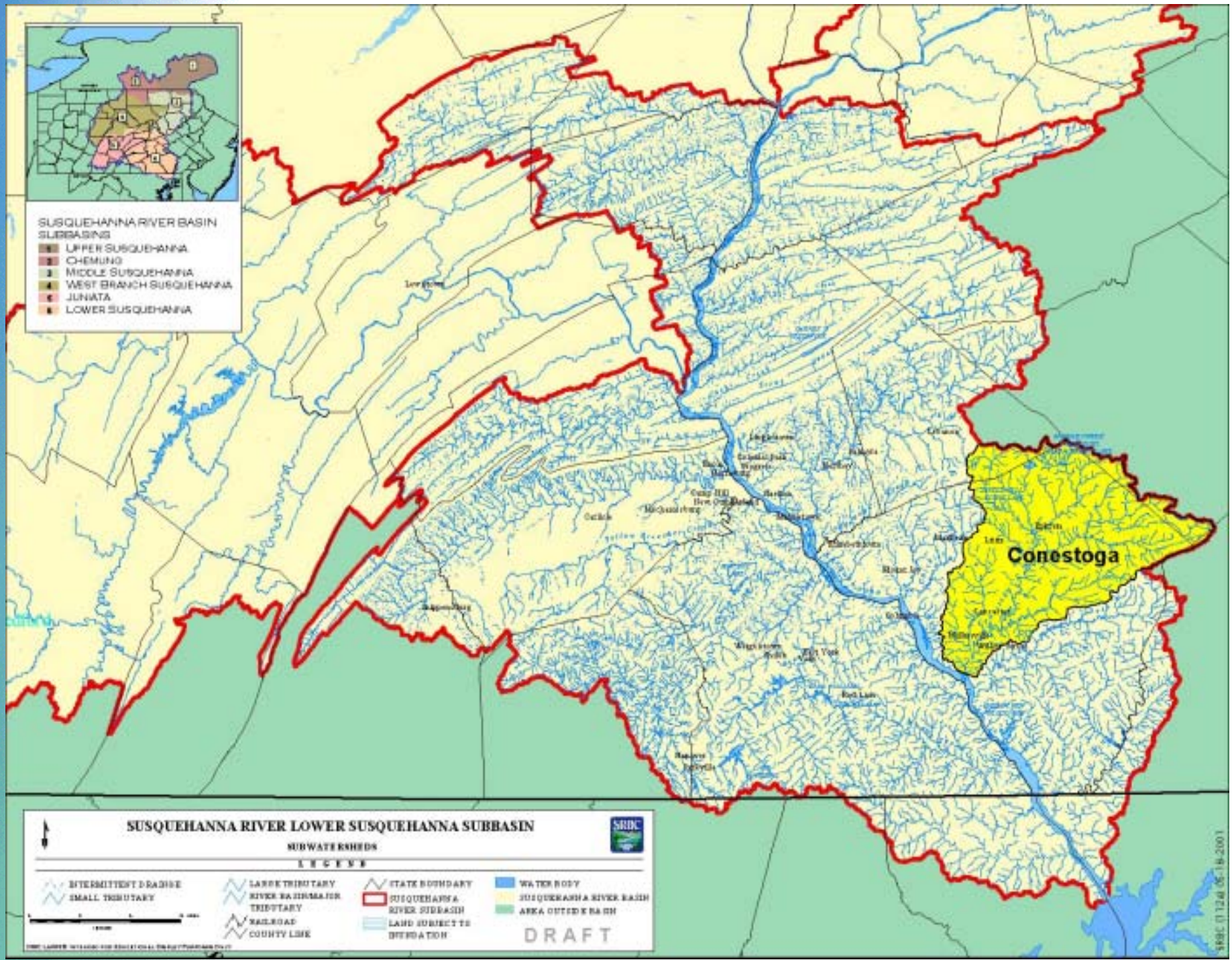
PA DEP
Pennsylvania Environmental Council
Chesapeake Bay Foundation
The Conservation Fund
Environmental Defense
CH2M HILL
Jones Day
Heinz Endowments
LandStudies, Inc.
Lancaster County Conservation District
Natsource, LLC
National fish & Wildlife Foundation
NRCS
Penn State, Institutes of the Environment
US EPA
World Resources Institute, NutrientNet

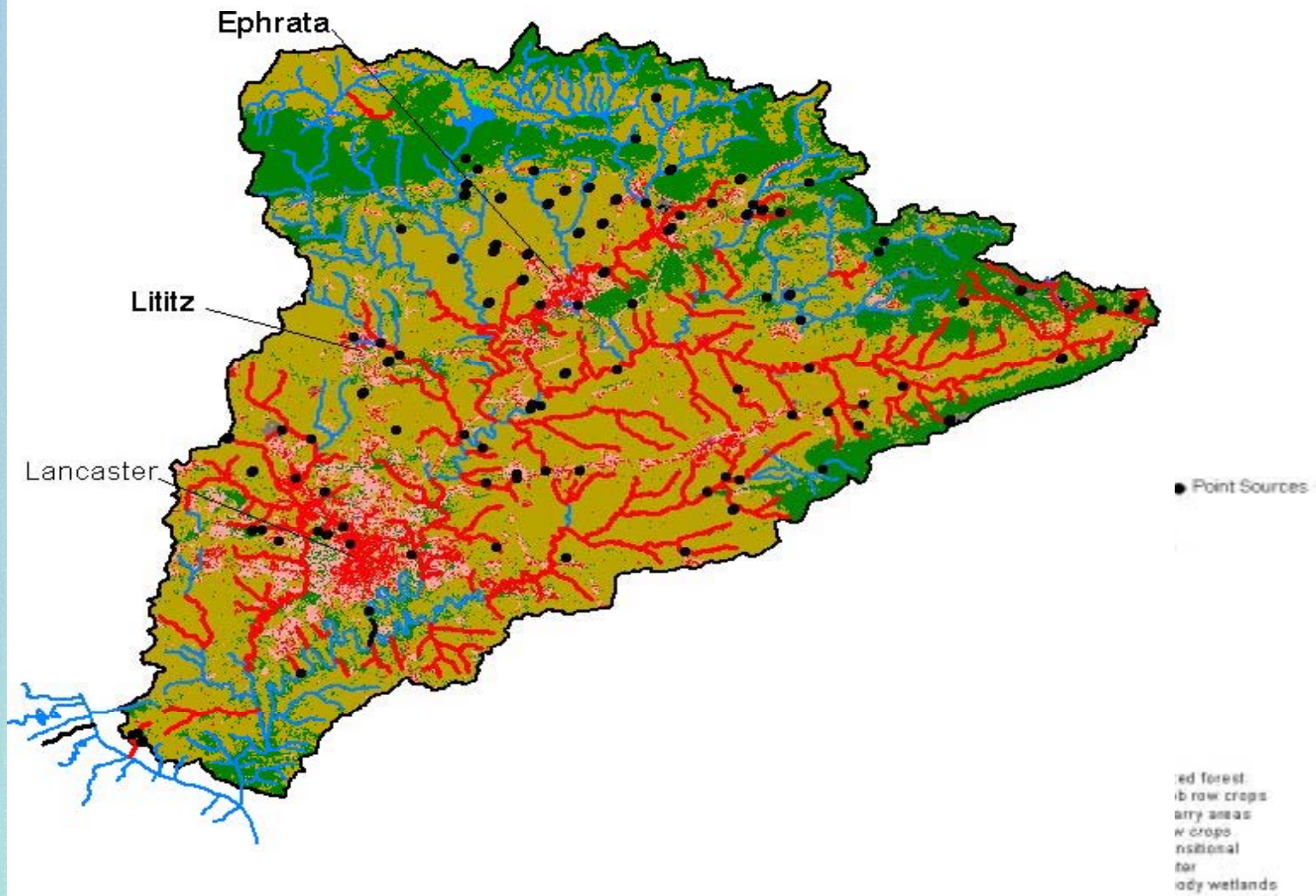
Project Goals

- Facilitate the development of state nutrient trading policy
- Serve as a model for a full-scale, statewide nutrient trading program & similar programs nationwide
- Reduce nutrient loadings from both nonpoint and point sources
- Lower compliance costs
- Avoid the need for additional regulation
- Improve water quality

Why the Conestoga Watershed?

- Within the Chesapeake Bay watershed
- Diverse mix of point and nonpoint sources
- Potential for significant community involvement
- Point sources have phosphorous limits
- Voluntary nitrogen targets under Bay agreement


SUSQUEHANNA RIVER BASIN
SUBBASINS
1 UPPER SUSQUEHANNA
2 CHEMUNG
3 MIDDLE SUSQUEHANNA
4 WEST BRANCH SUSQUEHANNA
5 JUNIATA
6 LOWER SUSQUEHANNA
Conestoga
SUSQUEHANNA RIVER LOWER SUSQUEHANNA SUBBASIN
SUBWATERSHEDS
LEGEND
INTERMITTENT DRAINAGE
SMALL TRIBUTARY
LARGE TRIBUTARY
RIVER MAINMAIN TRIBUTARY
RAILROAD
COUNTY LINE
STATE BOUNDARY
SUSQUEHANNA RIVER SUBBASIN
LAND SUBJECT TO INUNDATION
WATER BODY
SUSQUEHANNA RIVER BASIN
AREA OUTSIDE BASIN
DRAFT
SRBC


Ephrata
Lititz
Lancaster
Point Sources
ed forest
b row crops
arry areas
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ter
ody wetlands

Teamwork:

Steering Committee

Data Subcmte

Outreach Subcmte
Subcmte

Policy

Facilitate Policy Development:

Key Policy Challenges:

1. **Threshold for Eligibility: When can reductions be deemed credits?**
   - PSs → pollution caps
   - NPS scenario is complex
     - Under PA Trib Strategy, 95% of farms w/in CB need BMPs to reach nutrient goals.
       - Riparian buffers, etc. = creditable actions
       - How much reduction needed before actions = credits? Ex. 50%?
2. **Uncertainty Discount: NPS uncertainty, 1 lb = 1 lb?**
   - 2:1 or even 4:1 discount?? Different for various BMPs?

PA Tributary Strategy
PA DEP December 2004

- Cap on Point Sources – 142 sign. disch. (>0.4mgd): 8mg/l N, 1mg/l P based on 2010 predicted flows – convert to lbs/yr allocation
- Watershed Permit – Cap & Trade: Susquehanna, Potomac, subwatersheds (13 watershed teams, 12&1)
- Conestoga – Lower Susquehanna East
- Tributary Strategy Steering Committee
- DEP Public Meetings & Outreach

PA Tributary Strategy
PA DEP December 2004

- Nonpoint Source Strategy – 89% Nitrogen, 82% Phosphorous: PA NP load to the Bay
- Agricultural NP Strategy – "Agricultural BMPs account for 75% of the nitrogen reductions in the strategy but only account for about 7.2% of the costs at $592 millon" – total cost of PA strategy: $8.2 billion
- P to NP trading policy under development: "Pennsylvania's nutrient trading program for point and nonpoint sources in anticipated to generate additional nutrient reductions at reduced costs."

Facilitate Policy Development:

Policy Challenges:

1. **Hot Spots: Upstream vs. Downstream**
   Local impacts → policy considerations?
2. **Enforcement:**
   PSs = permit
   NPSs = ?
3. **Baseline for Agriculture:**
   PA Trib Strategy
   Nutrient Management Plan
   Erosion and Sedimentation (conservation) Plan
4. **Monitoring:**
   PSs = self-monitoring & reporting
   NPSs = ?

Pfizer Voluntary Trade:

Pfizer Pharmaceuticals → Santo Domingo Creek restoration

- 1,300-foot restoration project
- $80,000
- sediment monitoring: 28 tons sediment lost/4 mo
- modeling to determine reductions

Estimated Credits: 387 lbs N/year

74 lbs P/year

66 tons sediment/year

Credits held & "retired" by Pfizer (??)

Private Contract – Transfer of Pollutant Reductions from Borough of Lititz to Pfizer, Inc. (Jones Day)

New Street Park, Lititz, PA, before improvements

Photograph courtesy of LandStudies, Inc.

New Street Park, Lititz, PA, during improvements

Photograph courtesy of LandStudies, Inc.

New Street Park, Lititz, PA, after improvements

Photograph courtesy of LandStudies, Inc.

Multi-credit Markets

- Recognize the full range of ecological values in the watershed—water, wetlands, habitats, riparian forests, etc.
- Support trading the same range of environmental credits, using watersheds as the basis for trades
- Provide multiple incentives for restoration and improvement of ecosystem functions

The Building Blocks of Environmental Markets

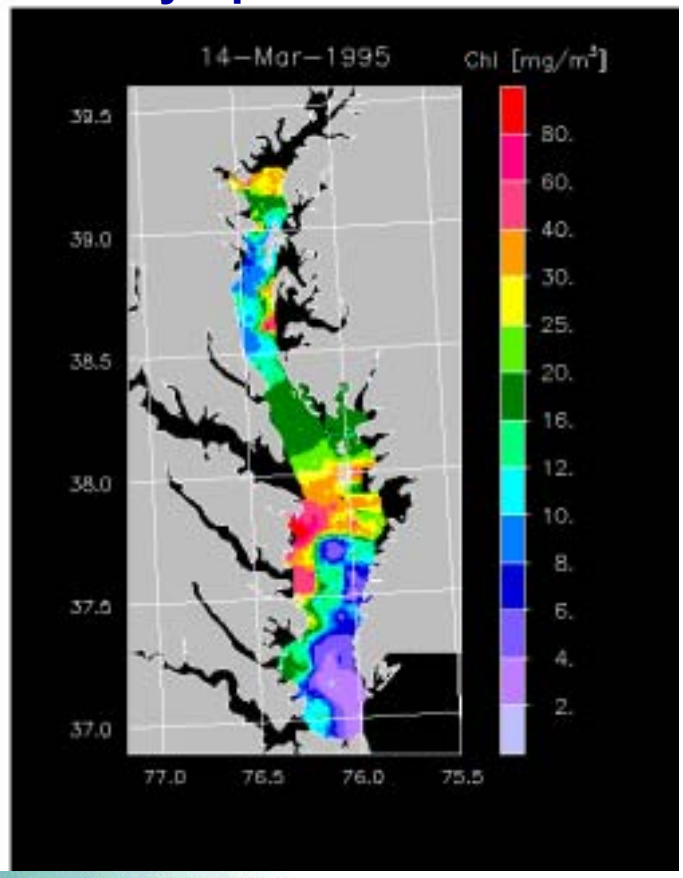
- Consistent
- Transparent
- Verifiable

Traditional market infrastructure

- Legal
- Financial
- Economic/accounting
- Anti-trust legislation
- Public scrutiny infrastructure

Innovative Policy Making

Chesapeake Bay Phytoplancton bloom



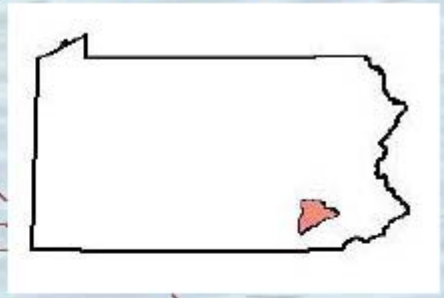
Pennsylvania's policy goals

- **Reduce the release of nutrients (N, P) in the Chesapeake Bay**
- **Encourage Greenhouse Gas emissions reduction initiative**
- **Stimulate the renewable energy market**

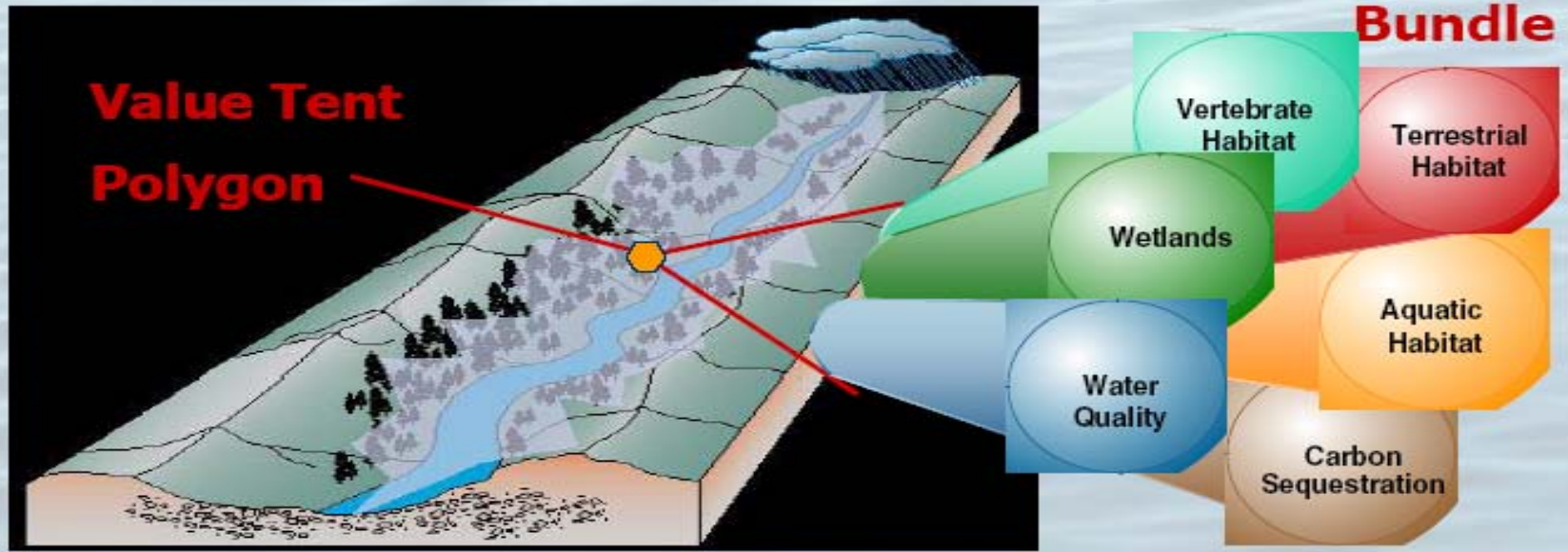
Multi-pollution accounting framework

- Reverse auction
- Calculation tools
- Monitoring reporting and verification protocols
- Multi-pollutant registry

Conestoga Watershed

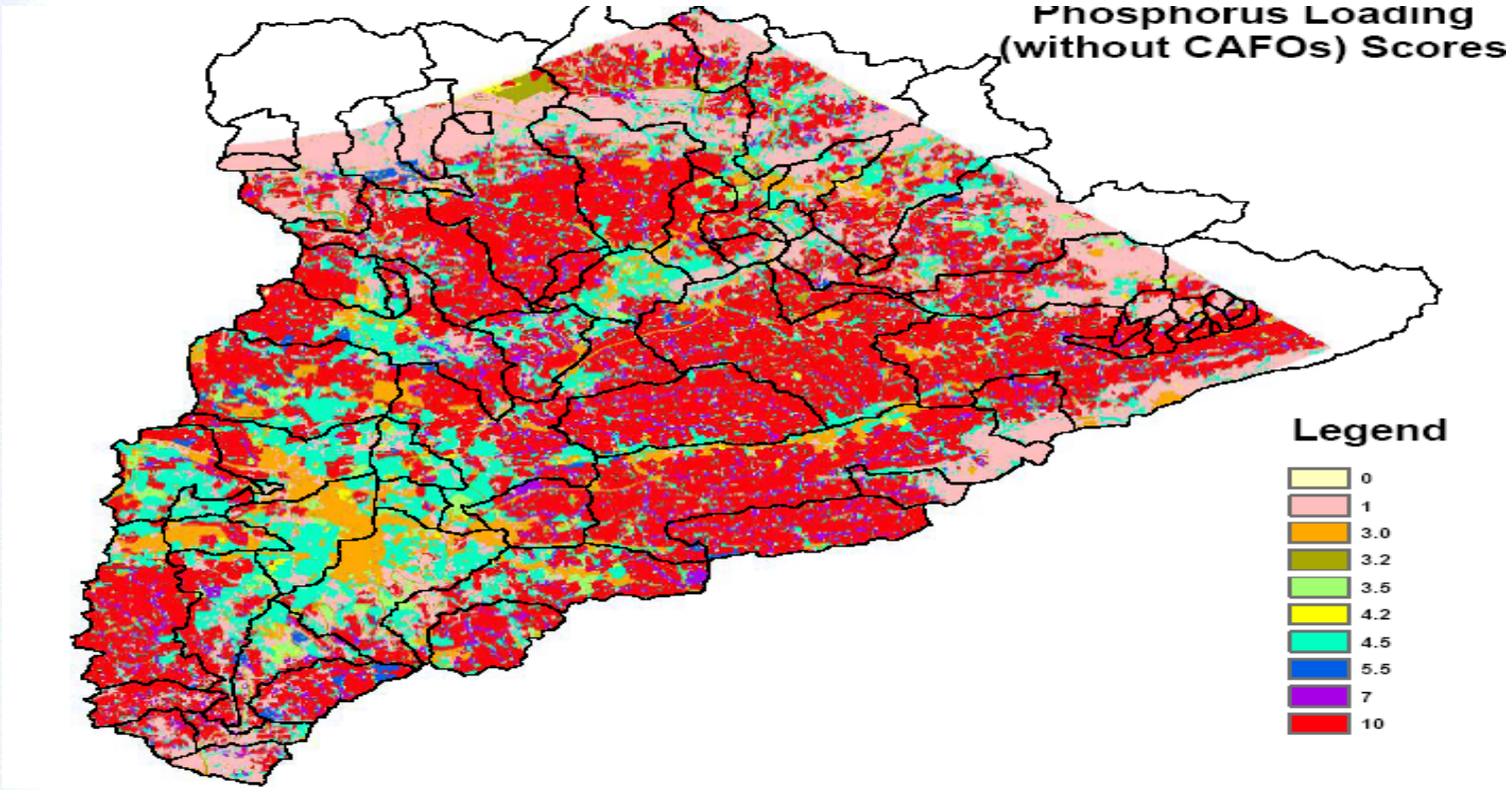


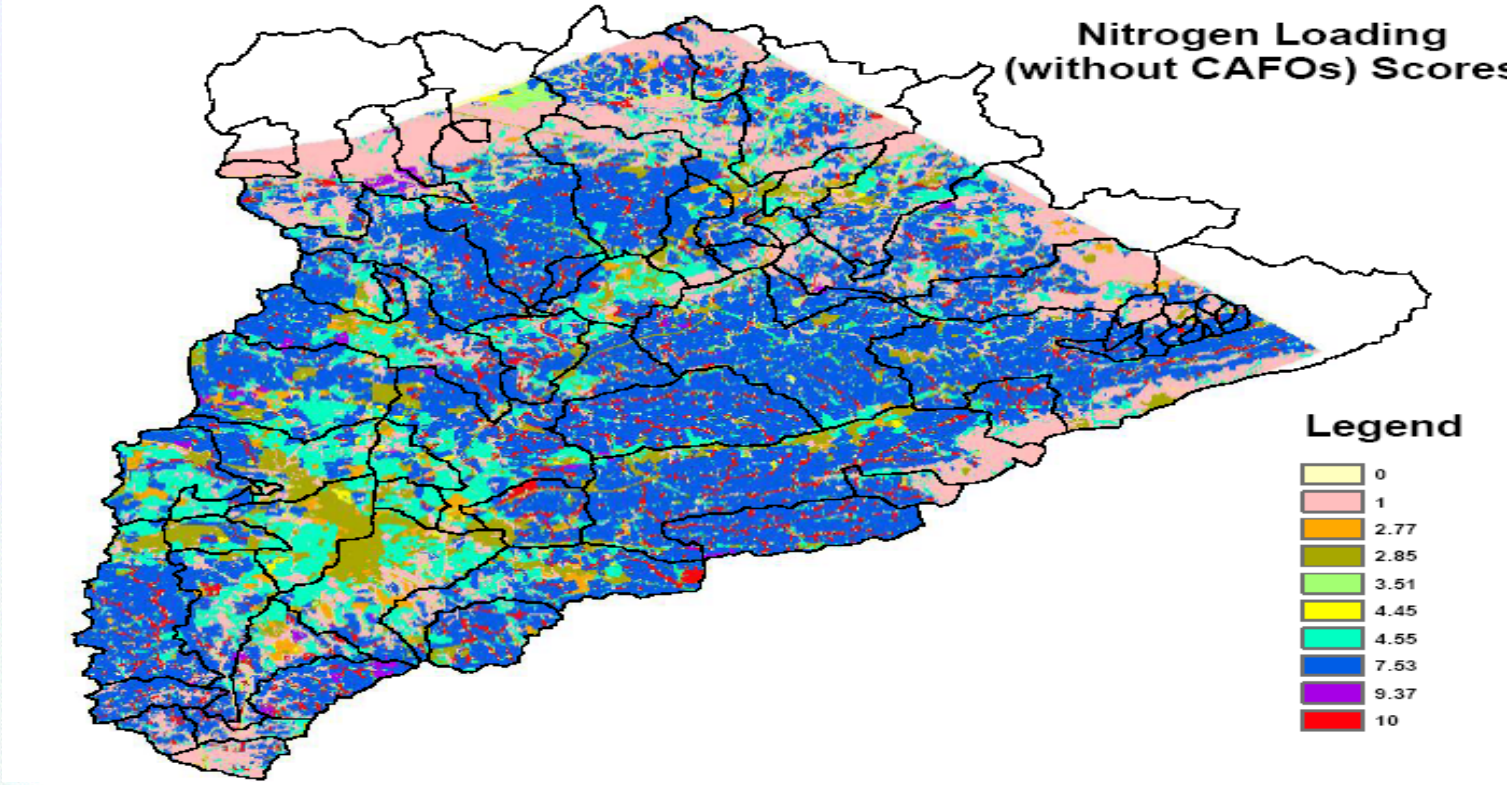
This creates multiple credit opportunities: Evaluated ecosystem values

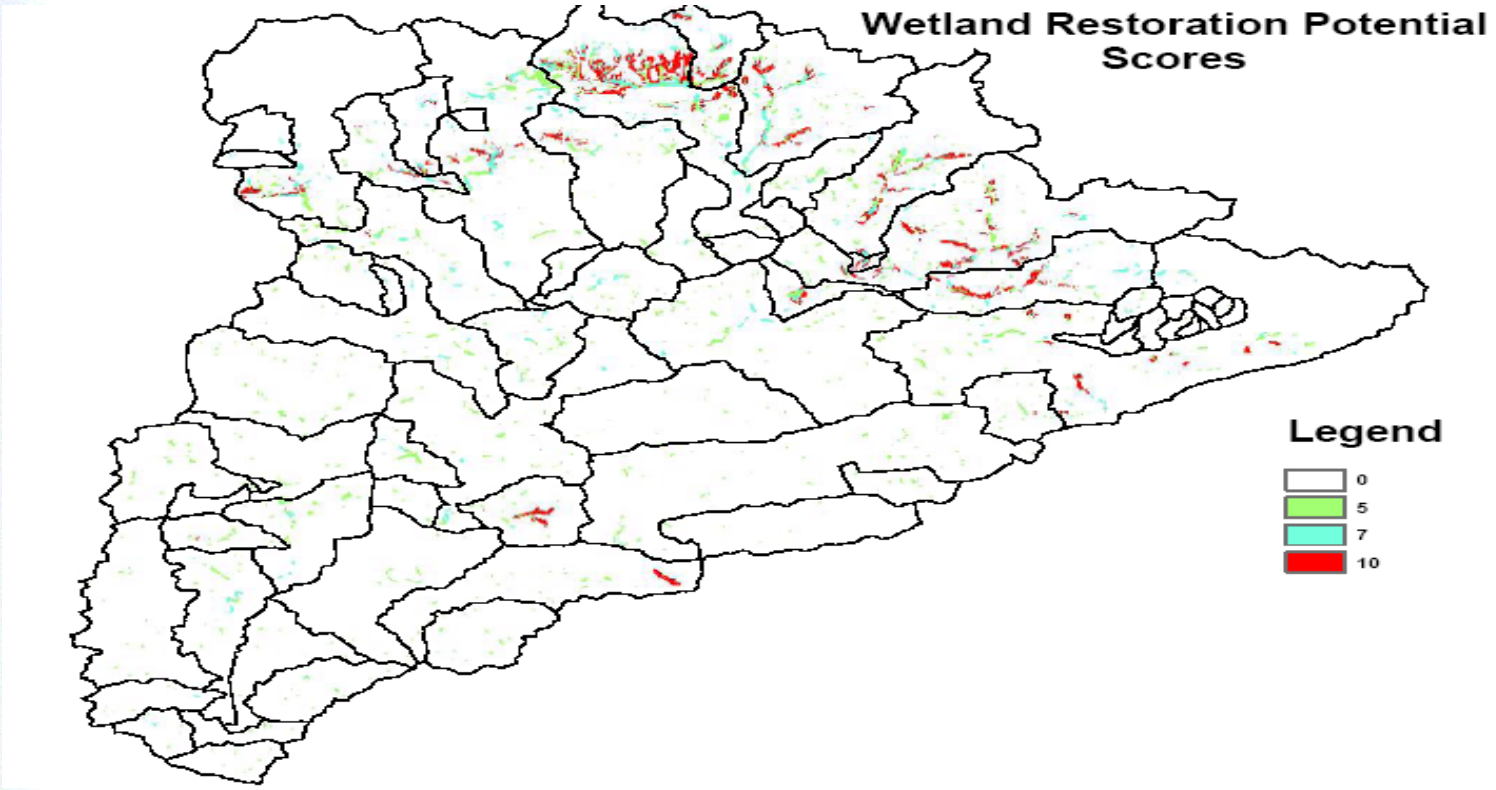


Creating a Value Tent

- Value tent – identifies areas where one could receive the most benefits from their project
- Build it by overlaying GIS layers of watershed values
- Score each layer based on how "creditable" the location is within the layer
- Add layers together to obtain the final value tent score


Phosphorus Loading
(without CAFOs) Scores
Legend
0
1
3.0
3.2
3.5
4.2
4.5
5.5
7
10


Nitrogen Loading
(without CAFOs) Scores
Legend
0
1
2.77
2.85
3.51
4.45
4.55
7.53
9.37
10


Wetland Restoration Potential Scores
Legend
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7
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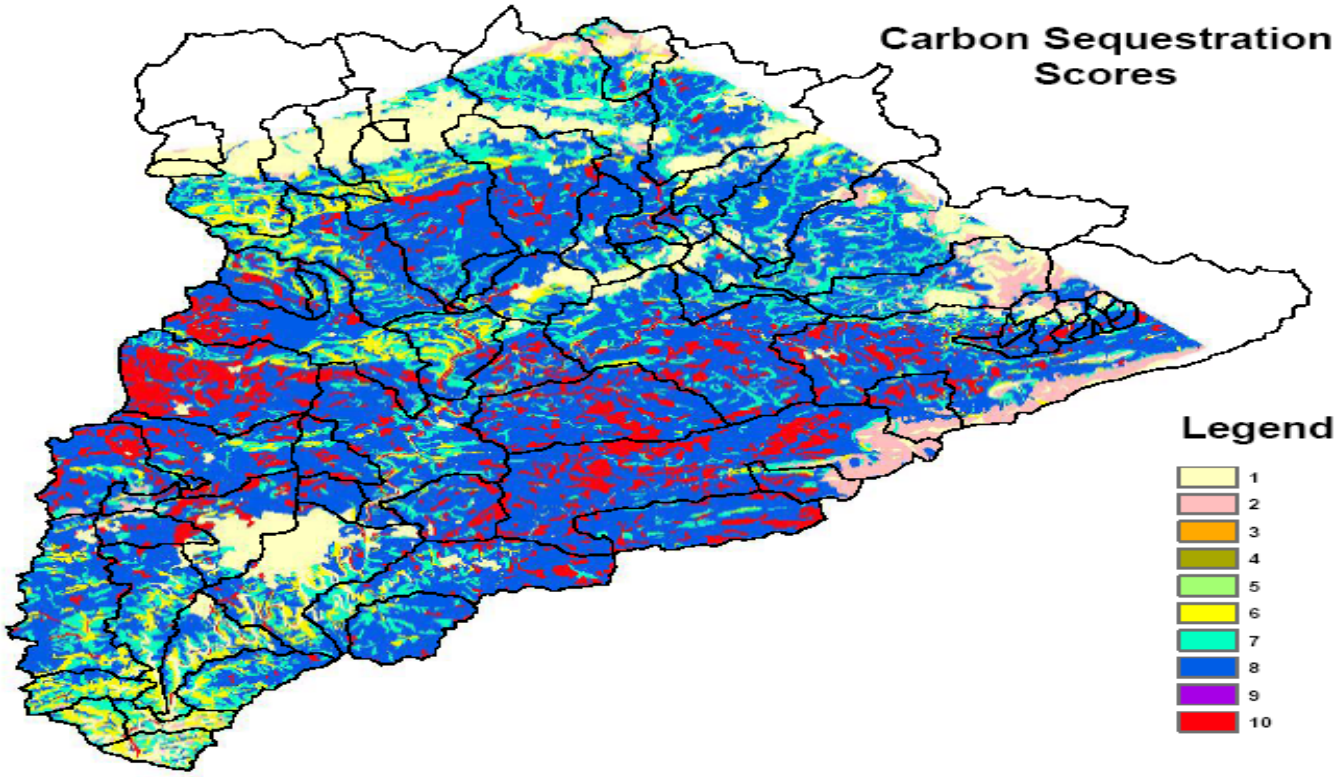
Carbon Sequestration Scores
Legend
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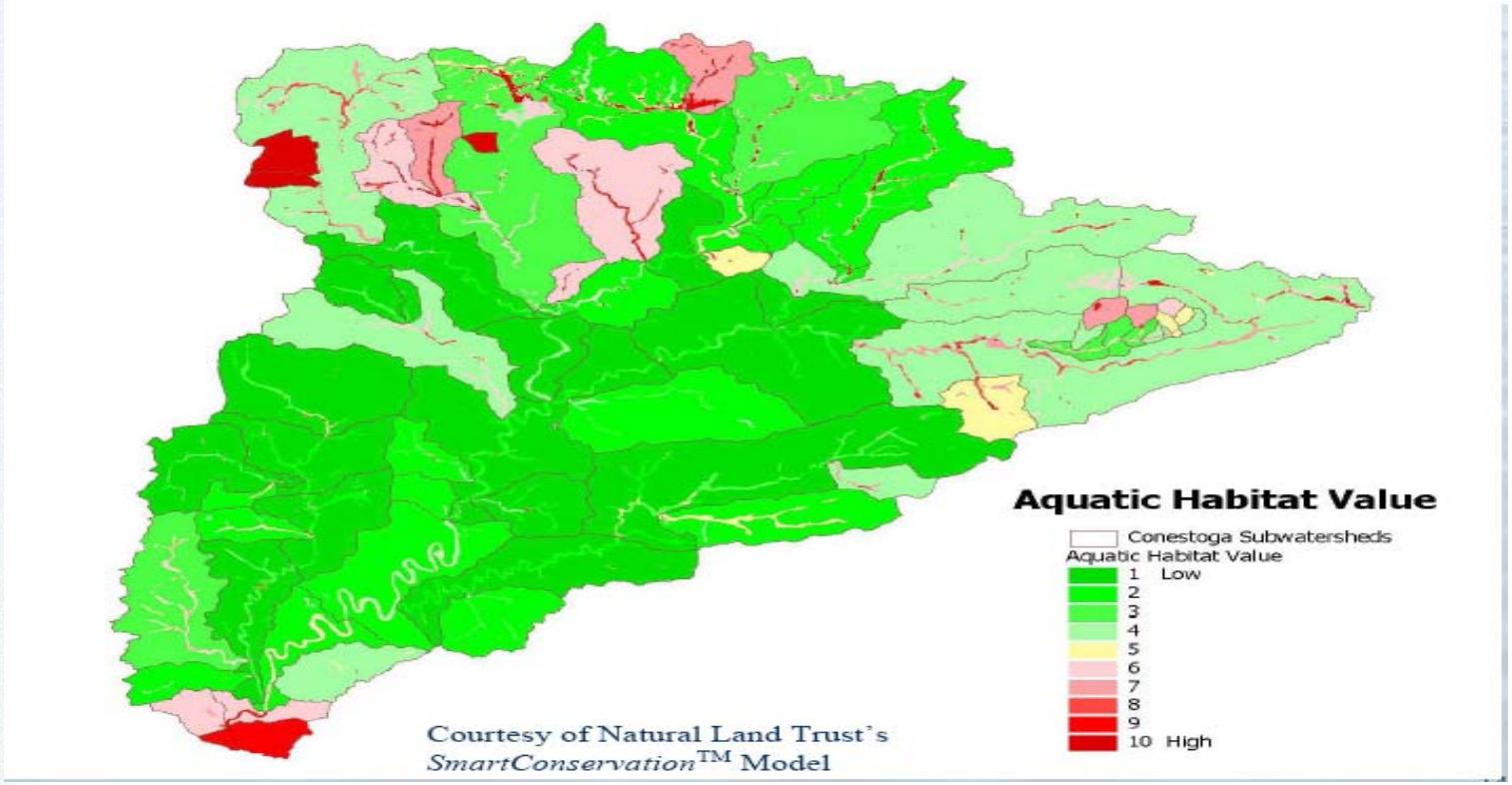
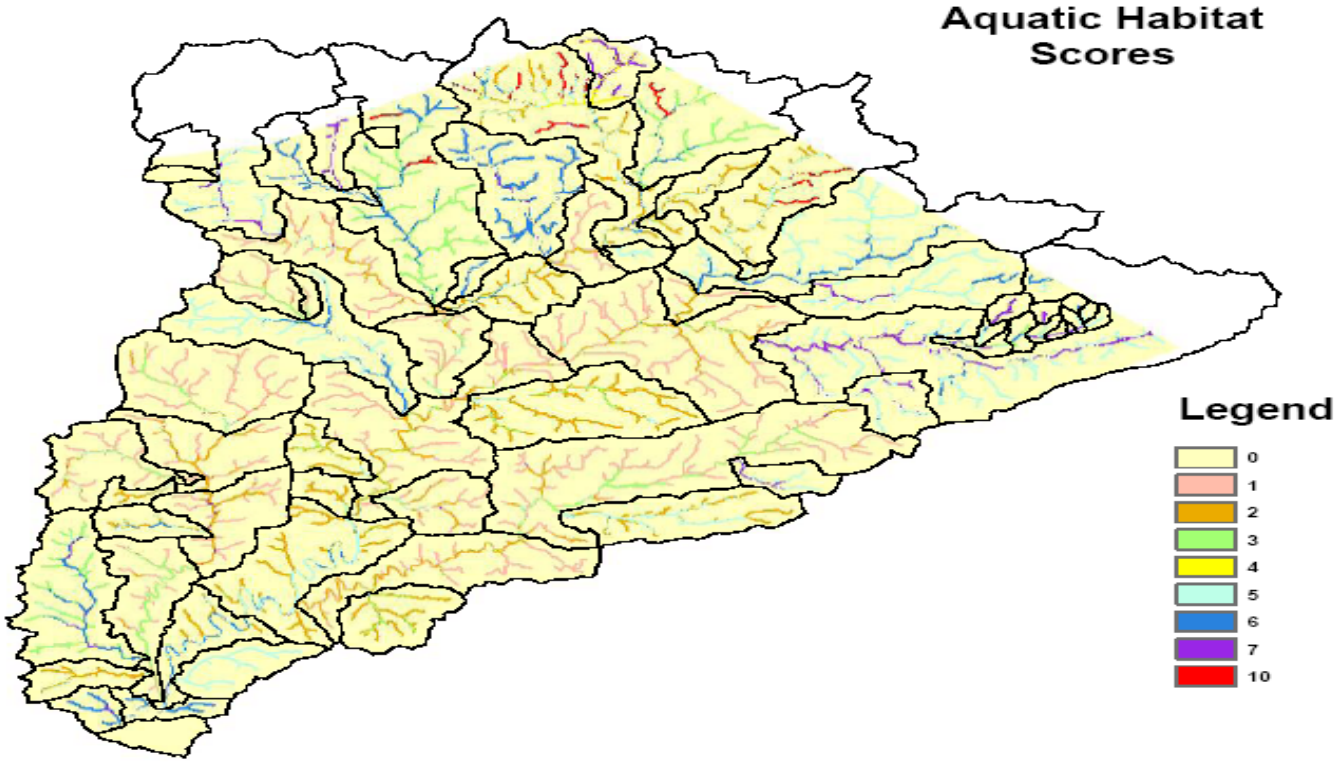

Aquatic Habitat Value
Conestoga Subwatersheds
Aquatic Habitat Value
1 Low
2
3
4
5
6
7
8
9
10 High
Courtesy of Natural Land Trust's
SmartConservation™ Model


Aquatic Habitat
Scores
Legend
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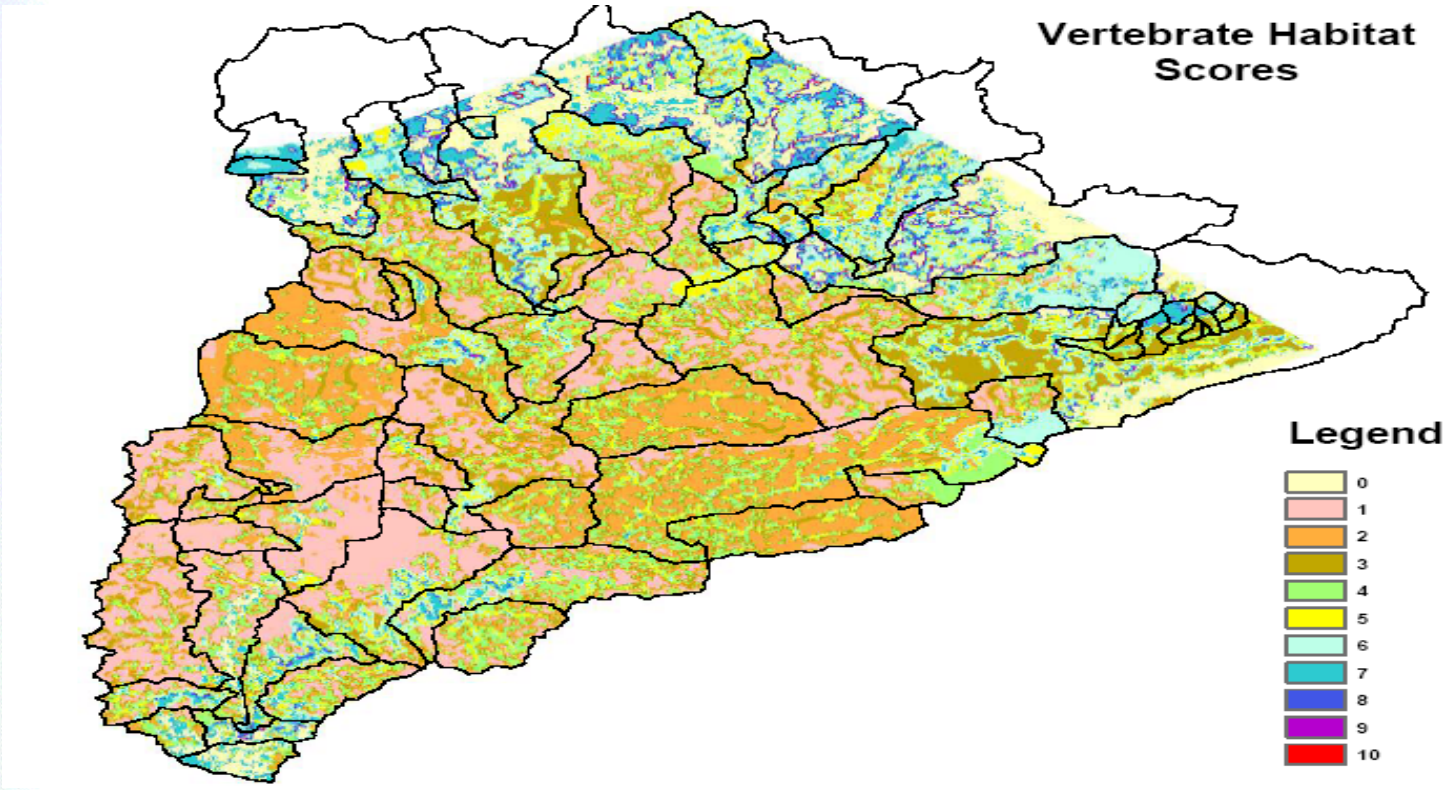
Vertebrate Habitat Scores
Legend
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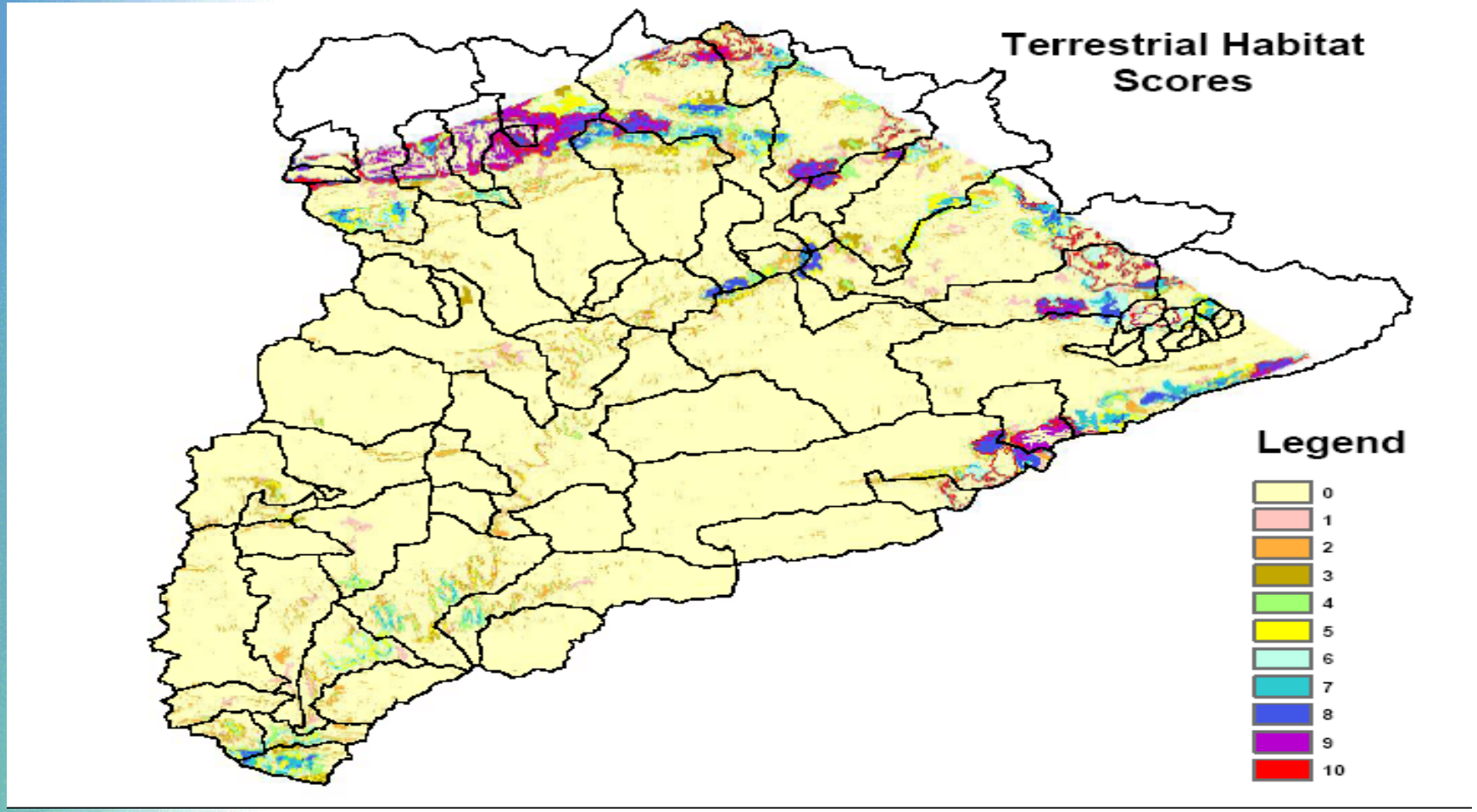
Terrestrial Habitat Scores
Legend
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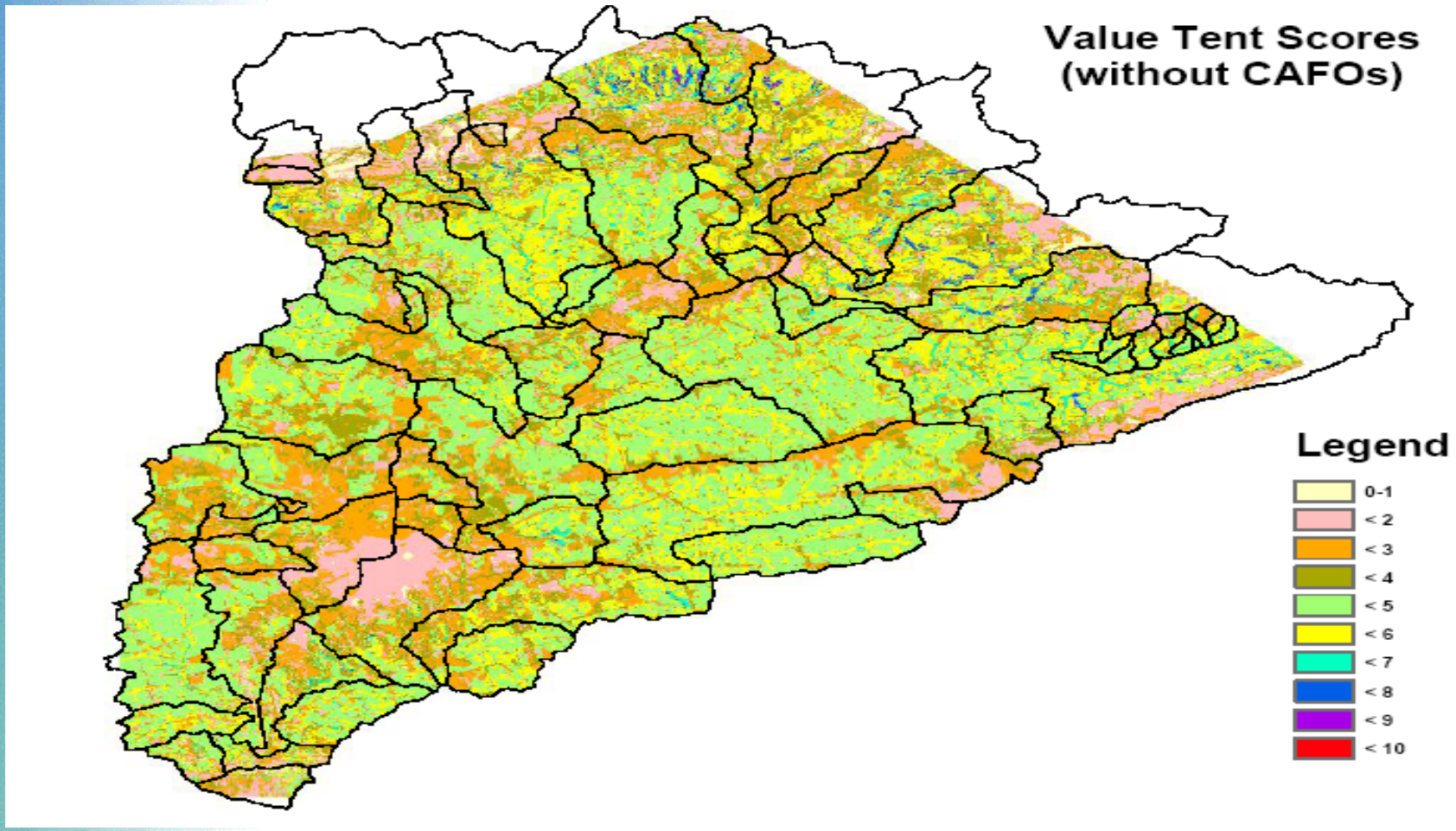
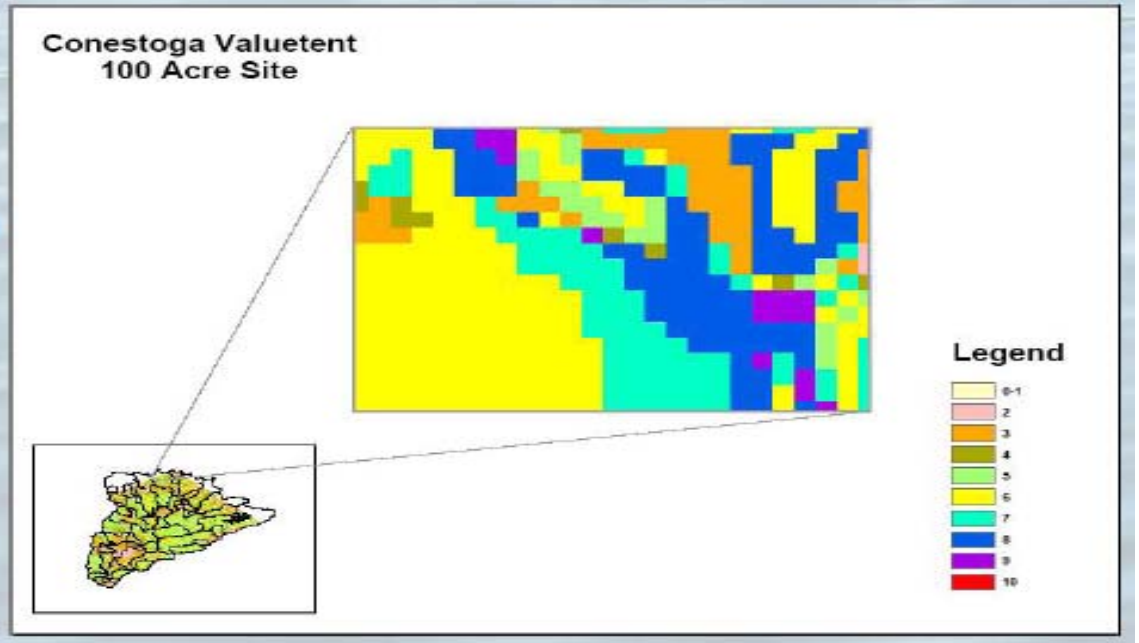

Value Tent Scores
(without CAFOs)
Legend
0-1
< 2
< 3
< 4
< 5
< 6
< 7
< 8
< 9
< 10

Multi-credit Trading Illustration: Pro-Forma Trade

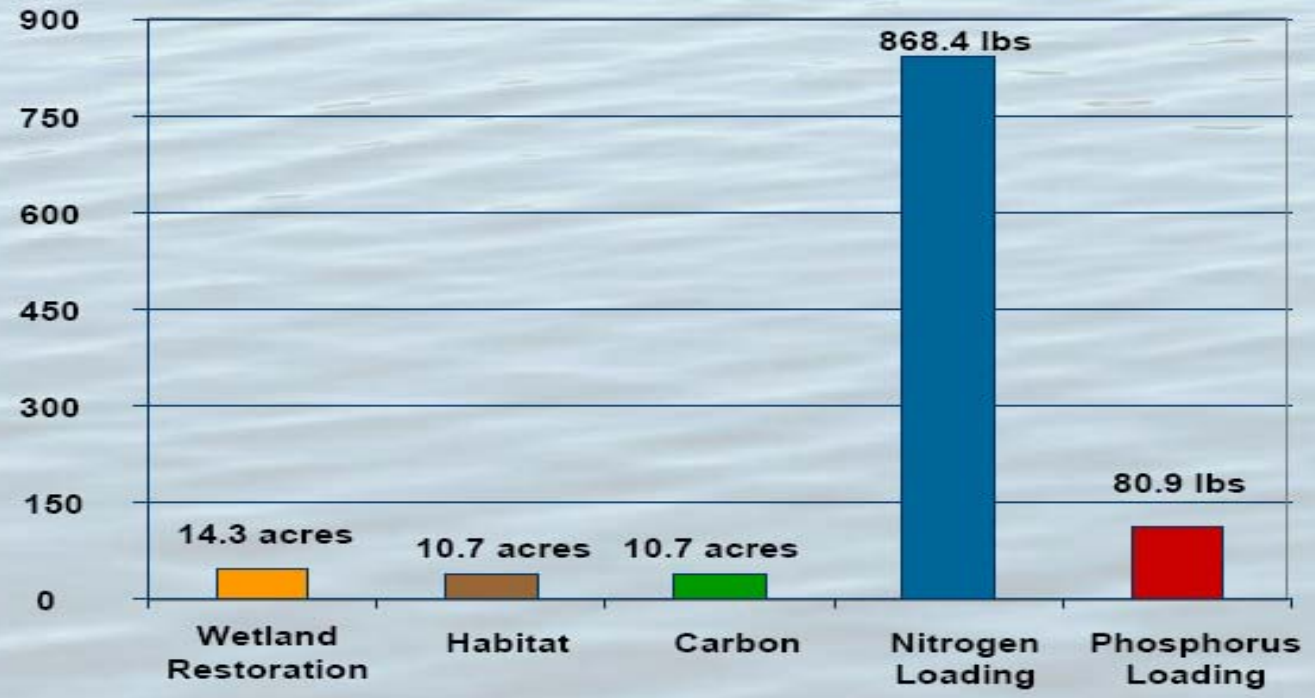
- Hypothetical, but reality-based example
- Key players in the pro-forma:
  - Agricultural community – “Mr. Smith”
  - Non-profit environmental groups – Natural Lands Trust (NLT)
  - Industrial sector – Pennsylvania Power & Light (PP&L)
  - Municipal government – Lancaster County
  - State agency – PA DEP

Pro-Forma Site

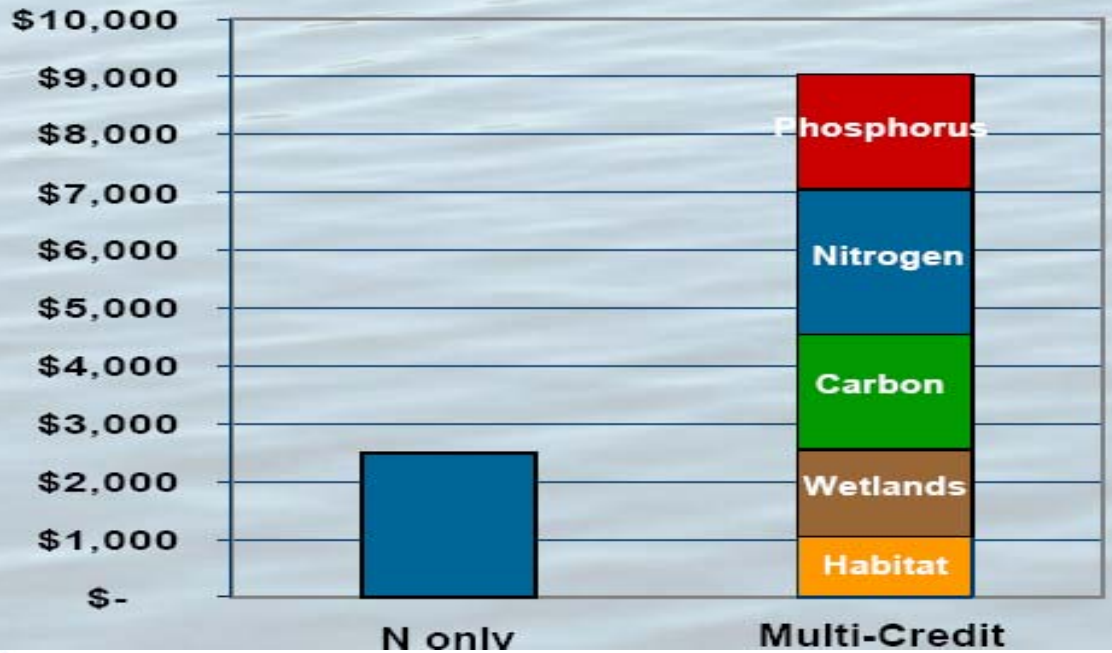
- 100 Acre Parcel
- Range of landuses
- Northern portion of watershed



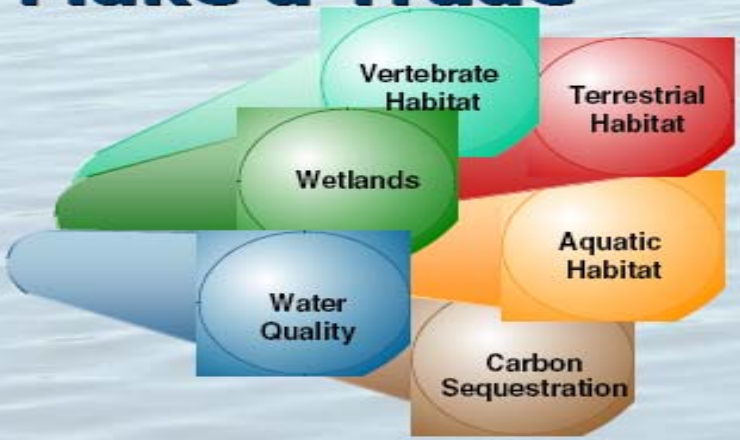
Output Possible Credit Portfolio



Bundling values in a multi-credit market increases incentives to act



Make a Trade



Wetlands

$

Farmer

$

Nutrient Management

Constructed Wetlands

CH2MHILL

Executing the Trade

- **The Seller – "Mr. Smith"**
  - **Owns the site**
  - **Wants to improve his site with BMPs, but needs financial incentives**
  - **Keeps 868.4 nitrogen credits towards his Nutrient Management Plan**
- **The Buyer – NLT**
  - **NLT helps Mr. Smith put an easement on part of his land adjacent to some of their other conservation projects**
  - **Buys and retires the 10.7 habitat credits**

Executing the Trade

- **The Buyer – PP&L**
  - Needs offset credits for wetland mitigation
  - Buys the 14.3 wetland credits
- **The Buyer – Lancaster County**
  - Buys 80.9 phosphorus credits and banks them toward potential future TMDL
  - Helps implement statewide program locally
- **PA DEP**
  - Maintains statewide registry helped bring players together
  - Policy development, trade enforcement

Conclusions

- With stakeholder input, value-tent was created to direct potential traders to areas with highest credit potential
- Pro forma trade example was useful tool to show multi-credit opportunities
- Credit potential in value-tent based solely on environmental benefits
- Economic analysis is the next step in this process

Next Step: Creating a Mock Trading Platform

Questions:

Within the context of the Conestoga,

1. **How do potential sellers (farmers) find buyers to fund BMP projects?**
2. **How can buyers judge which projects are the most cost effective for reducing nutrients (i.e., creating credits)?**

Answer: NutrientNet, a "reverse auction" trading platform

Conestoga River Reverse Auction

- **USDA NRCS Conservation Innovation Grant Program – Environmental Quality Incentives Program funding for "innovative conservation approaches and technologies for environmental enhancement and protection in conjunction with agricultural production"**
- **Develop, customize, test and evaluate an online tool for conservation districts and farmers to estimate and register nutrient reductions for specific BMPs**
- **Provide a mechanism to direct EQIP and other conservation funding to the most cost-effective nutrient reduction projects**

Reverse Auction: Goal

- Conduct 2 auctions:
  - Summer 2005 & Winter 2006
  - Award $$ to farmers w/ successful bids to install BMP
    - PEC has $980k grant from NRCS to fund projects
    - Buyer = PEC
    - Nutrient reduction “credits” →“retired,” (i.e., not formally traded)
    - Credits will be tracked to help
      - PA understand its compliance w/ Tributary Strategy

Reverse Auction: Process

Note: NutrientNet is an on-line, internet tool (www.nutrientnet.org)

1. **Farmer identifies the BMP & its location**
   - **Eligible Farms = EQIP eligible**
   - **Eligible BMPs: cover crops; buffer strips; manure storage; streambank fencing;**
   - **terraces, waterways; barnyard runoff control**
2. **NutrientNet provides farmer w/ information:**
   - **BMP cost estimates**
   - **Quantifies nutrient (lbs. of P) reductions**
3. **Farmer submits final bid/project**
4. **NutrientNet ranks bids according to nutrient reduction**

NutrientNet - Home - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.nutrientnet.org Go Links

World Resources Institute

WRI Main Site...

NUTRIENT NET reducing watershed nutrient runoff

WELCOME to NutrientNet - first on-line market for improving water quality through nutrient trading

project of the World Resources Institute

» My NutrientNet

User name:

Password:

Login Sign-up

» About NutrientNet

- Introduction
- FAQs
- References
- Contacts

» Markets

- Nutrient trading
- Potomac river / market
- Kalamazoo river / market

» Support

- Getting started
- Glossary
- Forgot password?

» Get started in 5 easy steps: (why sign up?)

ADD POINT SOURCE OR FARMING FIELD

0 SIGN UP — 1 FIND LOCATION — 2 ENTER SITE DETAILS — 3 SELECT MITIGATIONS — 4 TRADE CREDITS

» What is NutrientNet? Quick guide:

- Water quality & current problems
- Nutrient run-off sources
- Existing policies & regulations
- NutrientNet approach

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Done Internet

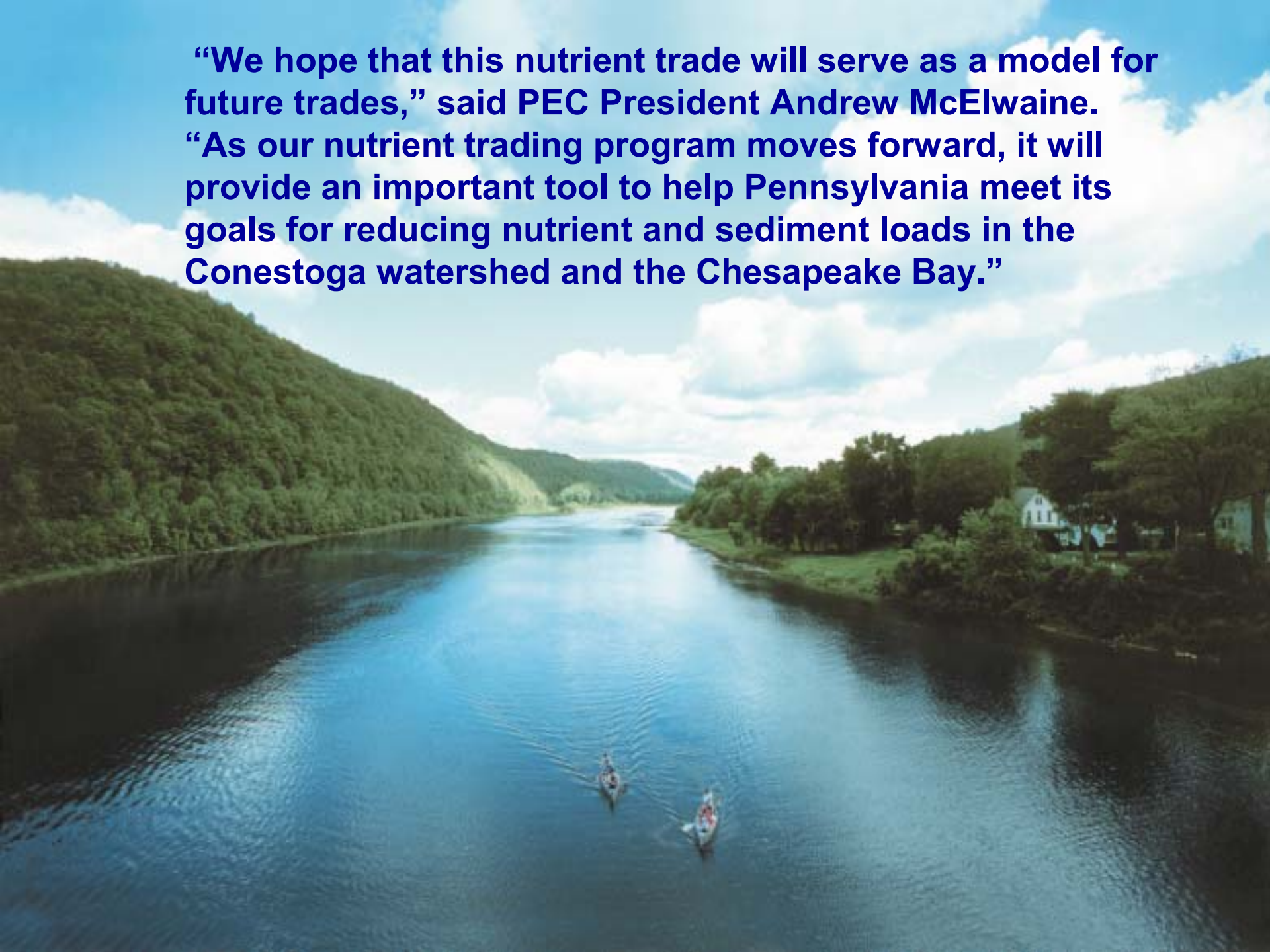
Reverse Auction: Process

- Designed to direct resources to the most cost-effective reductions
- Buyer is interested in securing maximum quantity of nutrient reductions from limited budget
- Farmers compete for Buyer's budget

  → Winning bids come from farmers that can produce maximum low cost reductions

More Questions:

- How will the P reductions be tracked in light of the CB Trib Strategy Goals?
- Who will be responsible to report total nutrient reductions to DEP?
- NN provides data on BMP installation, but what about maintenance costs?
- Enforcement against farmers?
- BMP monitoring?



“We hope that this nutrient trade will serve as a model for future trades,” said PEC President Andrew McElwaine. “As our nutrient trading program moves forward, it will provide an important tool to help Pennsylvania meet its goals for reducing nutrient and sediment loads in the Conestoga watershed and the Chesapeake Bay.”