New Science to Help Managers Prioritize Nutrient Reduction Actions

U.S. Geological Survey
National Water Quality Assessment
National Water Quality Assessment Program

Surface Water Status and Trends Regions

Northeast
Southeast
Upper Midwest
Lower Midwest
Missouri River
Pacific Northwest
Pacific Northwest
California
Northeast
Southeast
Lower Midwest

USGS
Integration of Monitoring Data with Information on Watershed Characteristics and Nutrient Sources
Monitoring Data Are Critical for Modeling

2,700 calibration sites with data from 73 agencies
Integration of Monitoring Data with Information on Watershed Characteristics and Nutrient Sources

(SPAtially Referenced Regression on Watershed Attributes)
Total Nitrogen Yields

[Map showing total nitrogen yields across the United States with color-coded regions indicating high and low yields.]
Largest Nitrogen Sources

EXPLANATION
- FOREST
- ATMOSPHERIC
- CROPLAND
- MANURE
- POINT SOURCE
- DEVELOPED LAND

USGS
Total Nitrogen Yields and Sources

Yields

Largest Sources

Legend:
- High
- Low

Colors:
- FOREST
- ATMOSPHERIC
- CROPLAND
- MANURE
- POINT SOURCE
- DEVELOPED LAND

USGS
New SPARROW Decision Support System
Amounts and Sources of Nitrogen to Streams in the Upper Mississippi/Great Lakes Basin

Point Sources
Amounts and Sources of Nitrogen to Streams in the Upper Mississippi/Great Lakes Basin

Atmosphere
Amounts and Sources of Nitrogen to Streams in the Upper Mississippi/Great Lakes Basin

Agricultural Fertilizers
Amounts and Sources of Nitrogen to Streams in the Upper Mississippi/Great Lakes Basin

All Sources

Point Sources

Atmosphere

Agricultural Fertilizers
Illinois River Basin

Total Nitrogen Yields to local streams
Illinois River Basin—Total Nitrogen Yields
Which sources are contributing the largest amounts of nitrogen? – Location Matters

- **Illinois River**
  - Point Sources
  - Atmosphere
  - Ag Fertilizers

- **Des Plaines River**
  - Point Sources
  - Atmosphere

- **Kankakee River**
  - Point Sources
  - Atmosphere
  - Ag Fertilizers

Map showing the contributions of different sources to nitrogen levels in various rivers.
Illinois River Basin

Conclusion for Scenario 1 – Reducing individual source inputs by 25% provides at most 10% reduction in load at the outlet.

Conclusion for Scenario 2 – Reducing multiple sources by 25% provides more significant (18%) reduction in load at the outlet.
How can this information be used?

* Prioritize Areas for Nutrient Reduction

* Identify Important Sources of Nutrients

* Test Long-Term Benefits of Reductions