

Defining the Problem: Nutrient Pollution

2018 URBAN WATERS

NATIONAL TRAINING WORKSHOP

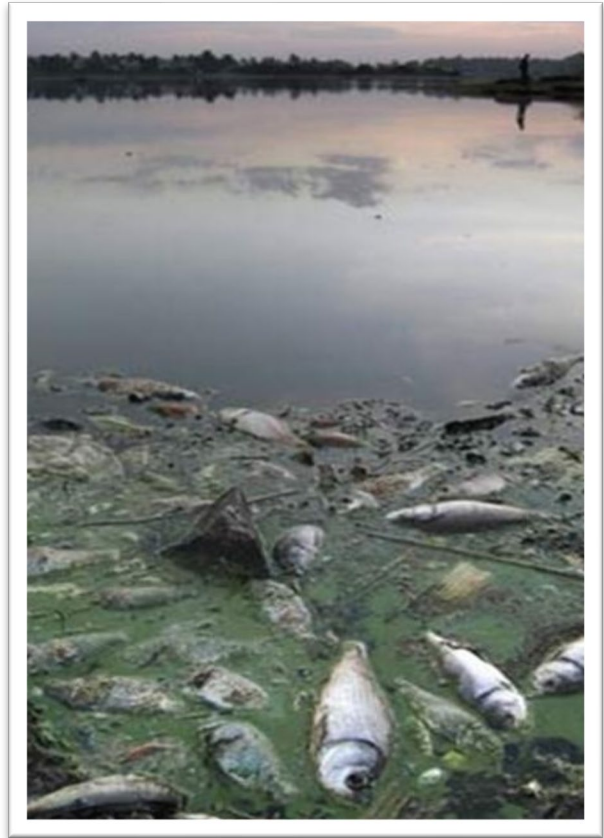


The Nutrient Problem

The amount of nutrients entering our waters has dramatically escalated over the past 50 years, and nutrients now pose significant water quality and public health concerns across the United States...

Nitrogen and phosphorus pollution has the potential to become one of the costliest, most difficult environmental problems we face in the 21st century.

D.F Boesch, 1999



Nutrient Pollution Impacts

Public Health:

- Nutrients feed harmful algal blooms that release toxins and can impact surface water quality
- Nitrate contaminated drinking water can cause shortness of breath and blue-tinted skin which is sometimes fatal in infants (i.e. blue baby syndrome)

The Environment:

- Algal bloom toxins are harmful to humans and animals and can lead to beach closures.
- Algal blooms also create aquatic dead zones with little or no oxygen
- Nutrients also contribute to acidification of coastal and marine waters

The Economy:

- Nuisance algae and odor negatively impacts local tourism, property values
- Increases drinking water treatment costs
- Lost aquatic life impacts local commercial fish and shellfish industries



National Scope of Nutrient Problem

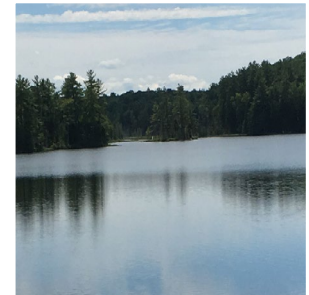


Streams

- **ABOUT HALF OF ALL RIVERS AND STREAMS** have elevated levels of nitrogen and phosphorus associated with degraded biological condition.

Lakes

- Approximately **5 MILLION LAKE ACRES** identified as threatened or impaired for nutrients.
- A national assessment of lakes in 2012 found that **about 1 in 3 lakes (35%) have excess nitrogen and 2 out of 5 lakes (40%) have excess phosphorus.**



Coastal waters

- Approximately **78% OF ASSESSED COASTAL AREAS** exhibit signs of eutrophication.

Sources of Nutrient Pollution

NATURAL SOURCES

- Soil and phosphorus-containing rocks
- Fixation of atmospheric nitrogen gas
- Dry and wet atmospheric deposition of nitrogen compounds

ANTHROPOGENIC SOURCES

- Municipal wastewater
- Industrial wastewater
- Urban storm water runoff
- Wet weather overflows
- Animal agriculture
- Row crop agriculture
- Atmospheric deposition
- Septic systems

The Challenge

Nonpoint Sources

- Limited federal, state, county level regulatory tools to address some sources
- Insufficient funding and financing tools for voluntary nutrient reduction solutions
- Inadequate adoption of watershed scale, systems based approaches to nutrient management

Point Sources

- Exploring tools other than that NPDES permits to improve water quality
- Where permit limits can provide significant reductions, affordability may be an issue
- Highly efficient innovative technologies are being used but further research and full-scale demonstrations are needed to expedite full scale adoption of some of these technologies by utilities.
- Special assistance is needed for small facilities with limited technical and financial capacities.

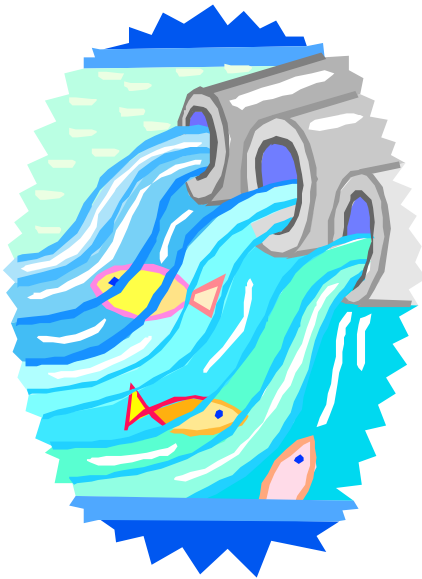
Drinking Water

- Affordability of solutions to monitor and mitigate nutrient related contaminants impacting drinking water
- Need for tools and authority for control of nutrient inputs impacting drinking water sources

Water Quality Trading

Presented by Amelia Letnes,
United States Environmental Protection Agency

What is Water Quality Trading?



- ▶ **Water quality trading** is a voluntary exchange of **water quality credits** generated through pollutant reductions
- ▶ Sources with higher pollutant control costs may purchase pollutant credits from sources with lower control costs
- ▶ Best suited for pollutants with **long term, downstream** impacts, such as nutrients.

Formula for Water Quality Trading

- ▶ Trading is:
 - ▶ **DRIVEN** by regulation
 - ▶ **MOTIVATED** by economics
 - ▶ **GOVERNED** by local trading rules
 - ▶ **BUILT** on trust
- ▶ WILL NOT BE VIABLE EVERYWHERE

Trading Between Two Point Sources

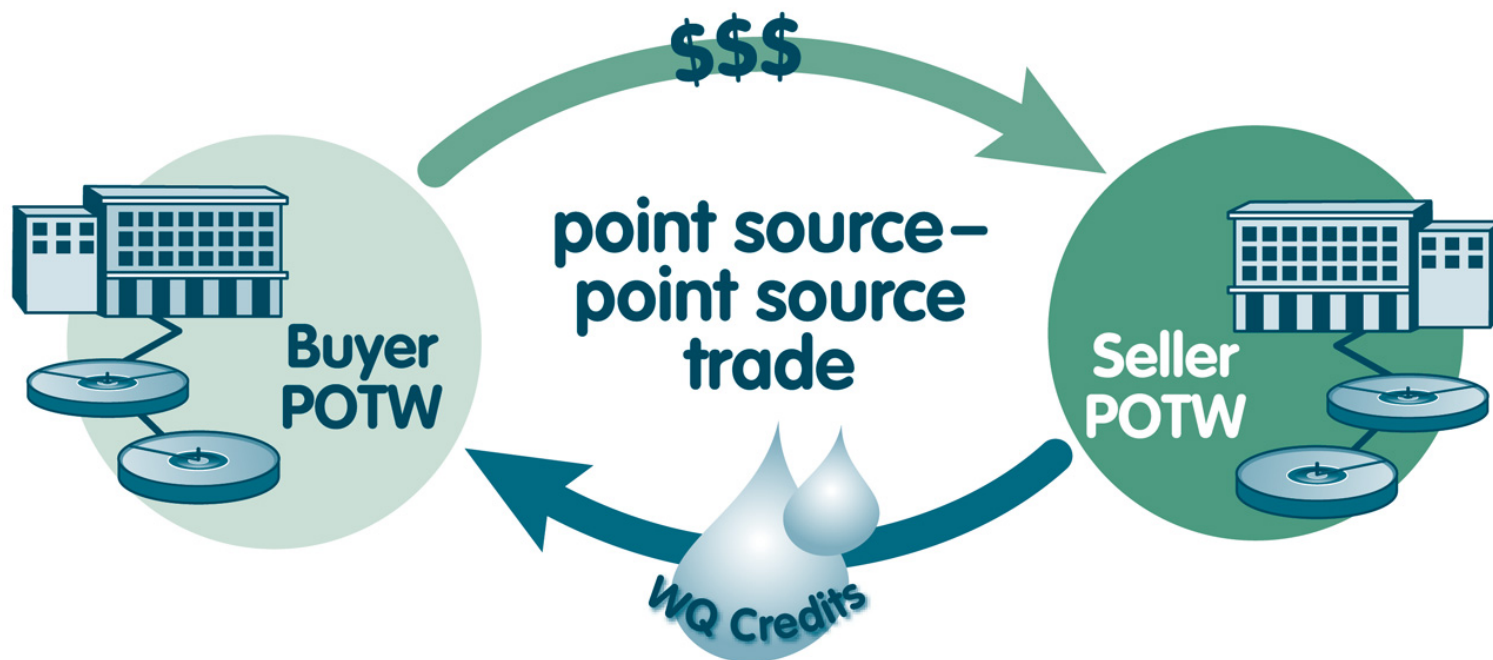
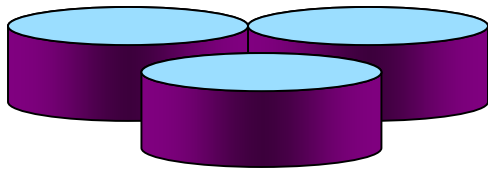


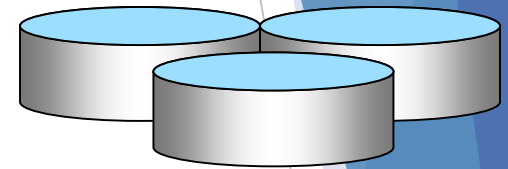
Illustration of a Trade Between Point Sources

Facility A



Technology
Reduces
200 lbs

Facility B



Need: 120 lbs
reduction



Selects: **Treatment**



$$200 \text{ lbs} - 120 \text{ lbs} = 80 \text{ lbs}$$

Need: 50 lbs reduction

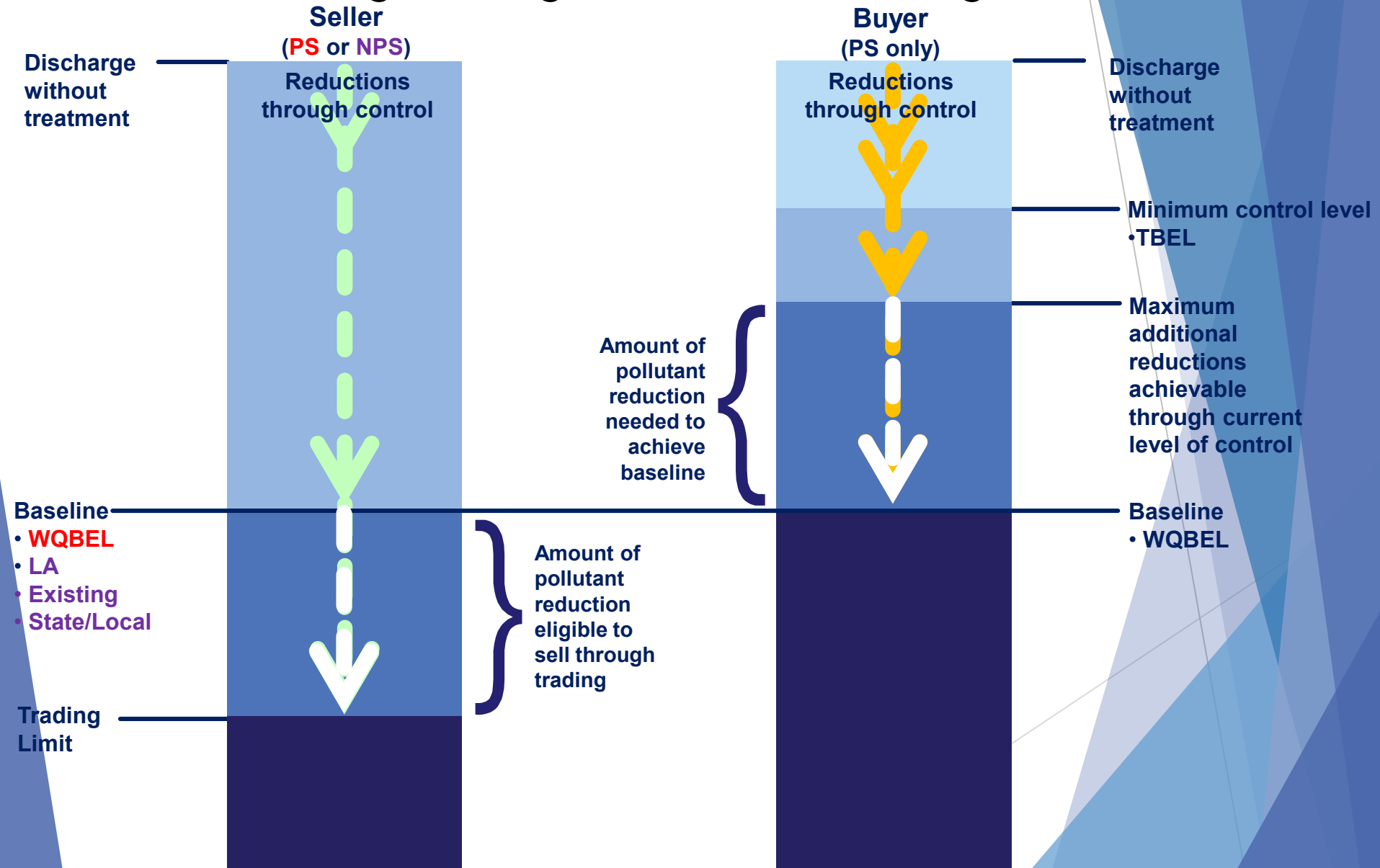


Selects: **Trading**

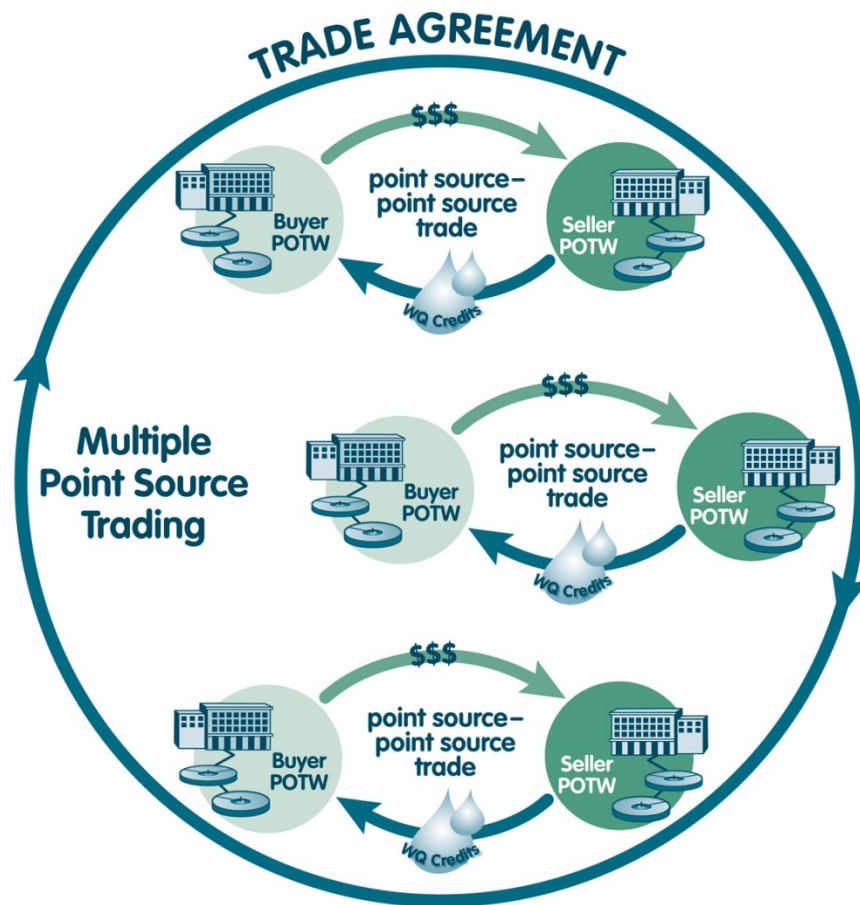
What Limits Apply When Trading?

- ▶ **Baseline:** Discharge level that applies in the absence of trading (*buyers and sellers*)
- ▶ **Minimum control level:** Discharge level that a buyer must meet through treatment before buying credits (*buyer only*)
- ▶ **Trading limit:** Discharge level a seller would be held to in order to generate and sell credits (*point source sellers only*)

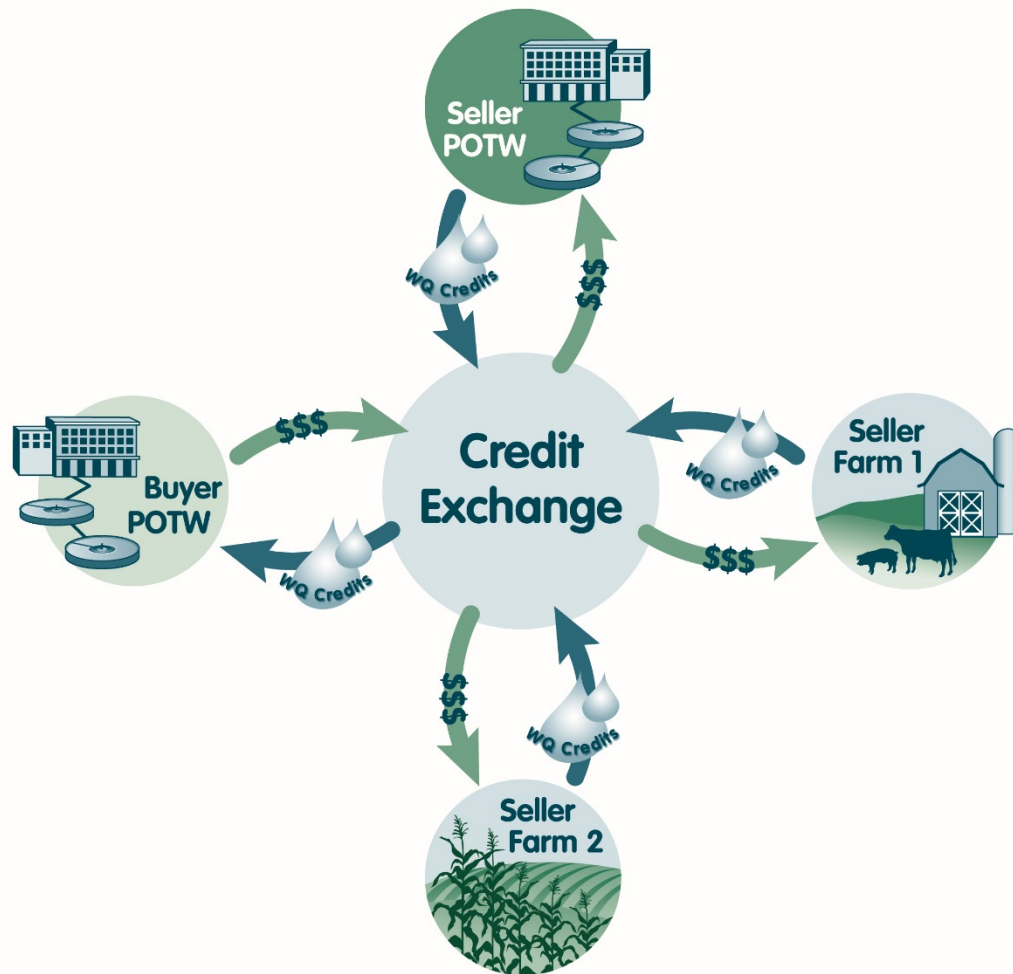
Translating Discharge Limits Into a Trading Transaction



Multiple Facility Point Source Trading



Credit Exchange



Where May Trading NOT Occur?

- ▶ May not be used to meet technology-based requirements
- ▶ May not cause or contribute to nonattainment of any applicable water quality standard
- ▶ May not adversely affect water quality at an intake for drinking water supply
- ▶ May not cause or contribute to an established pollutant cap for a water body being exceeded

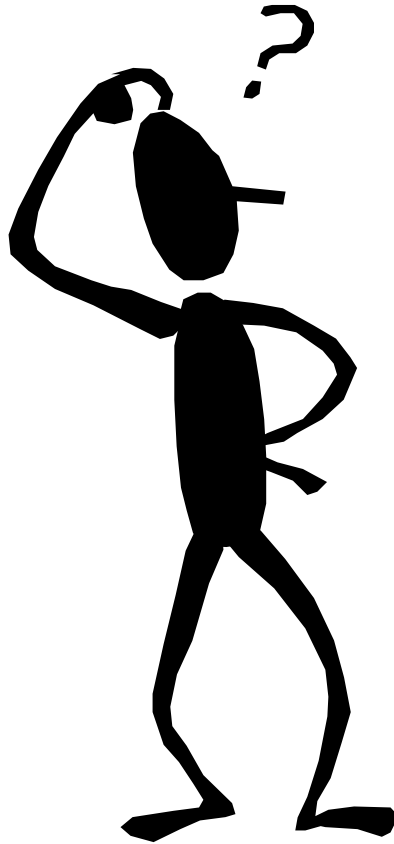
Active Trading Programs

- ▶ Connecticut- Long Island Sound TMDL
 - ▶ Nitrogen Credit Exchange established in 2002
 - ▶ PS-PS only
 - ▶ All credits bought and sold by state agency
- ▶ Virginia and Pennsylvania- Chesapeake Bay total maximum daily load.
 - ▶ Both states had trading programs prior to the establishment of the Bay TMDL in 2010.
 - ▶ PA generally is a broader program, with PS-NPS trading
 - ▶ VA allows PS-NPS trading only for new and expanding facilities.

Benefits of Water Quality Trading

- ▶ Environmental Benefits
 - ▶ Quicker nutrient reductions from point sources
 - ▶ Method to manage additional loadings from growth.
 - ▶ Creates incentives for unregulated sources to meet waterbody caps
 - ▶ Secondary environmental benefits (e.g., habitat restoration, carbon sink) from nonpoint source best management practices.
- ▶ Benefits to Permittees
 - ▶ Provides several different tools for achieving compliance
 - ▶ More cost-effective approach than treatment upgrades only
 - ▶ Allows for future growth as it eases costs and resource demands
- ▶ Benefits to Permitting Authority
 - ▶ More streamlined and efficient permitting process
 - ▶ Increased stakeholder support

Questions?



NPDES
Permit
Writers'
Specialty
Workshop
:
Addressin
g
Nutrient
Pollution
in NPDES

Additional Resources

- ▶ Water Quality Trading Web Site

<https://www.epa.gov/npdes/water-quality-trading>

- ❖ 2003 Water Quality Trading Policy
- ❖ Water Quality Trading Toolkit for Permit Writers

- ▶ Water Quality Trading Training:

<https://www.epa.gov/npdes/npdes-training#web>

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