

Ecosystem Service Markets

**Eileen McLellan
Environmental Defense**

Ecosystem Service Markets



services)

ecosystem
credits)

Why Ecosystem Service Markets?

Good for the environment

- An integrated ecosystem approach

	WWTP Upgrade	Ag. Practices
Pollutant of concern	Yes	Yes
Other pollutants	?	Yes
Habitat	No	Yes
Canopy	No	Yes
Stream bank	No	Yes
Velocity	No	Yes
Wetland	No	Yes
Floodplain	No	Yes
Assimilative capacity	No	Yes

Miami Conservancy District

Why Ecosystem Service Markets?

Good for the environment

- Beyond compliance
- A way of scaling up conservation efforts

Ecosystem Multiple Markets



"Ecos Marke (Maxir return invest

WQ Tr "Mark (optim compl offset TMDL:

Ecosystem Levels

KIESER & ASSOCIATES

Why Ecosystem Service Markets?

Cost-effective way of meeting environmental goals

- **More efficient than command-and-control or individual credit markets**
- **Synergistic and strategic (*maybe*)**
- **Coordinate planning, money, permitting, stakeholders (*maybe*)**

Why Ecosystem Service Markets?



Suzanne du Pont, Maryland Department of Agriculture Brown

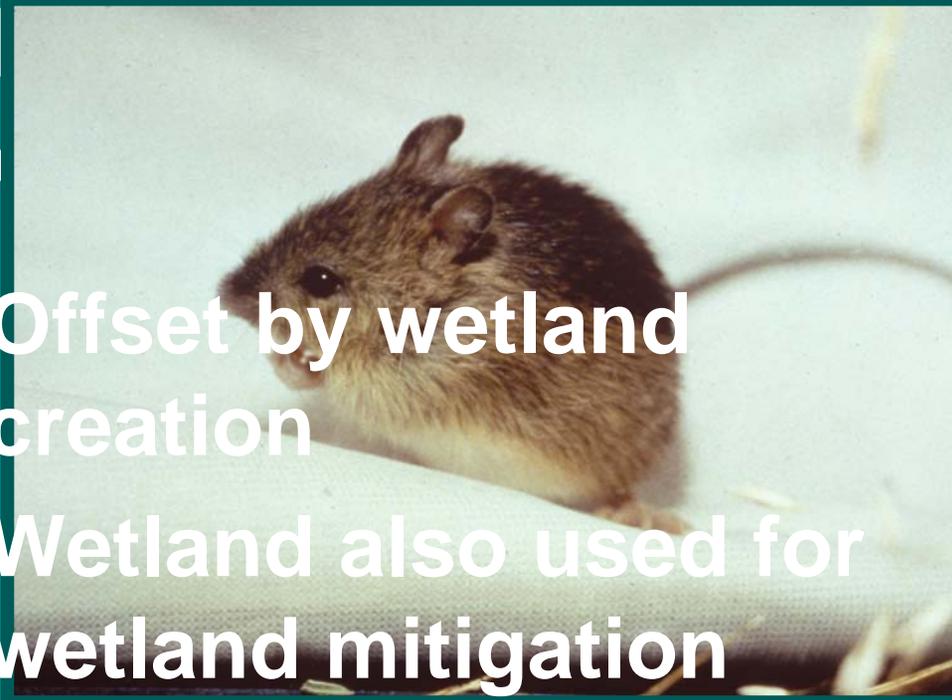


EPA's Water Quality Trading Policy

**“..other market-based programs
that bundle ecological services
to achieve multiple
environmental and economic
benefits..”**

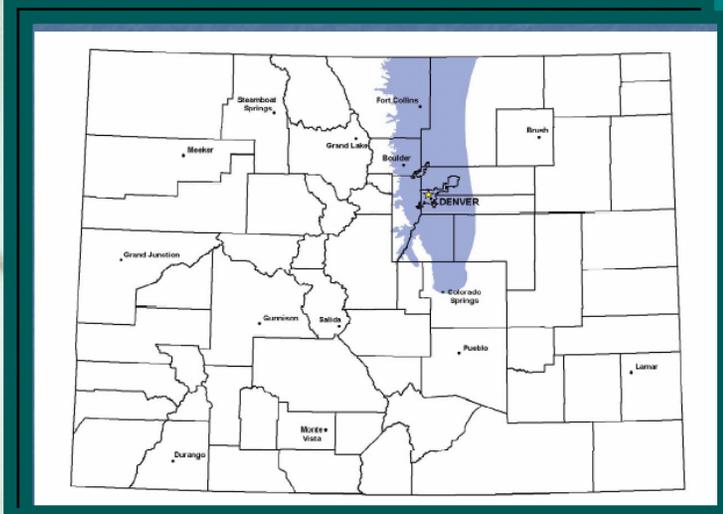
Example: Chatfield Basin, CO

■



Offset by wetland creation

Wetland also used for wetland mitigation



Also serves as habitat for Preble's meadow jumping mouse



Making Ecosystem Markets Work

Market Framework

Market Infrastructure

- **Marketplace** *Web-based mapping tools (NutrientNet, BayBank)*
- **Monitoring and verification tools**
- **Credit bank** *Ecological credits and debits
Accounting, public vs. private*
- **Legal instruments for enforceability**

Ecosystem Market Framework

Option 1: Local Ecosystem Markets

- Help local governments deal with challenges of development
- Leverage existing regulatory drivers
- Participate in existing regulatory markets (and create new voluntary ones)

Option 1: Local Ecosystem Markets

What do localities care about?

- Clean water
- Water supply
- Clean air
- Open space
- Flood control
- Local economy

Market drivers at the local level

An aerial photograph of a city, likely Raleigh, North Carolina, featuring the North Carolina State Capitol building in the center. A large river flows through the city, with a bridge visible on the right. The background shows a mix of urban buildings, green spaces, and agricultural fields under a blue sky with scattered clouds. Overlaid on the image are several dark green text boxes with white text, representing various market drivers.

TMDL

**Impervious
cover cap**

GHG cap

MS4

**CAA non-
attainment**

Water supply

TDR

**CWA 316 (a)
and (b)**

Wetlands

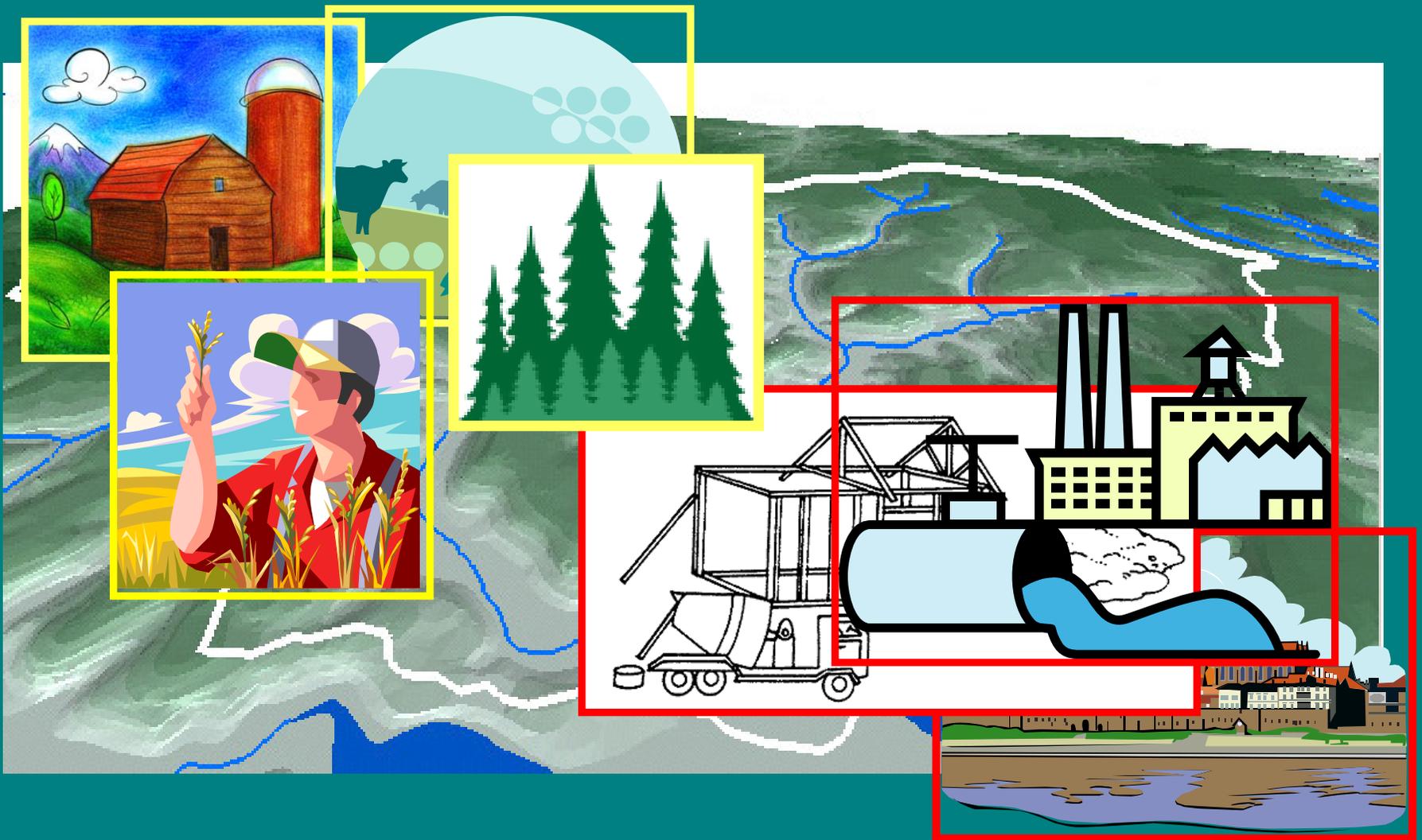
SDWA

Forest conservation

NPDES

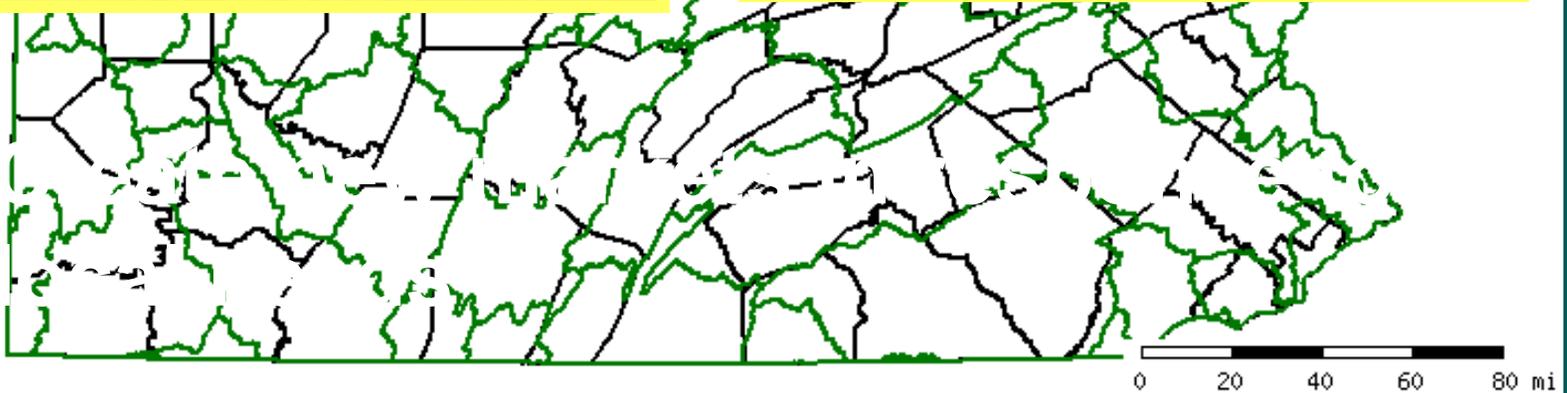
Endangered species

Option 1: Local Ecosystem Markets – Credit Stacking

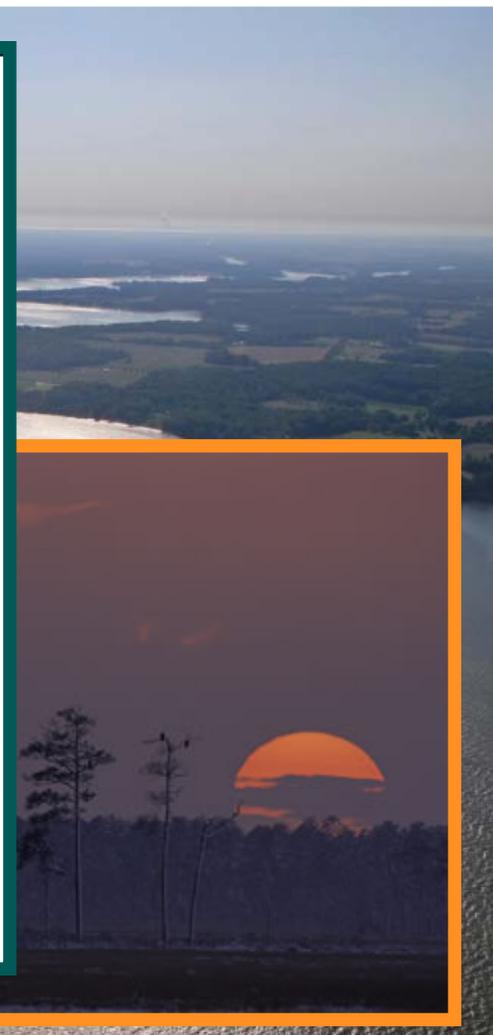
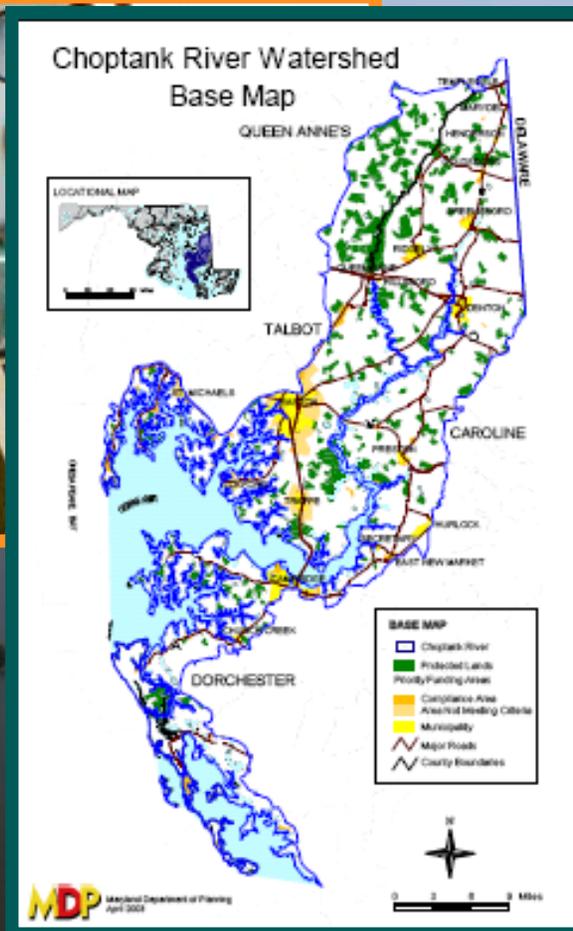


Option 1: Local Ecosystem Service District

Watershed Local Ecosystem Service District (WLESD)



Local ecosystem service district – example *(illustration purposes only)*



Challenges for Option 1

	DE	MD	NY	PA	VA	WV
<ul style="list-style-type: none"> Fragmented markets 	*	*		✓	✓	*
<ul style="list-style-type: none"> Water quality trading 						
<ul style="list-style-type: none"> Incomplete markets 	✓	✓				
<ul style="list-style-type: none"> GHG trading 						
<ul style="list-style-type: none"> Conservation banking 						✓
<ul style="list-style-type: none"> Wetland banking 	?	Limited	Active	Active	Very active	Limited
<ul style="list-style-type: none"> Forest banking 	#	✓				
<ul style="list-style-type: none"> TDR 	#	✓				

- Water quality
- CWA 402, 303(d)
- Wetland and stream habitat
- CWA 404
- Endangered species
- voluntary *BUY* may change
- Forest habitat
- Maryland's Forest Conservation Act
- Transfer of Development Rights

Risks of Fragmented Markets

- **Uncoordinated activities**
- **At the wrong scale**
- **May not address real threats to ecosystem**
- **Miss opportunities to engage wider array of stakeholders**
- **“Double-dipping”**

“Double-dipping” in Fragmented Markets

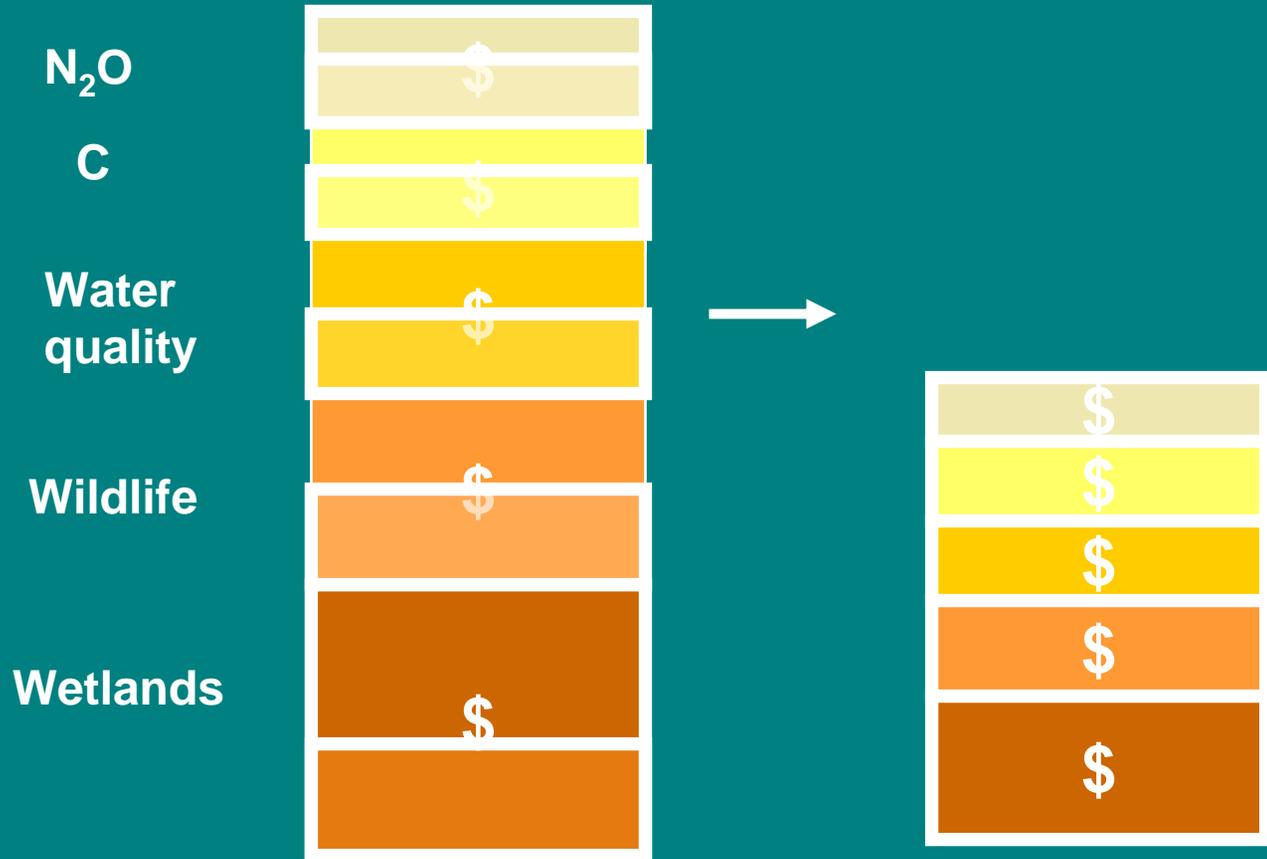


\$	N ₂ O
\$	C
\$	Water quality
\$	Wildlife
\$	Wetlands

Double-dipping



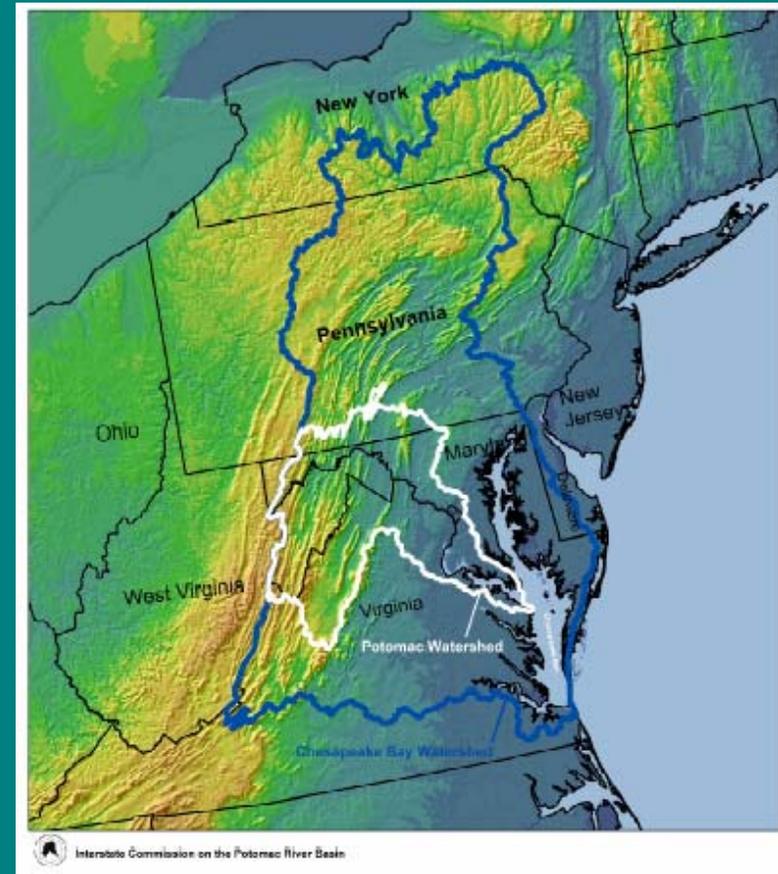
Complex accounting



How Do We Overcome These Challenges?

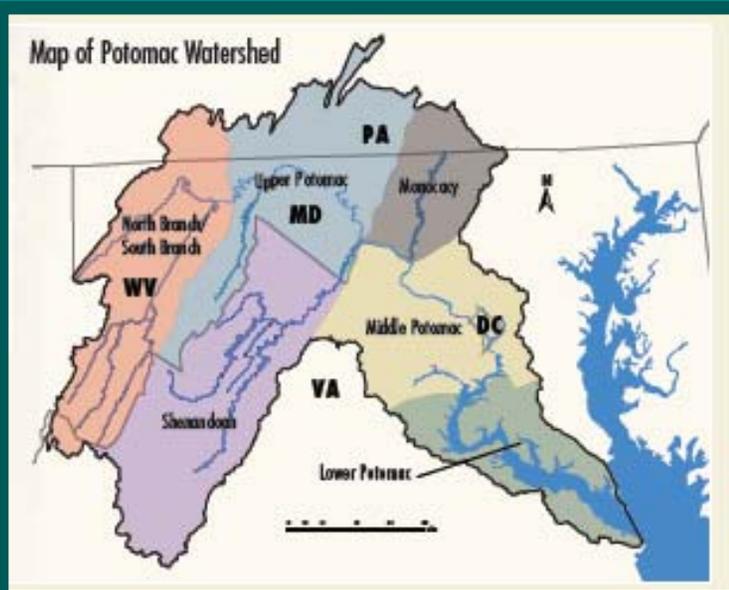
Explore integrated markets

Option 2: Regional ecosystem service district





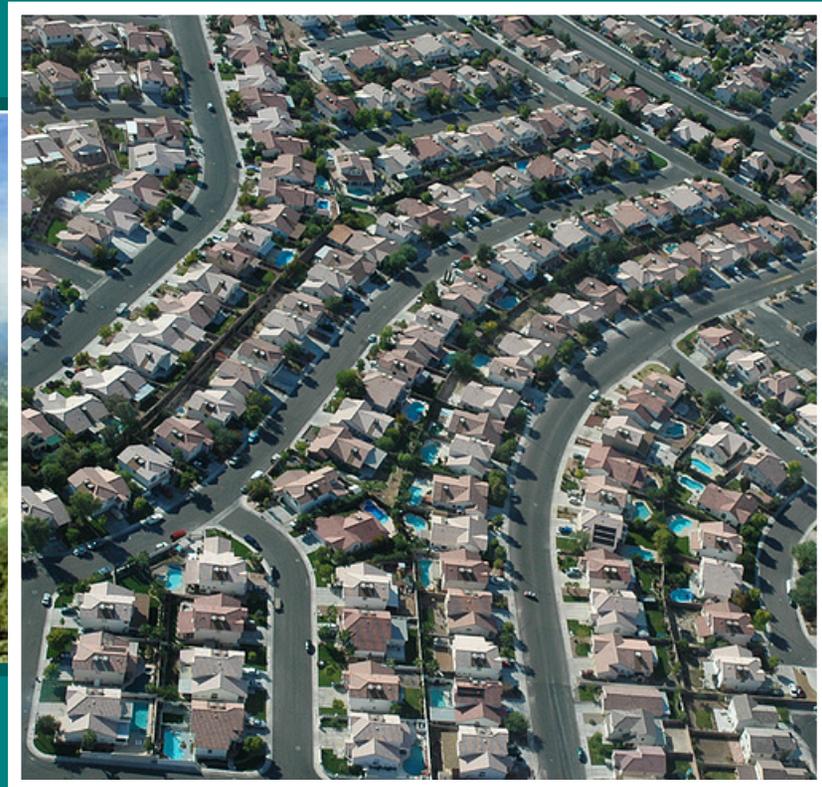
STATE OF THE NATION'S RIVER POTOMAC WATERSHED 2007



- **Loss of forest cover**
- **Increased impervious cover**
- **CSOs**
- **Stormwater pollution**

Option 2: Regional Ecosystem Service District – service caps

- Forest mitigation
- Caps on impervious cover
- Water quality trading



Regional Ecosystem Services District

Integrated ecosystem market

- **Strategic ecosystem planning**
- **Ecological currency (currencies)**
- **Regulatory streamlining**

Strategic Ecosystem Planning

- **Assess ecosystem condition**
- **Identify stressors**
- **Identify desired future condition**
- **Translate to ecological targets (service caps, market drivers)**
- **Evaluate and prioritize restoration activities (ecological currency)**

Strategic Ecosystem Planning



Reduce overall N loading by XX%



Increase baseflow by 10% in targeted tributaries



Restore 1,000 acres fish spawning habitat



Ecological Currency

- **P.S.E. & G., N.J. (NRDA)**
- **Cheat River, WV**
- **N.C. Ecosystem Enhancement Project**
- **Willamette Ecosystem Marketplace**

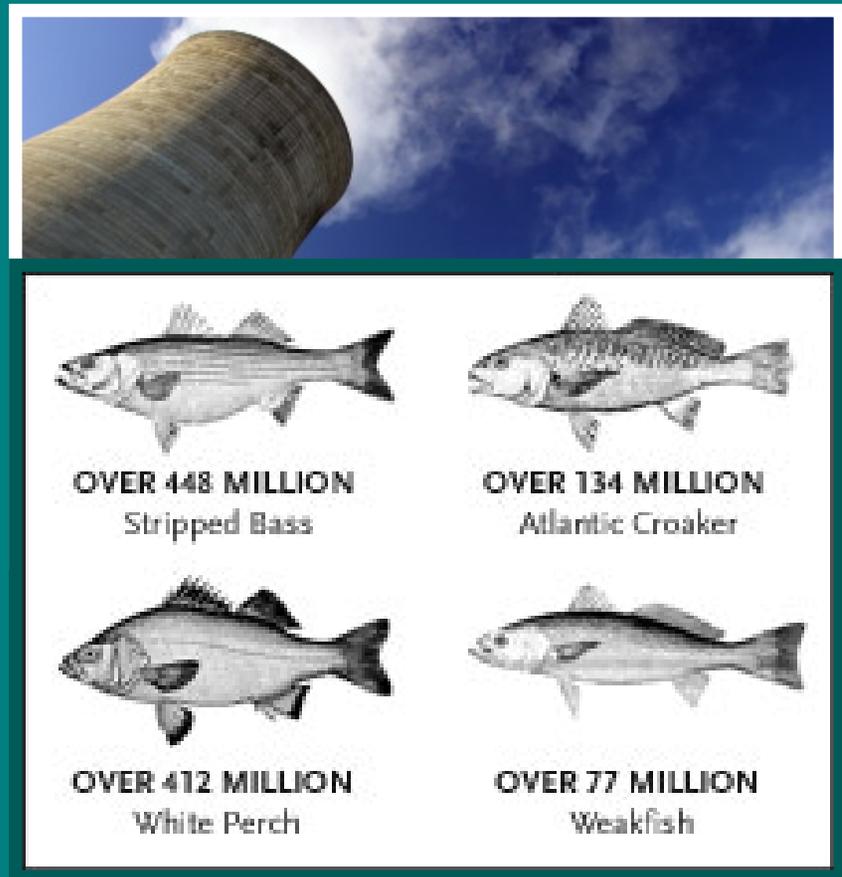
Ecological Currency

Habitat Equivalency Analysis

**P.S.E. & G.'s
Salem Power
Plant, N.J.**

**Cooling water intake
injures fisheries
resources**

**Suite of estuary
enhancement
actions**



Habitat equivalency analysis

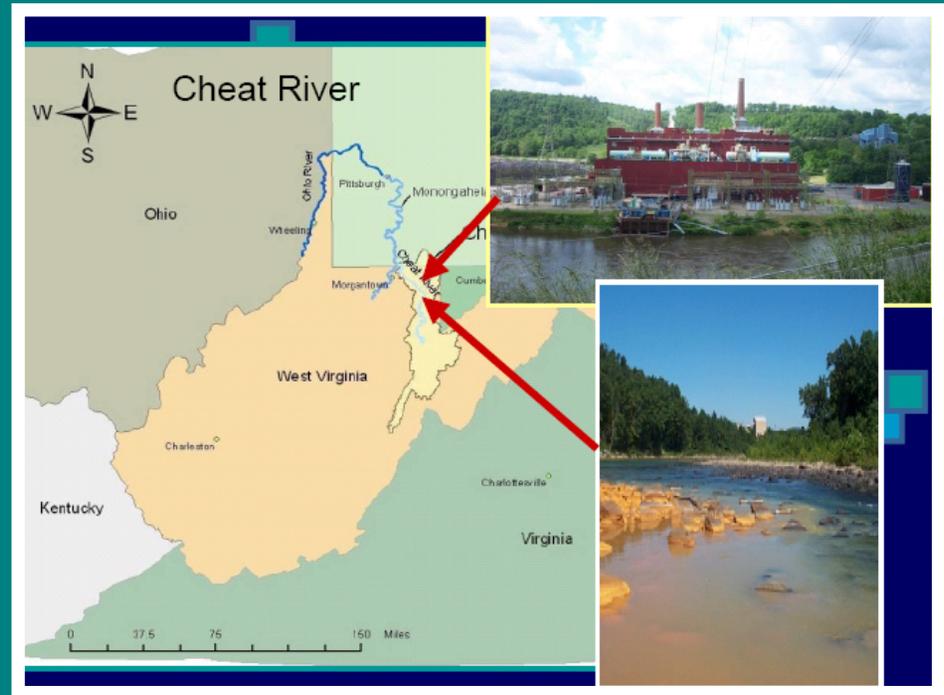


- 10,000 acres tidal wetlands
- 8,000 acres diked wetlands
- 2,000 acre wetland preserve
- 6,000 acres upland buffer
- Fish ladders
- Artificial reefs

Ecological Currency

- Eco-units based on stream condition
- Equivalency between impacts from acid mine drainage and thermal discharge

Cheat River, WV



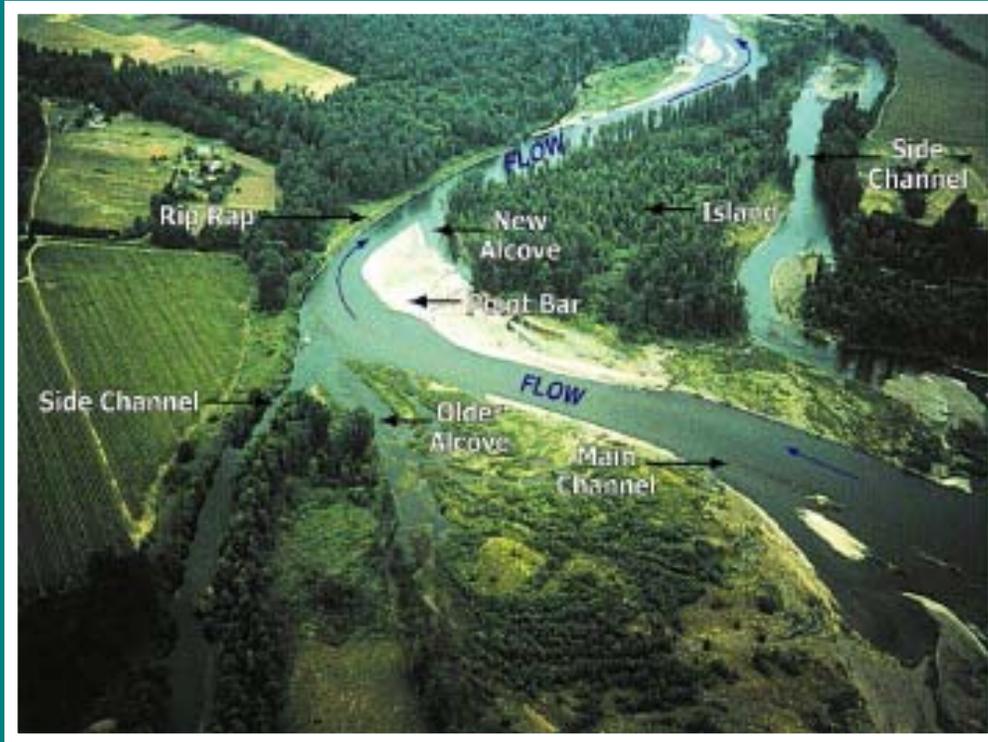
Ecological Currency

N.C. Ecosystem Enhancement Program

- In-lieu fee wetland mitigation
- Watershed focus
- Focus on replacing ecosystem function
- Alternative mitigation options



Ecological Currency



Temperature
credits from
flow, habitat

- Habitat accounting
 - Willamette Ecosystem Marketplace

Regulatory Streamlining

- **CWA/ESA (aquatic)**
 - **Joint TMDL/HCP**
 - **section 7 consultation**

- **CWA 303/404**
 - **Out-of-kind mitigation (N.C. EEP)**

Questions?

A large, bright yellow sun is positioned in the lower center of the frame, partially obscured by dark, silhouetted clouds at the bottom. The sky is a deep, vibrant red, transitioning from a lighter orange near the horizon to a darker red at the top. Numerous birds are scattered across the sky, appearing as dark silhouettes against the bright background. Some birds are in flight, while others are clustered near the sun.

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