

*National Forum on Synergies Between  
Water Quality Trading and Wetland Mitigation Banking*

# **Challenges of Point/Non-point Trading**

**By**

**Dennis King  
University of Maryland  
And  
King and Associates, Inc.**

**July 11, 2005**

# Outline

## **1. General Comments**

- Summary of our 2003 and 2005 Review of WQ Trading
- Rules and Units of Exchange and Incentives for Exchange
- Necessary conditions for a success trade:  
    Willing Sellers, Willing Buyers, Approval of the trade

## **2. Experience with Wetland Mitigation Trading**

- Ad hoc (political) vs. Commodity (market-style) trading
- Problems with quality control and risk management

## **3. Challenges of Point/Non-point WQ Trading**

- Institutional and Technical Issues
- Economic and Political Issues
- Creating the necessary conditions for success

# Broad Market Context

## 2003 Nobel Prize winning economic research

by Jonathan Nash (of "Beautiful Mind" Fame)

- **Asymmetric Information problems** in markets results in *gaming behavior* causing excessive firm/product branding, less competition, and winner-take-all markets.

*In Environmental Markets:*

*Buyers and Sellers both have incentives to exploit and perpetuate quality uncertainty and to collude against trade regulators and the public interest.*

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## 2004 Nobel Prize winning economic research

by Edward Prescott and Finn Kydland

(of "Rational Expectations" Fame)

- **Time inconsistency problems** with the way markets are regulated results in widespread *gaming behavior* that causes regulatory programs to fail.

*In Environmental Markets:*

*WTP for credit is not based on marginal treatment costs, but the expected cost of not complying after adjusting for political/legal maneuvering*

# Our 2003 Nutrient Trading Review Paper in the Environmental Law Reporter

## Focus

Initial: How are people “scoring” nutrient credit trades? **A: They were not**

Eventual: Why are no WQ trades taking place ? **A: No buyers, no sellers**

## Approach

Reviewed 37 on-the-ground water quality trading systems

(Noted barely any trading, and no point/non-point trades)

Evaluated Supply conditions, Demand conditions, and Institutional conditions

(Concluded: no incentives to participate ...and many disincentives )

## Results

- 1) **Institutional/Technical Problems** are significant, but can be overcome
- 2) **Supply/Demand Problems** are far more important... and outside the control of regional watershed organizations.
- 3) **Centralized Trading Systems** (e.g., government-run offset and bidding programs) have much more near-term potential than the **decentralized** (market-style) credit trading programs that most of us would prefer.

# My 2005 Nutrient Trading Review Paper - in current issue of AAEA “Choices” Journal

## Focus

Initially – What’s happening ? What’s working ?

Eventually – Why is nutrient credit trading still not happening ?

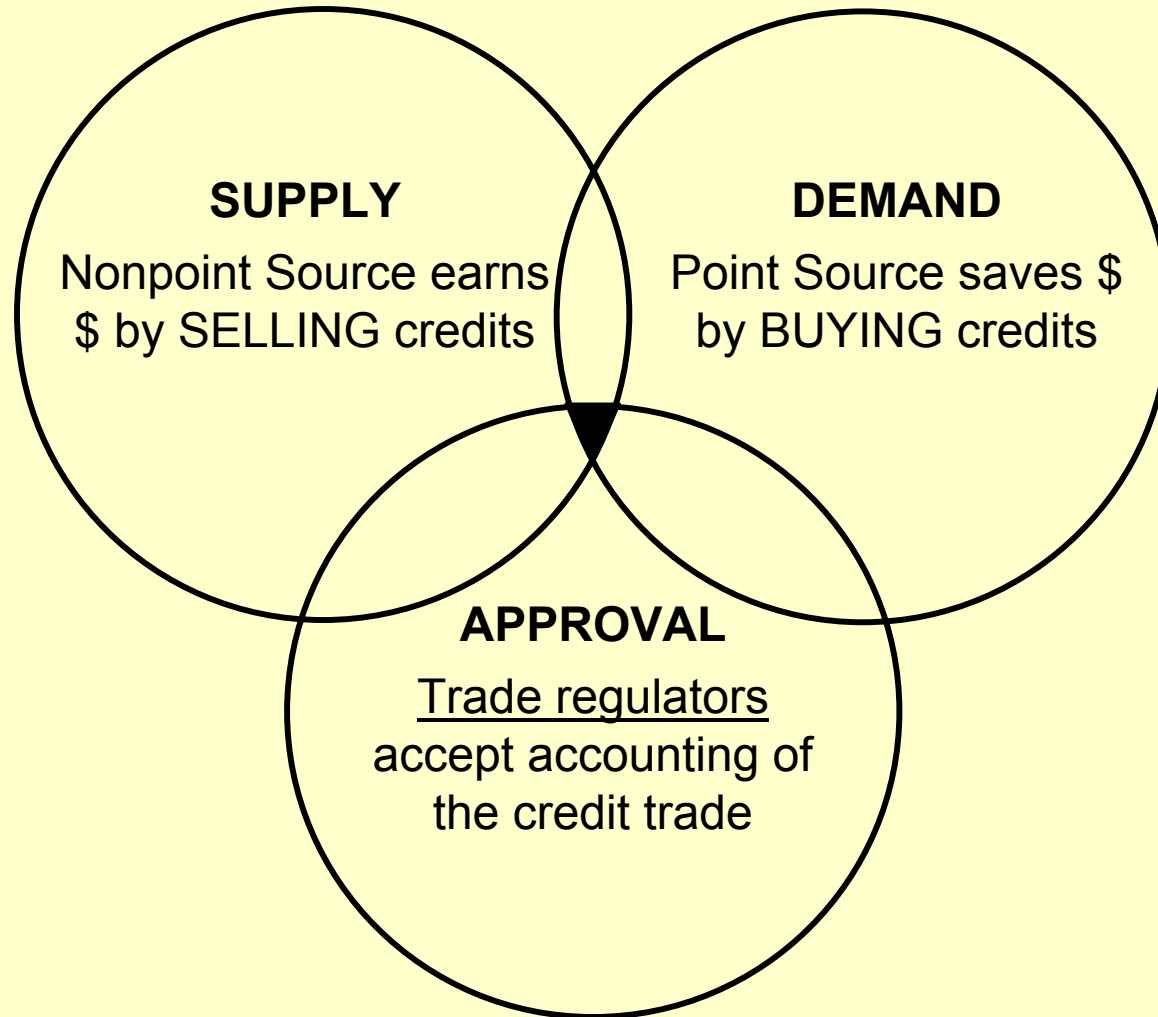
## Results

- Lots of interest, support, and even start up funding,
- 70 or so water quality trading systems
- Still almost no trading taking place

## Conclusions

- Serious Supply and Demand Problems (few willing buyers and sellers) because of:
  - Regulatory programs that dictate treatment methods & levels
  - Subsidy programs that require treatment methods & levels
  - No currently binding discharge restrictions
  - Weak enforcement of discharge restrictions
  - TMDL’s will help, but not without big changes in market savvy of regulators.
- Where WQ trading is possible centralized Trading Systems (e.g., government-run offset and bidding programs) have more near-term potential than decentralized (market-style) credit trading.

# Necessary Conditions for P/NP Nutrient Credit Trading



# TWO BASIC STYLES

## CENTRALIZED vs DECENTRALIZED TRADING

### 1) Market Style Credit Trading

- Standard units of exchange (e.g. credit)
- Many buyers and sellers (e.g. competition)
- Formal rules of exchange (e.g. liability assigned)

### 2) Regulator-Approved Offset Trading

- Ad hoc trade “scoring” criteria
- May be simple bi-lateral or tri-lateral contracts
- Possibly single source of offsets
- Single source of credits can be Government that subsidizes providers of offsets

# GENERAL QUESTIONS ABOUT TRADING

- 1) Full or partial cap, and how tight ?
- 2) Can Trading occur within or outside the “cap” or both?
- 3) How are allowances allocated within the “cap”?
- 4) Who decides how, where to modify discharges or find offsets?

# SPECIFIC QUESTIONS ABOUT TRADING

- 1) **Units** of Exchange  
Establishes equivalency of WQ gains and losses
- 2) **Rules** of Exchange  
Establishes who can trade, who is liable, etc.
- 3) **Incentives** for Exchange  
Equity of initial endowments of “rights”  
Do Credit producers lose “green payments” or expose themselves to future regulations?



# Potential NP Sources of Credits

- Activities that **reduce** Nutrient discharges
  - reduce fertilizer use, build/use manure sheds
- Activities that **prevent** Nutrients from reaching water body
  - plant wetlands or grass or forest riparian buffers
- Activities that **remove** Nutrients from water body
  - Restore oyster beds or grow oysters on off-the-bottom racks

# HOW MUCH PRECISION CAN WE AFFORD ?

*(Can the Laws of Large Numbers save us ?)*

**COST  
OF  
VERIFICATION**

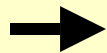
\$ per acre  
or  
\$ per pound

Never

Maybe

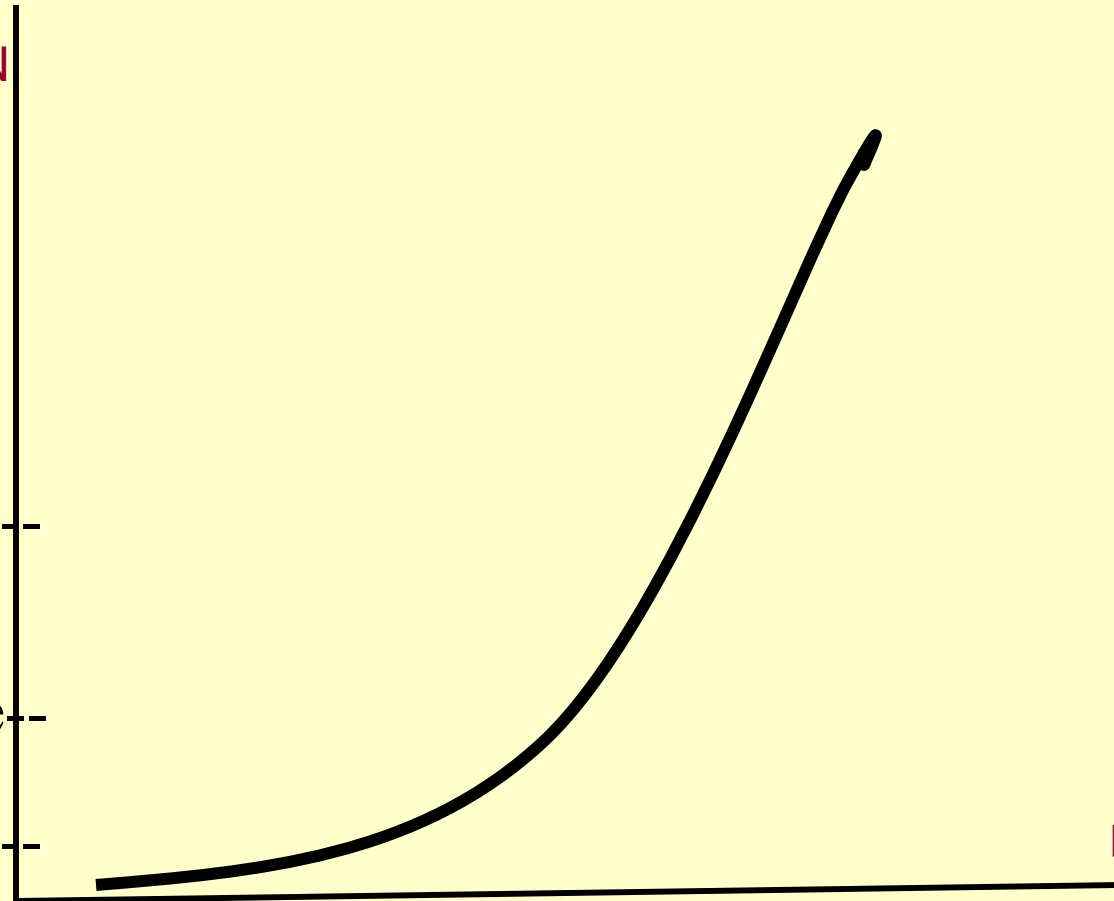
OK

0% 20% 40% 60% 80% 100%

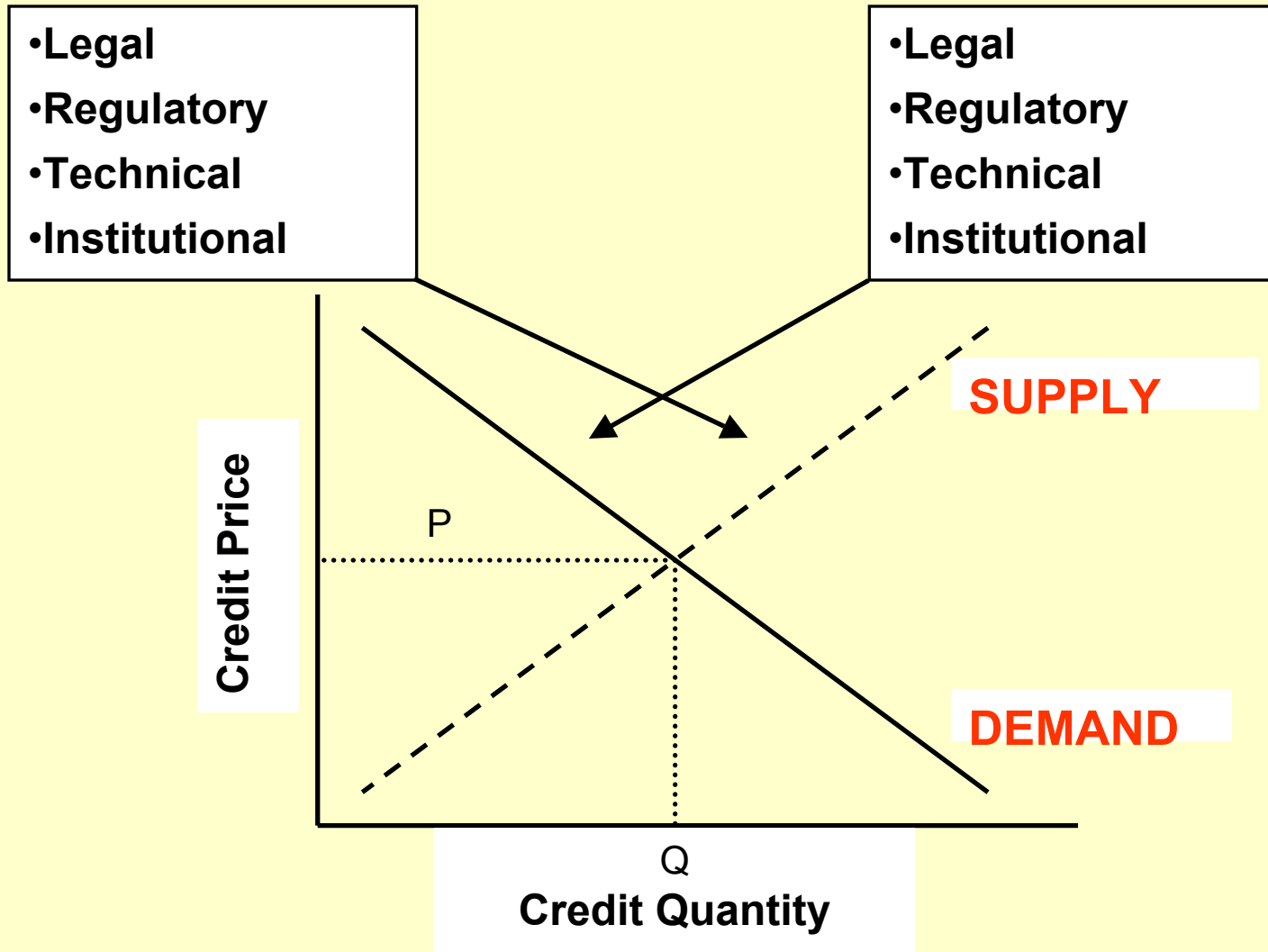


RULES—MODELS--REMOTE SENSING--SITE SAMPLING

**PRECISION  
OF  
ESTIMATE**  
(% Confidence)



# Factors Affecting Nutrient Credit Markets



# Potential Effects of Gov't Decisions on WQ Credit Markets

**A**

**Ideal market**

- Supply and Demand curves cross
- Many trades

**B**

**Marginal market**

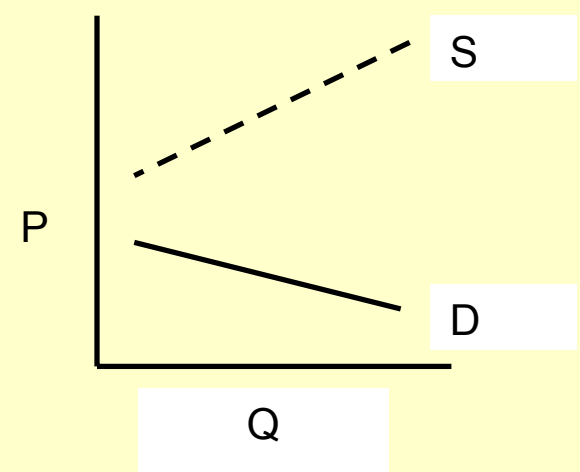
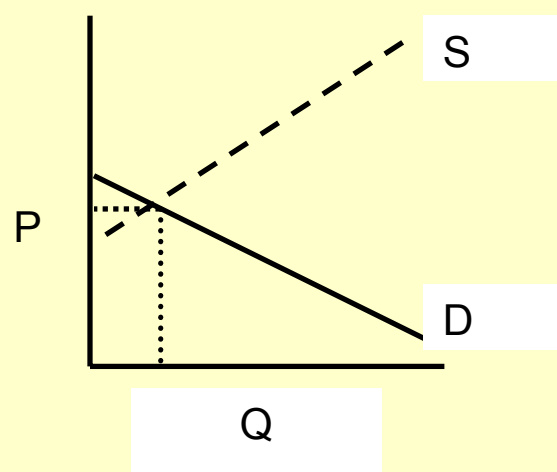
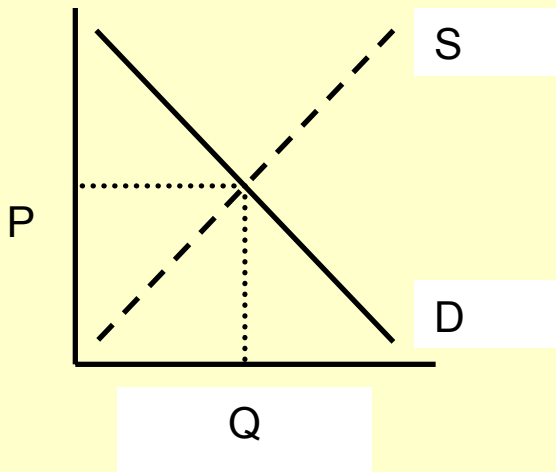
- Supply and Demand curves cross (barely)
- Few trades

**C**

**Nonexistent market**

- Supply and Demand curves do not cross
- No trades

(Current Conditions)



# Scoring Patuxent River Watershed NPS Trades

1. Site Ranking (e.g., Soil, slope, hydrology)
2. BMP Efficiency (% N reduction per acre)
3. Landscape Ranking  
(Proximity to other natural features )
4. River Segment Ranking (dilution/attenuation)
5. Seasonal adjustment (hydrology/ecology)

# Nutrient Enforcement Economics Decision Support (NEEDS) Model

Dennis King, Patrick Hagan  
and Lisa Wainger

University of Maryland, Center for Environmental Science

# What's the NEEDS Model ?

- A county-level decision support tool designed to help focus, manage, and assess the likely success of initiatives to reduce nutrient discharges into the Chesapeake Bay
- The model has three components:
  1. county discharge *capacity* measures
  2. county discharge *control* measures
  3. geographic *dilution/attenuation* factors

# Five Suggestions for developing successful WQ Trading

- 1) **Follow** the new EPA guidance
- 2) **Discourage** “command and control” regulatory programs
- 3) **Encourage** binding discharge restrictions
- 4) **Establish** meaningful monitoring and enforcement of restrictions... and stiff penalties
- 5) **Get smart** about the “gaming” strategies that point and non-point sources will use to limit regulation and avoid penalties ...and about countervailing public policies.