

Using Marketable Trading System to Improve Water Quality



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Lecture Structure

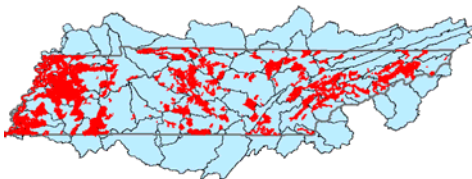
- I. The Problem
- II. Reasons of the Problem
- III. Marketable Trading System
- IV. EPA's Endorsement
- V. Future Directions



The Problem

- Continuing water quality impairment is increasingly due to non-point source pollution

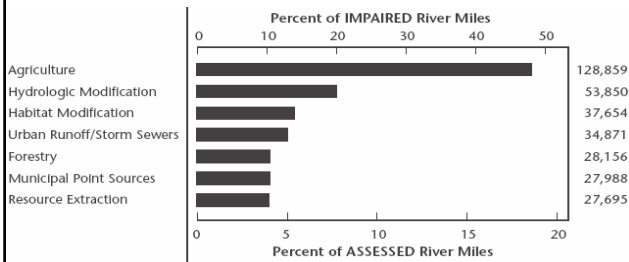
Tennessee's Impaired Waters



The Problem

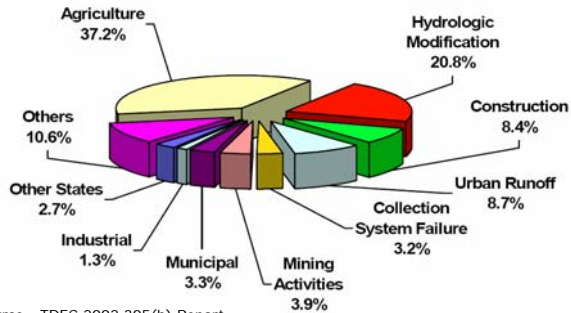
- **Point Source (PS)**
→ US Clean Water Act
- **Non-Point Source (NPS)**
→ runoff from agricultural and urban lands

Leading Sources of US River and Stream Impairment



Source: EPA, 2002

Leading Sources of TN River and Stream Impairment



Source: TDEC 2002 305(b) Report

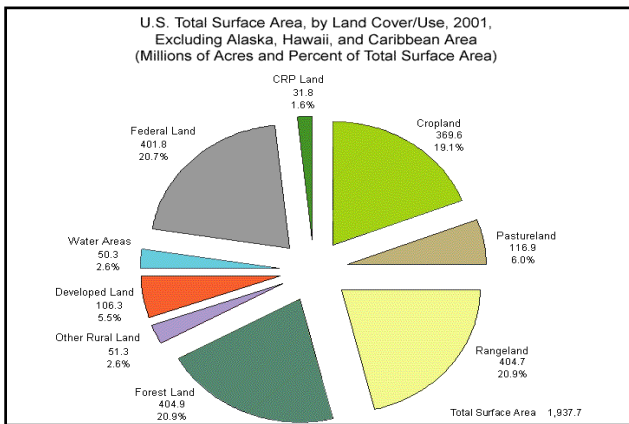
Reasons

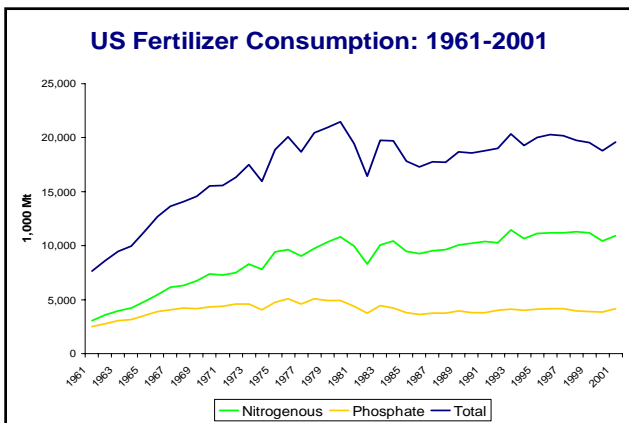
1) Large number of NPS

2) Industrialization of agriculture

3) Differing regulatory "approaches" to PS and NPS pollution







Poultry Production in the 1930's



21st Century Poultry Production



Differing Regulatory Approaches

- Federal technology based standards
- NPS: State-based voluntary approaches
 - Education, technical assistance

Water Quality Trading

- Market based incentives
- Marketable or tradable permits of pollutant emissions (NPDES Permits)
- Achieve ambient environmental standards at least cost

Cap-and-Trade System

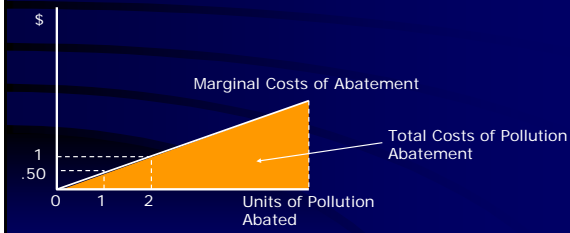
- Set a maximum quantity of pollutant to be emitted into a particular watershed
- Distribute permits of pollutants to be emitted, in total, up to this maximum quantity, to the dischargers within the watershed
- Allow dischargers to freely trade permits

Cap-and-Trade System

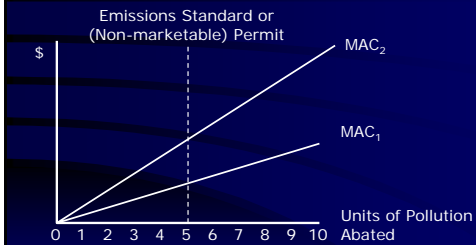
Results

- Low-cost abatement dischargers sell some of their permits to high-cost abatement dischargers
- Low-cost dischargers increase abatement while high-cost dischargers reduce abatement

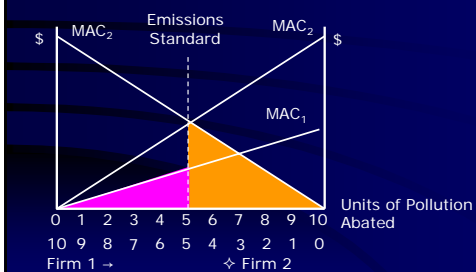
Abatement Costs



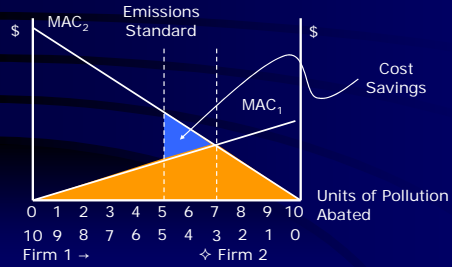
Marginal Abatement Costs (MACs) and an Emissions Standard



MACs and an Emissions Standard



Least-Cost Attainment of Ambient Environmental Standards: Equating MACs



EPA's Endorsement

- **1996 Policy Statement and Draft Framework and 2003 Policy Statement**
- **Limitations**
 - Nutrients, sediment and "oxygen-related cross-pollutants" only
 - Not a "cap-and-trade" system but an "offset system"

EPA's Offset System

- **Permit Buyers: PS**
Allows a PS discharger made additional reductions
- **Permit Sellers: NPS (Farmers)**
Reducing emissions by installing buffer strips

Future Directions

- Determine the potential of water trading system
 - PS/NPS, NPS/NPS
 - Market (Permit sellers and buyers)
 - Maximum amount of the permits
 - Initial distribution of the permits
 - Permits of more pollutants

Thank You

- Dr. Christopher D. Clark
- Dr. Clifford S. Russell
- Dr. Don Hodges
- Dr. Mathew Gray
- Department of Agricultural Economics
- Department of Forestry, Wildlife, and Fisheries

Questions?

Tradeable Impairments

