

# **“How Can We Help Farmers Comply with Modern Environmental Regulations?”**

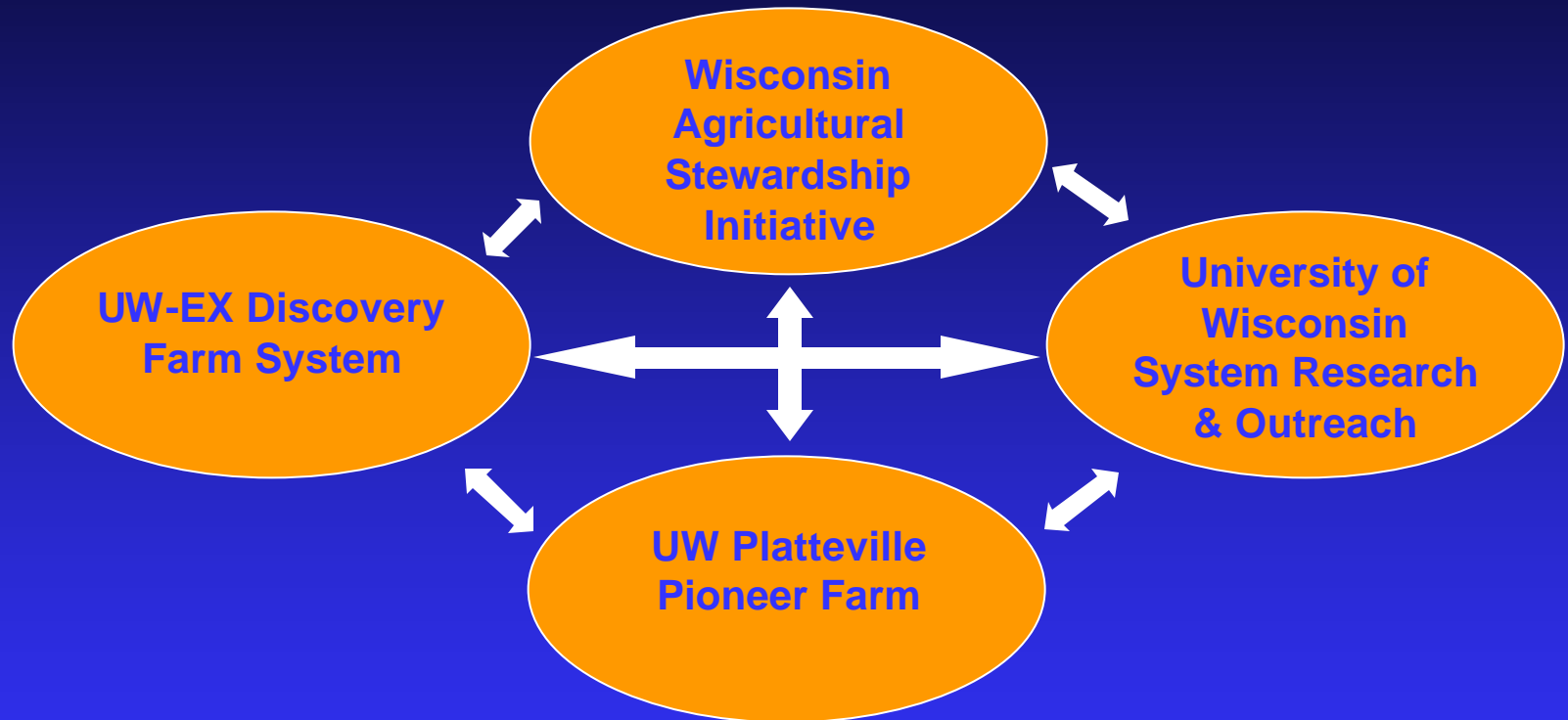
The Wisconsin Agricultural  
Stewardship Initiative and the  
Role of **Pioneer Farm**

Tom Hunt, Director-Research  
Pioneer Farm  
UW-Platteville

# Farmers Today Face Major Challenges

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- **World Population: 6.3 billion**
  - **Volatile Foreign & Domestic Markets**
  - **Complex Technology**
  - **Animal Health & Ethics**
  - **Food Quality & Safety**
  - **Environmental Regulations**
  - **Farm Policies**
  
  - **Threats to:**
    - ◆ **Traditional Profitability**
    - ◆ **Quality of Life**
    - ◆ **Ecological Health**

# WISCONSIN AGRICULTURAL STEWARDSHIP INITIATIVE (WASI)



## HISTORY

† Wisconsin 1997 Act 27

† 1999 Delegations to the Netherlands

† WASI unveiled in 2000

† Funded in 2001- 2003 budget

† Stakeholder Research Priorities 2000 & 2002

# Pioneer Farm

Working farm, located at UW-Platteville, with 430 acres and small dairy, swine, and beef herds

## **Mission**

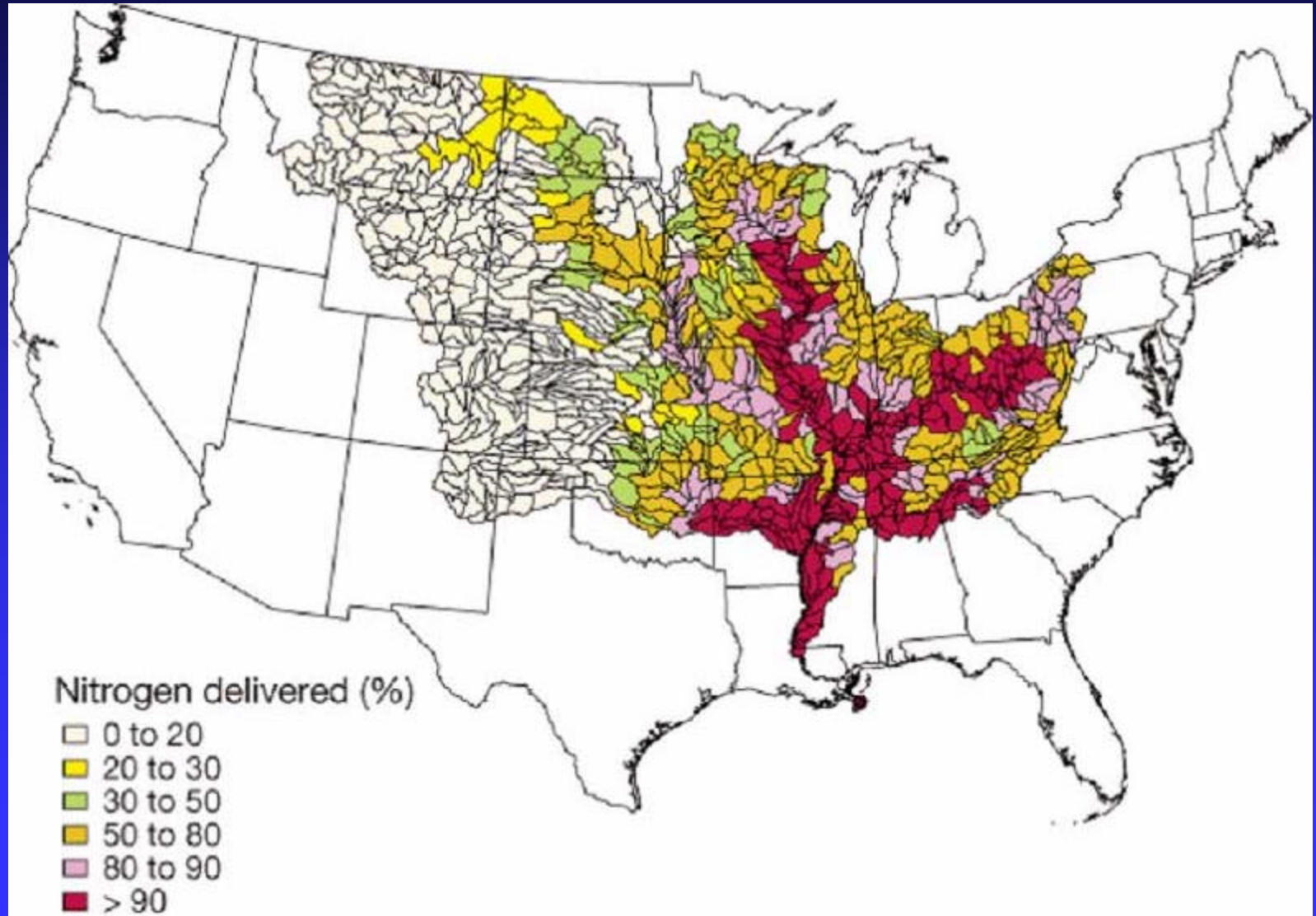
- Conduct, monitor, & evaluate applied systems research on ecology and economy of the whole farm
- Use stakeholder priorities to *guide* research agenda
- Share findings; Advocate science-based public policies; and Maintain and grow core competency of teaching



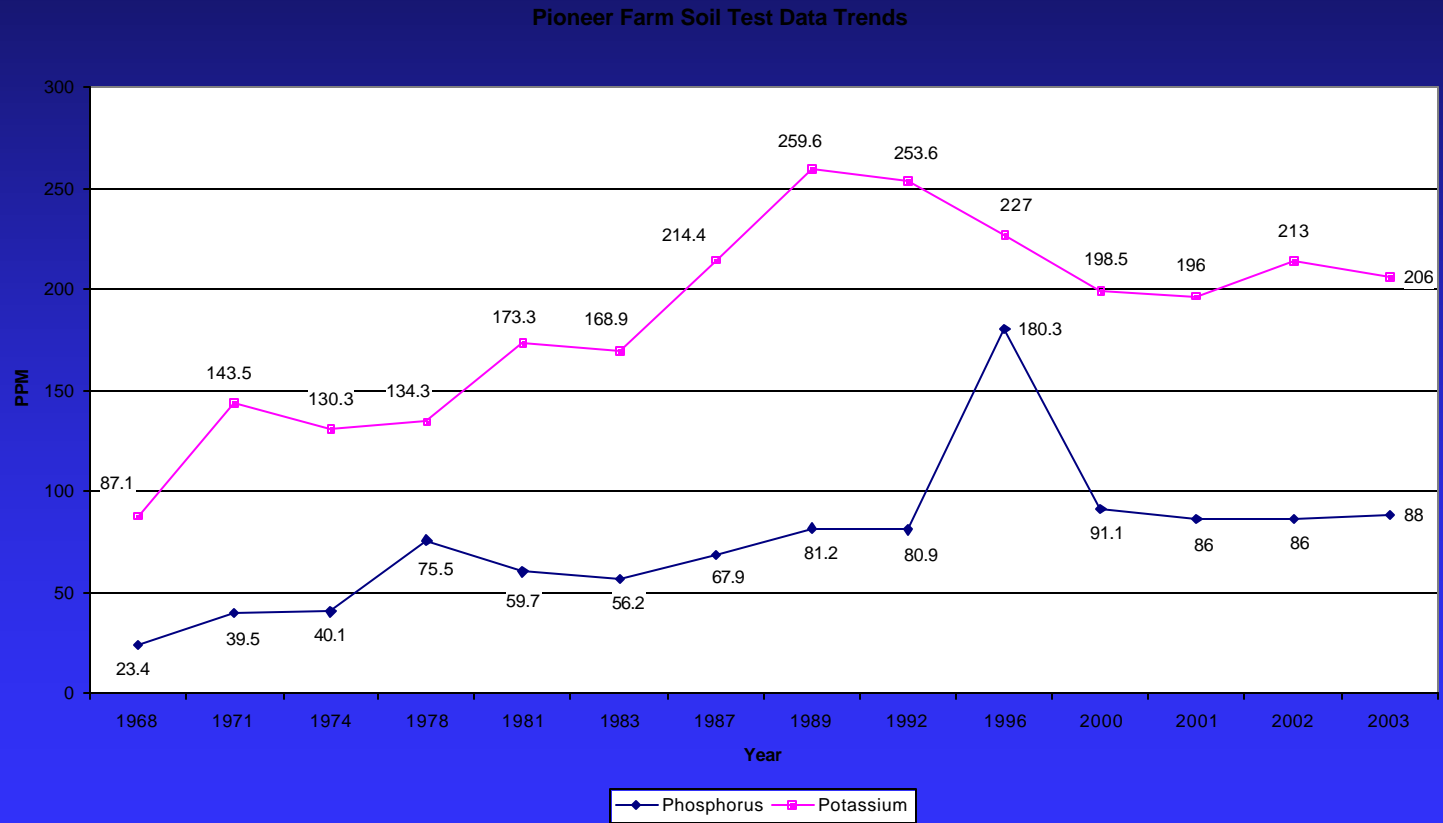
# Stakeholder Research Priority: Erosion & Sedimentation



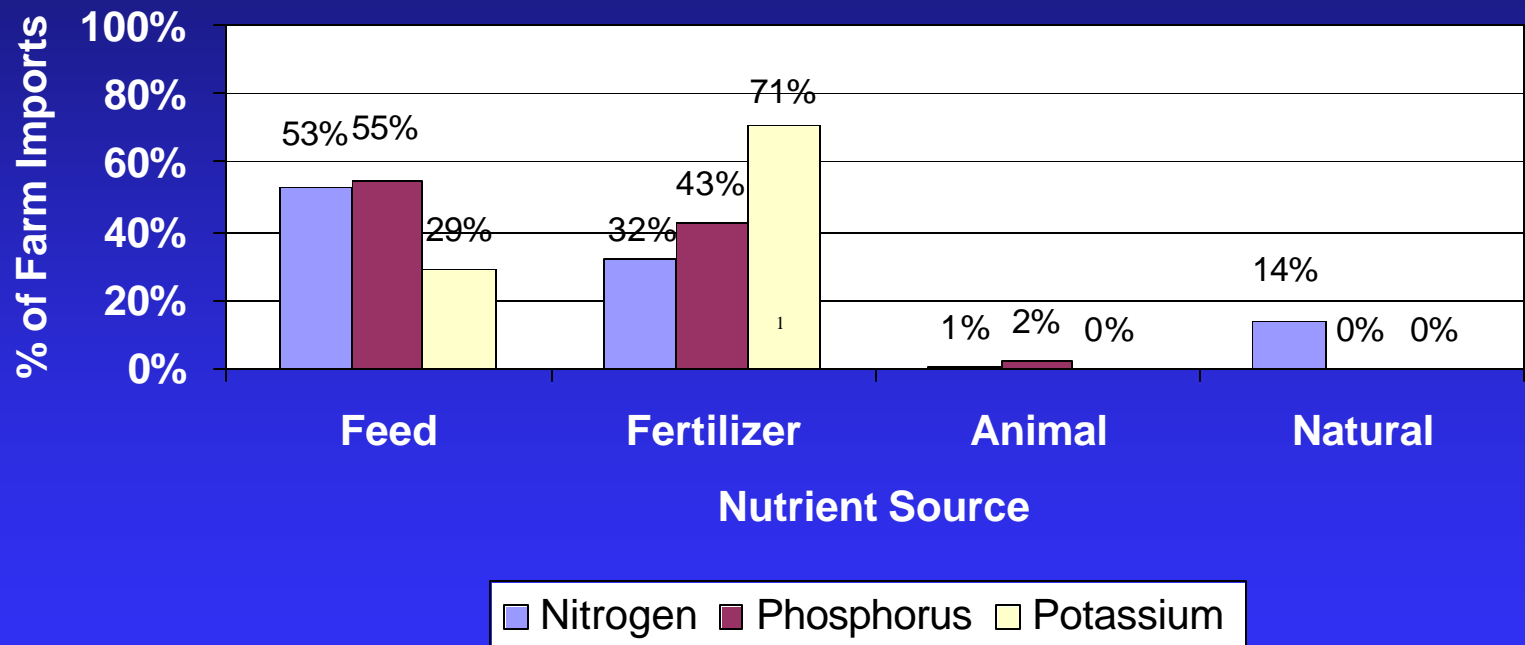
# Stakeholder Research Priority: **Hypoxia** Nutrient Loading is a Problem



# Stakeholder Research Priority: Nutrient Management



# Stakeholder Research Priority: Sources of Nutrients





# Stakeholder Research Priority: Systems Mass Balance



- Farm and Research staff gather inputs and outputs
- **Inputs** include TMR and other feed rations
- **Outputs** include manure, bedding, meat, and milk
- Time consuming and costly, needed to understand the nutrient/manure system

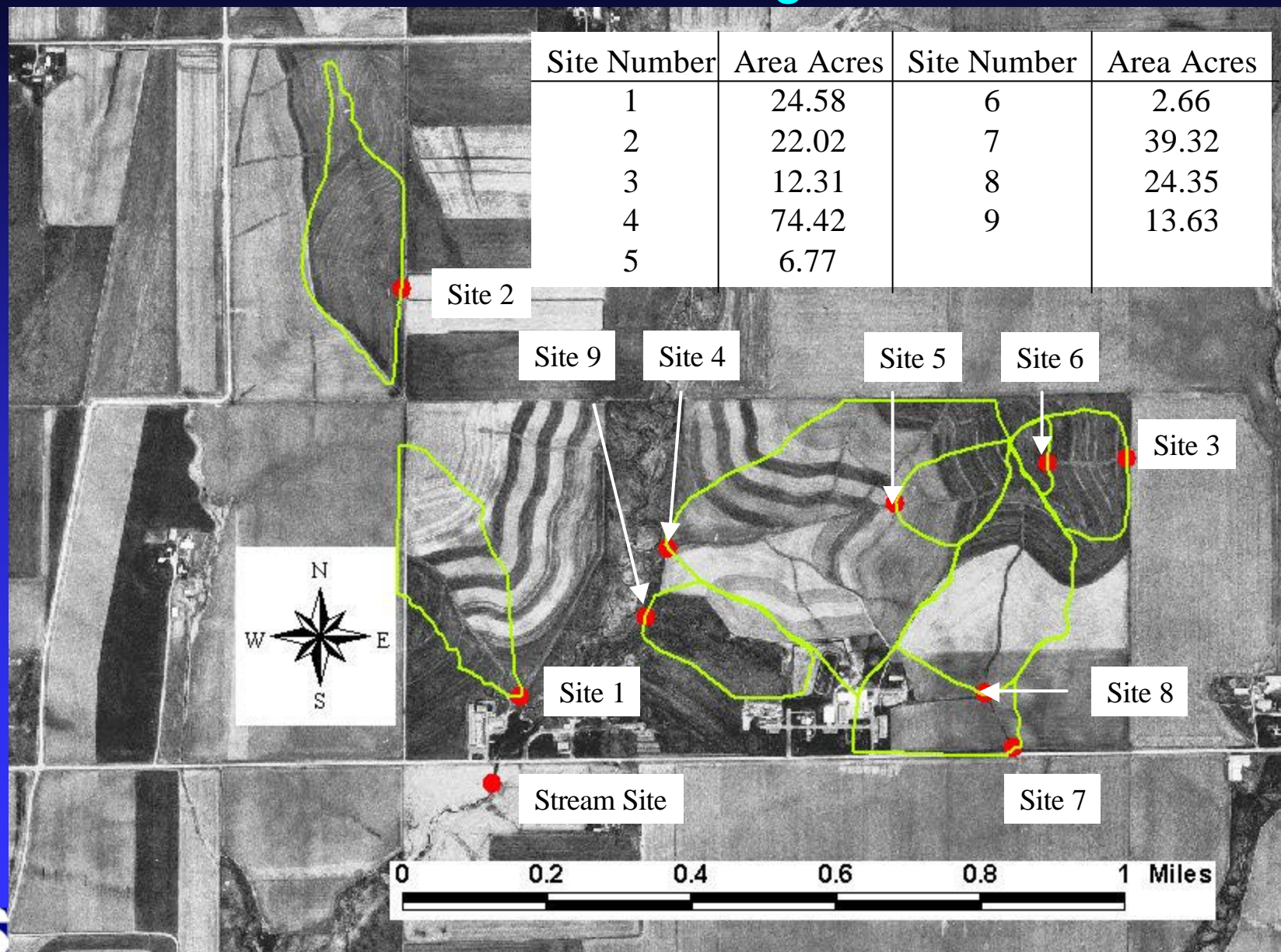
# Stakeholder Research Priority: Nutrient Management

- **WI Phosphorus Index**
  - Planning tool for farmers
  - Evaluate risk of P losses from fields with varying management practices
  - Part of WI Nutrient Management Standard 590

# Stakeholder Research Priority: Nutrient Management

- USING PIONEER FARM DATA TO CALIBRATE THE P INDEX
  - Risk Modeling Approach
  - Calculate average annual P losses in particulate and dissolved form in lb/acre/year for each field based on climate, soil, soil test P, and crop management
  - “Worst-case” loss factors added for unincorporated surface applications of P:
    - non-frozen ground
    - frozen ground

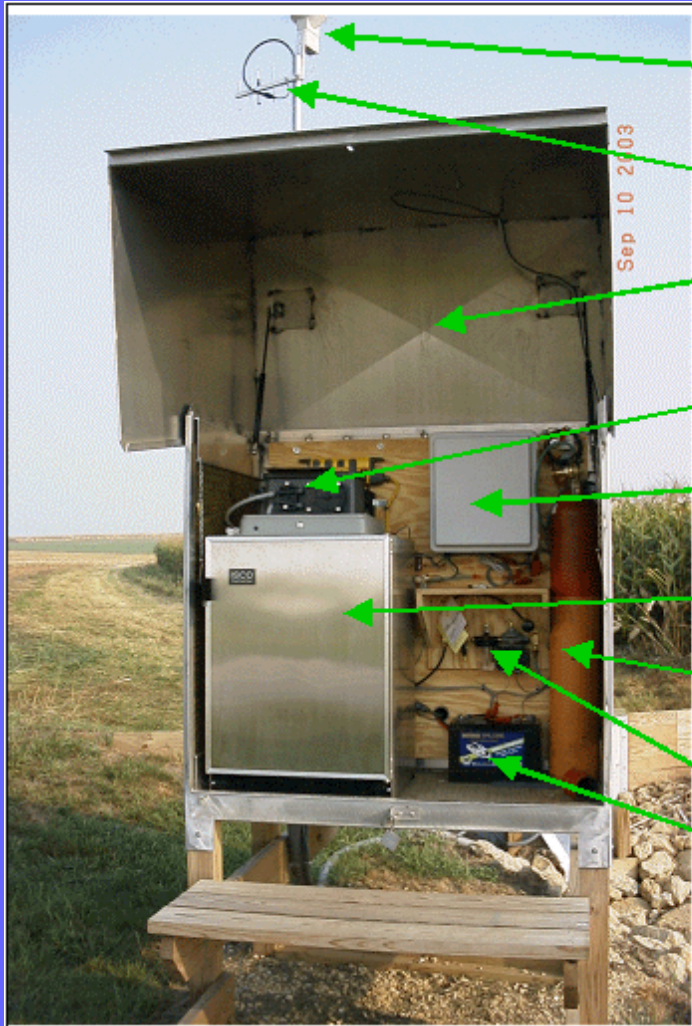
# Pioneer Farm Selected Nonpoint Runoff Basins & Monitoring Sites





Stakeholder Research Priority: Environmental Baseline

# NonPoint Runoff Monitoring Station



Precipitation Gage

Radio Telemetry Antenna

Cover w/ solar panels

Peristaltic Pump

Data Logger and radio

Sample Refrigerator

Nitrogen tank

Pressure Transducer

12 V Battery



# Sites in Action

including snowmelt



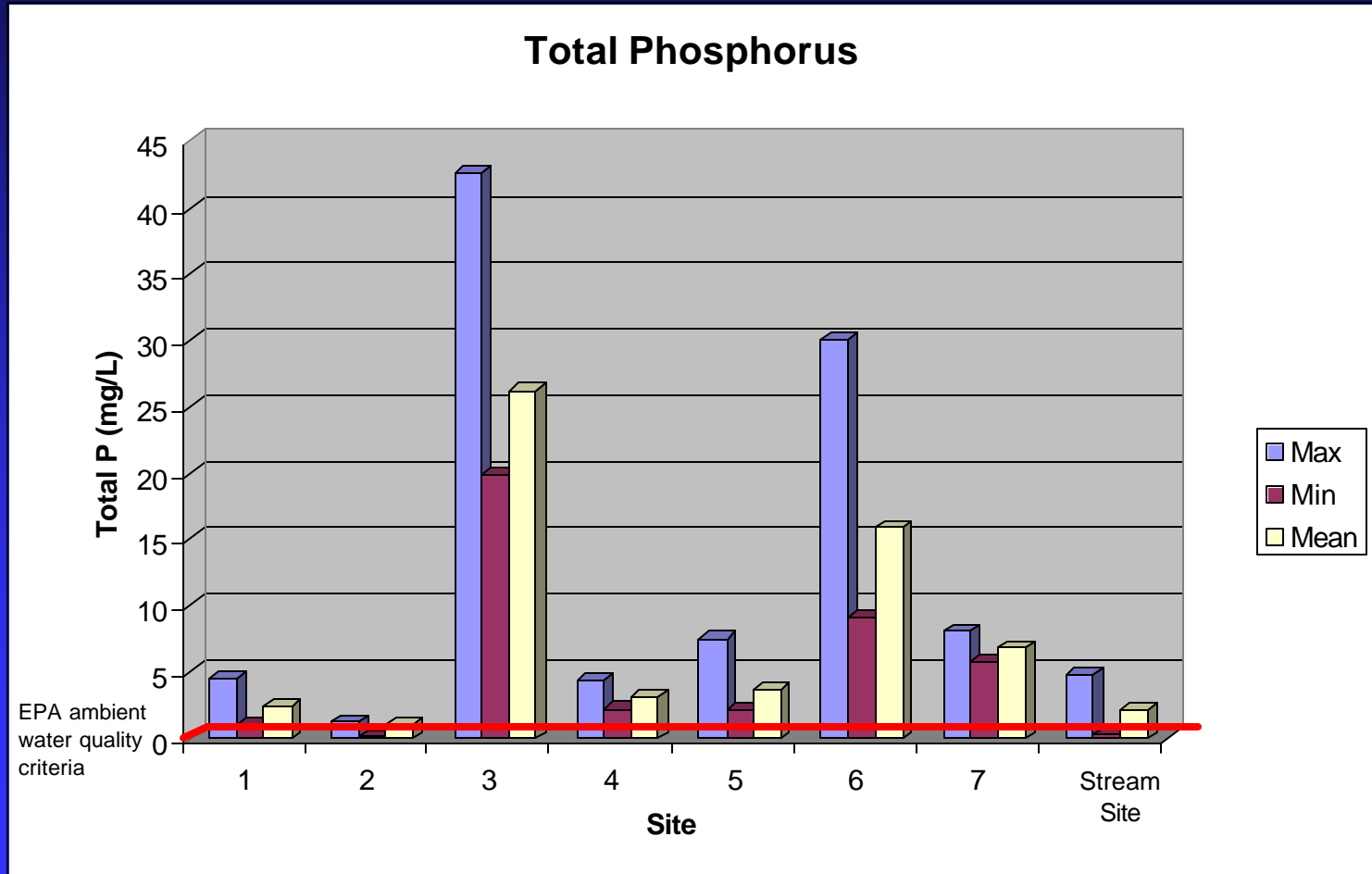


# Snowmelt 2-18-03

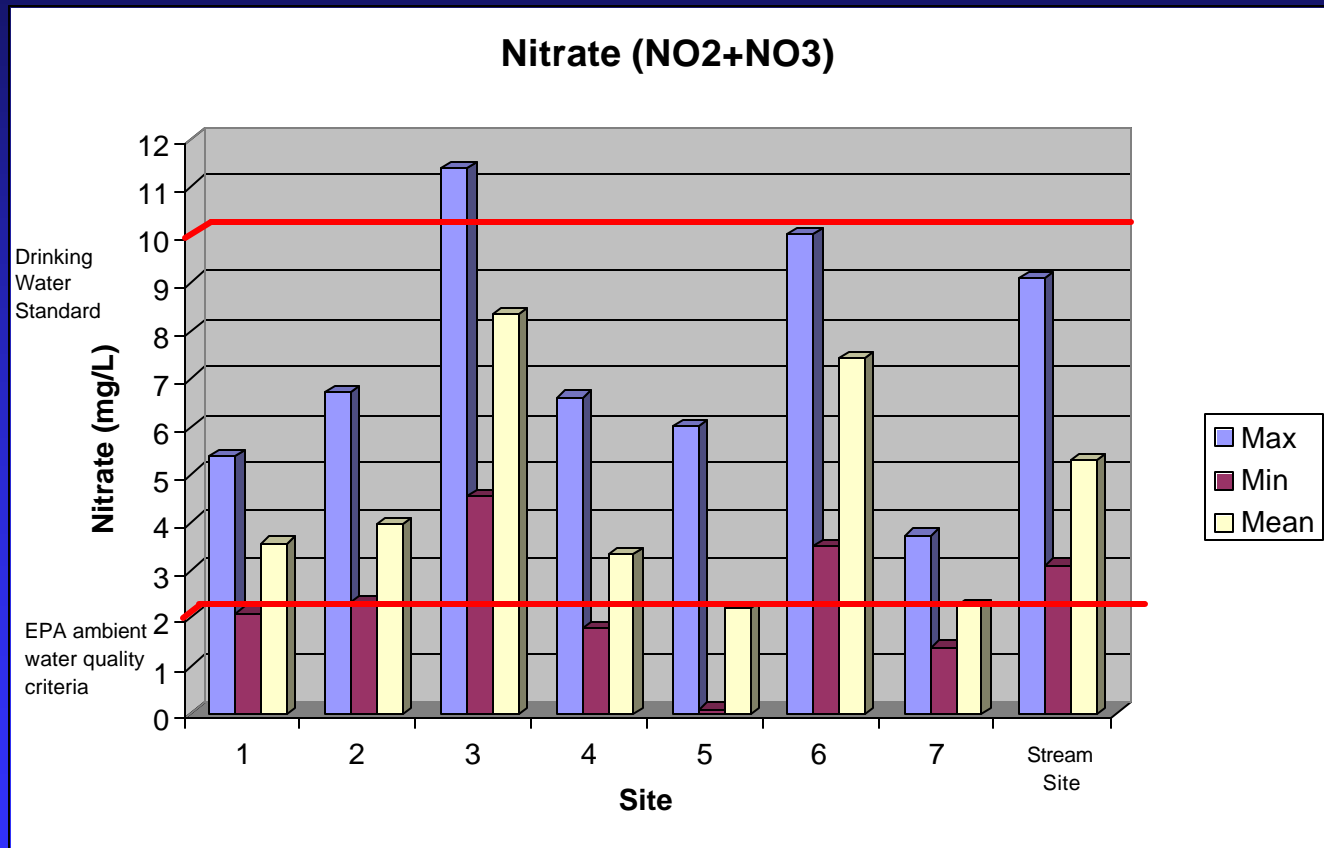


Manure applied to site 3 basin

# Preliminary Snowmelt Data: 2003 (all 3 events)



# Preliminary Snowmelt Data: 2003 (all 3 events)



# Composite 2002 Storm Runoff Data from all Sites

Note: does not include snowmelt data

Constituent (mg/L)	Max	Min	Average	Background	EPA
NO <sub>2</sub> +NO <sub>3</sub>	17	0.10	2	8	2.2
Dissolved P	4	0.01	1	0.02	n/a
Total P	14	0.03	3	0.08	0.076
Susp. Solids	9930	1.00	376	40	n/a

Background = typical low-flow concentrations  
in southwest Wisconsin streams (USGS Water Resources  
Investigations Report 85-4214)

EPA = Ambient Water Quality Criteria Recommendations:  
Rivers and Streams in Nutrient Ecoregion VI  
EPA 822-B-00-017 (2.2 mg/L is the total N criteria)





# Take Home Points

- Pioneer Farm is a bridge between science and policy.
- Gathering high quality data is time consuming, complicated and costly.
- Equipment selection is critical for research project flexibility and reliability.
- Collaboration is essential.
- Research must be timely and relevant.
- Serve a broad-based constituency.