



---

# USGS Water Quality Programs and the Water Quality Monitoring Framework

## CONTACTS:

Tim Miller  
[tmliller@usgs.gov](mailto:tmliller@usgs.gov)  
(703) 648-6868

Herb Buxton  
[hbuxton@usgs.gov](mailto:hbuxton@usgs.gov)  
(609) 771-3944

# Monitoring Objectives and Support

---

- Monitoring: Determination of Status and Trends of water quality conditions at regional and national scales (data-collection intensive).
- Assessment: Understanding Water-Quality Conditions by connecting monitoring data to land activities and natural conditions (ancillary data provides the context and causal factors).
- Research & Development: Evaluates New Issues and Develops New Methods, Tools and Capabilities (keeps monitoring activities evolving to remain useful).

## Develop Monitoring Objectives:

In the Mississippi River Basin, where do nutrients originate, and how do they move to the Gulf of Mexico, influencing hypoxia?

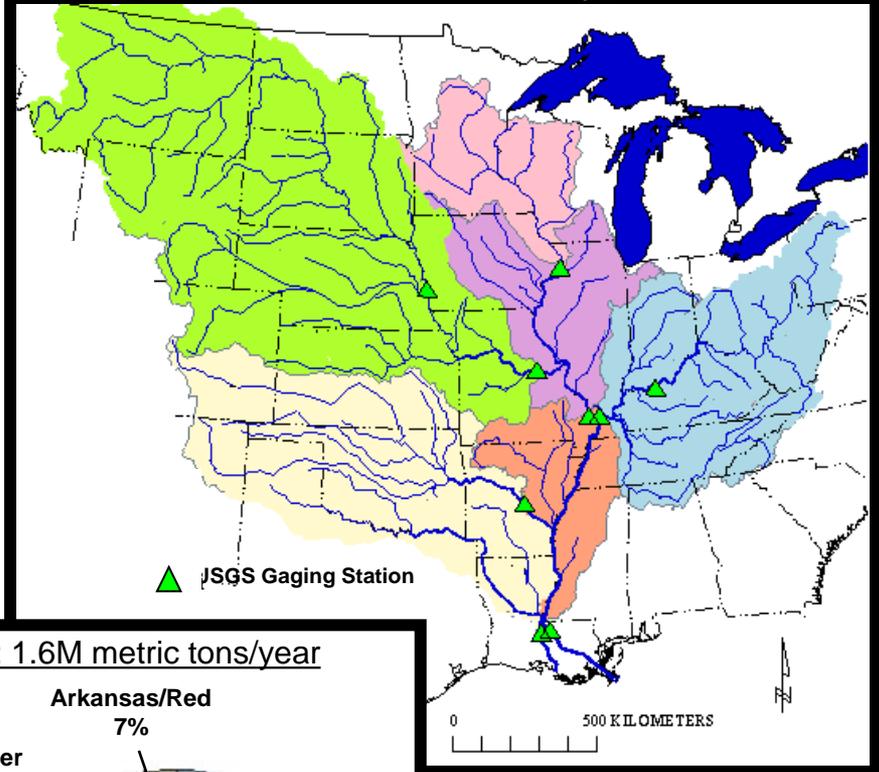
---

## Design Monitoring Program:

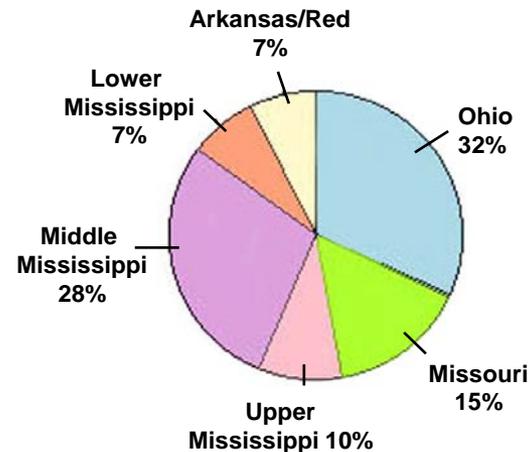
National Stream Quality Accounting Network (NASQAN)

- Nutrients to the Gulf are key for understanding hypoxia.
- Long-term periodic sampling at key large river tributaries to determine annual loads.
- Managers use the data for nutrient reduction strategies.

## Nutrient Sources & Loads Contributing to Gulf of Mexico Hypoxia.



N Load: 1.6M metric tons/year



# Collect Field and Laboratory Data

- USGS methods and protocols are available on the internet.
- Laboratory methods are being added to the NEMI for use by all organizations
- Training courses are available to other cooperating agencies
- Coordination is done at local and national levels.



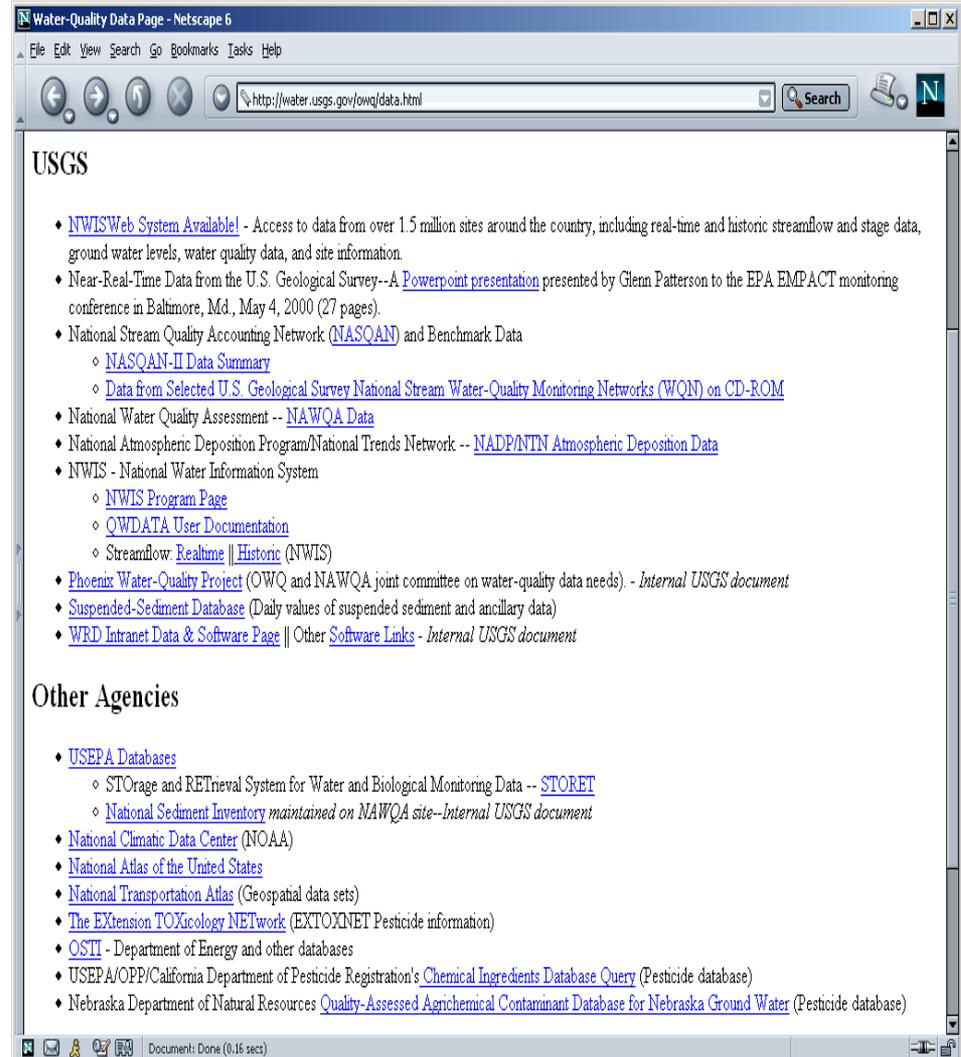
# USGS Infrastructure Supports Field and Lab Data, also Compiling and Managing Data

---

- National protocols to collect samples for trace analysis, provides environmental information other organizations typically do not have.
- A National team of professional field technicians collect samples for many organizations reducing duplication and ensuring consistent data collection.
- Laboratory methods measuring trace levels with supporting quality assurance, demonstrates the quality of analytical data.
- Regional and National-scale monitoring networks provide perspectives not duplicated by the states or other federal agencies.
- Long-term field research sites develop new tools applied to monitoring efforts of the future.
- The National Water Information System (NWIS) contains comparable data from across the nation, and has full public access.

# USGS Provides Data and Links on the Internet

- Data for more than 1.4 million sites available from USGS.
- More than 63 million analytical results using consistent methods.
- Data quality verified before public release.
- Meta data developed using the Water Quality Data Elements (WQDE) thru the National Monitoring Council.

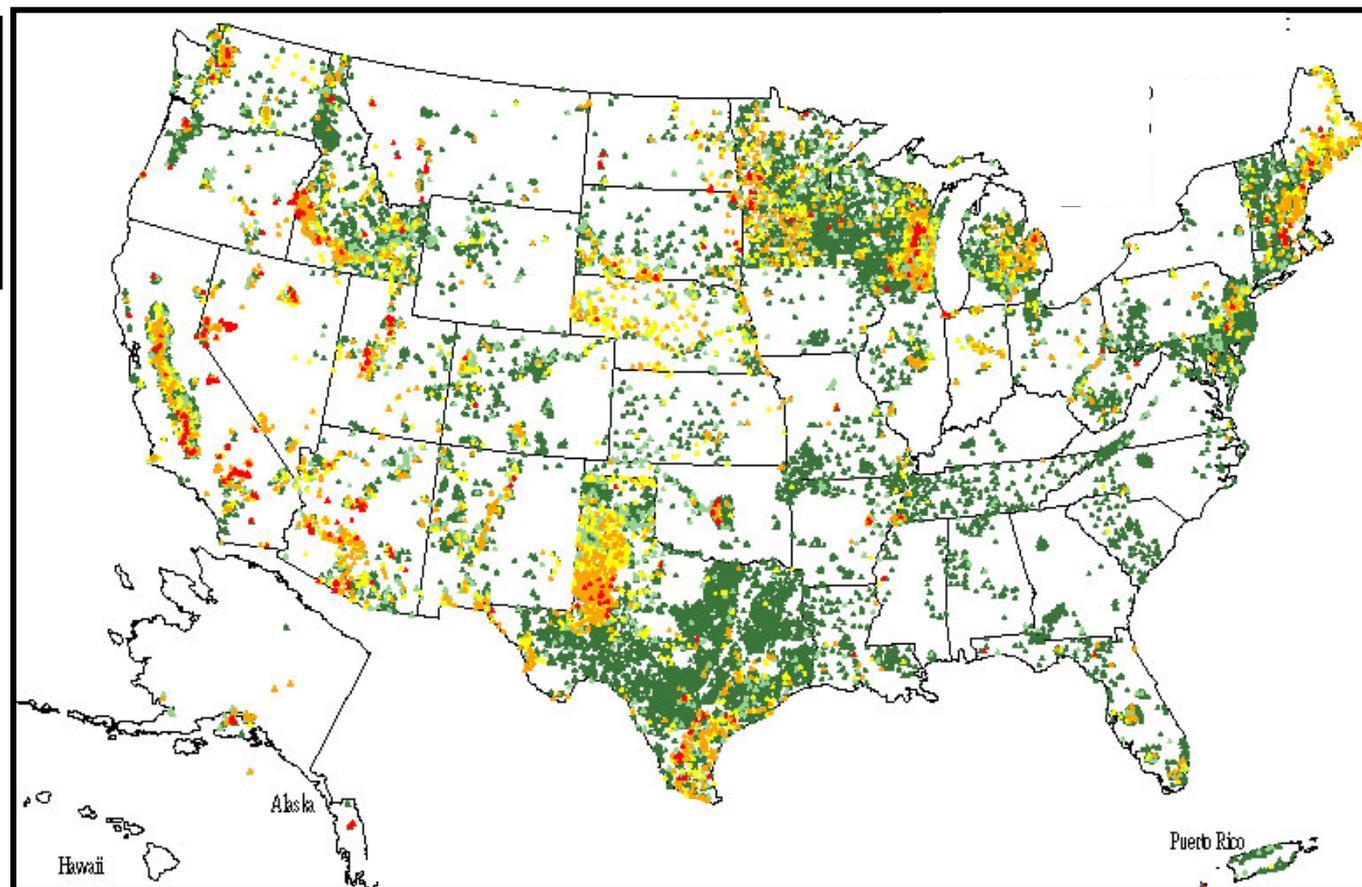


# Assess and Interpret Data: Arsenic in Ground Water—Mining the USGS NWIS Database

---

<u>Well Summary</u>	
USGS	20,000
States	10,000
Total	30,000

<u>Conc. <math>\mu\text{g/L}</math></u>	
	> 50
	10-50
	5-10
	3-5
	1-3

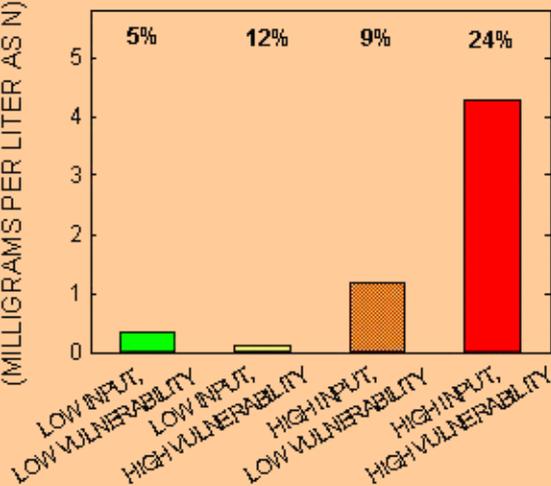




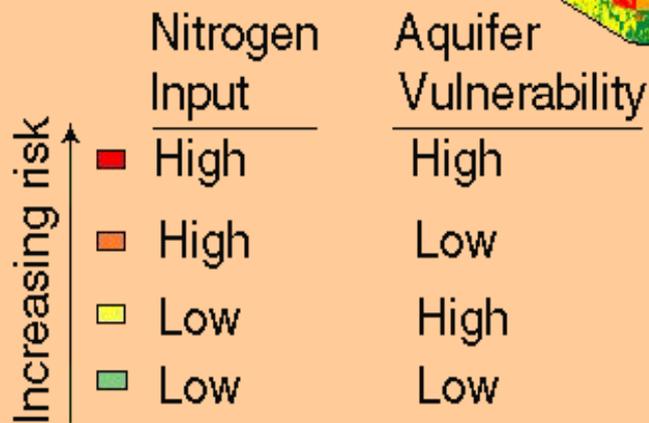
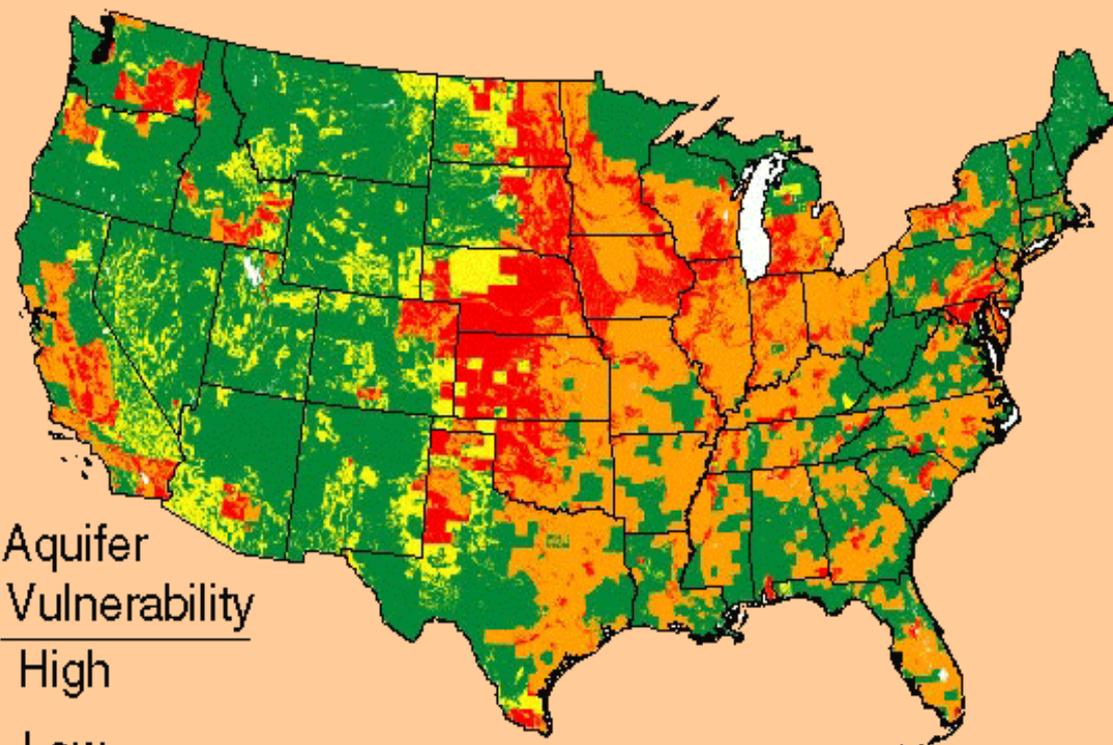
# NAWQA—Assessing Data Water Quality & Management Relevance

PERCENT OF WELLS EXCEEDING DRINKING-WATER STANDARD:

MEDIAN NITRATE CONCENTRATION (MILLIGRAMS PER LITER AS N)

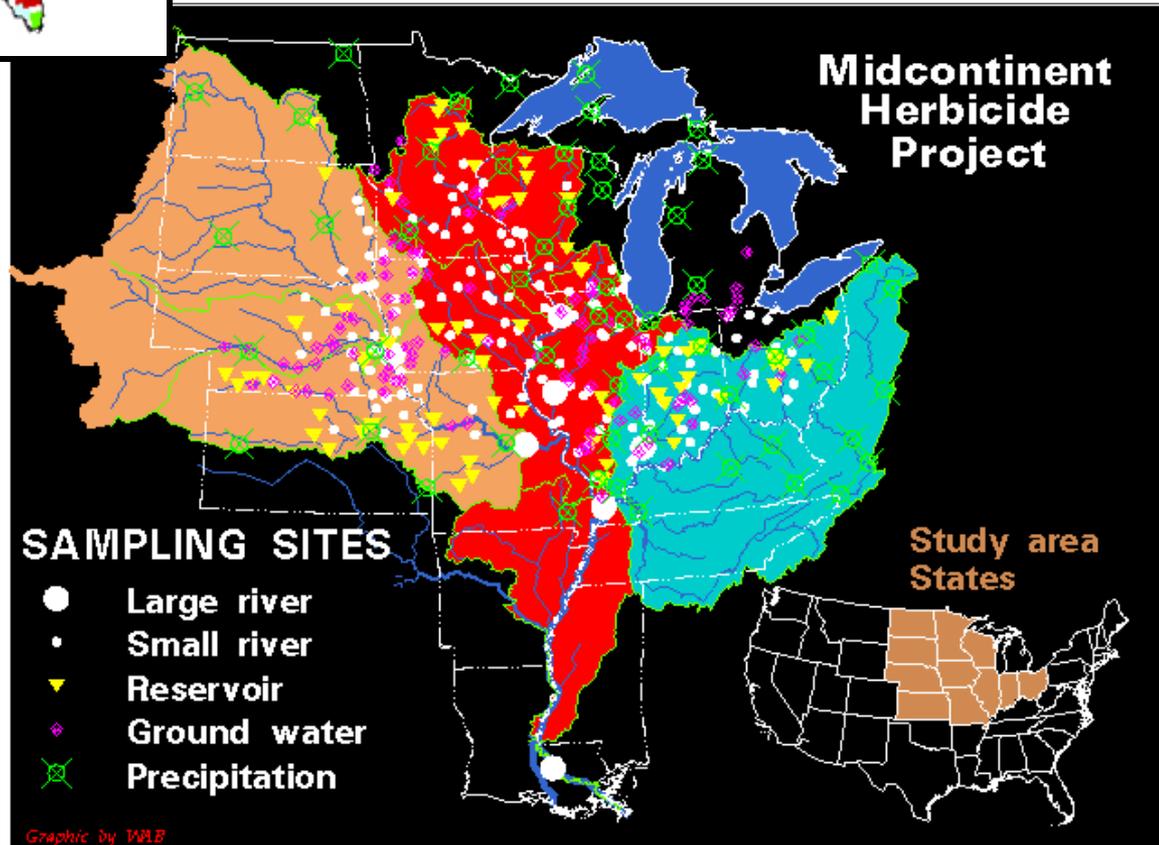
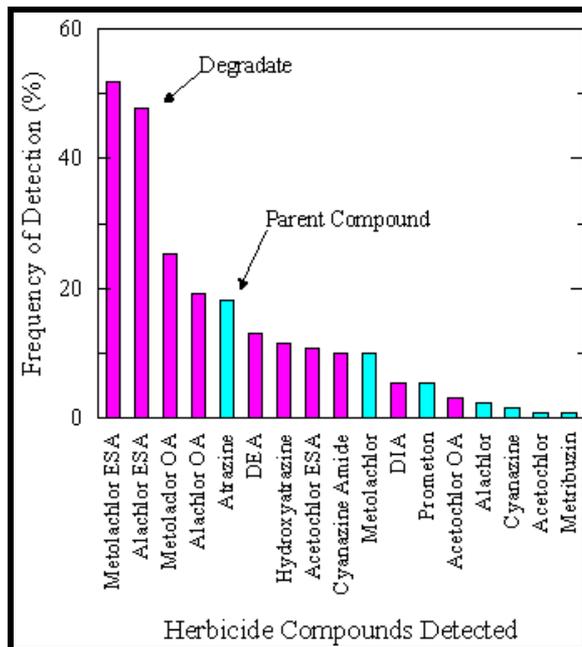
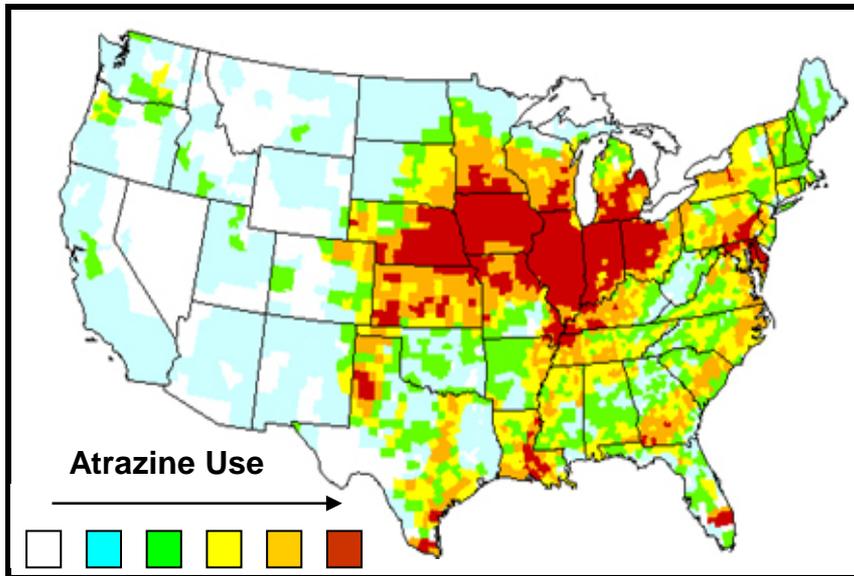


INCREASING RISK OF GROUND-WATER CONTAMINATION



# Toxic Substances Hydrology Program (TOXICS)

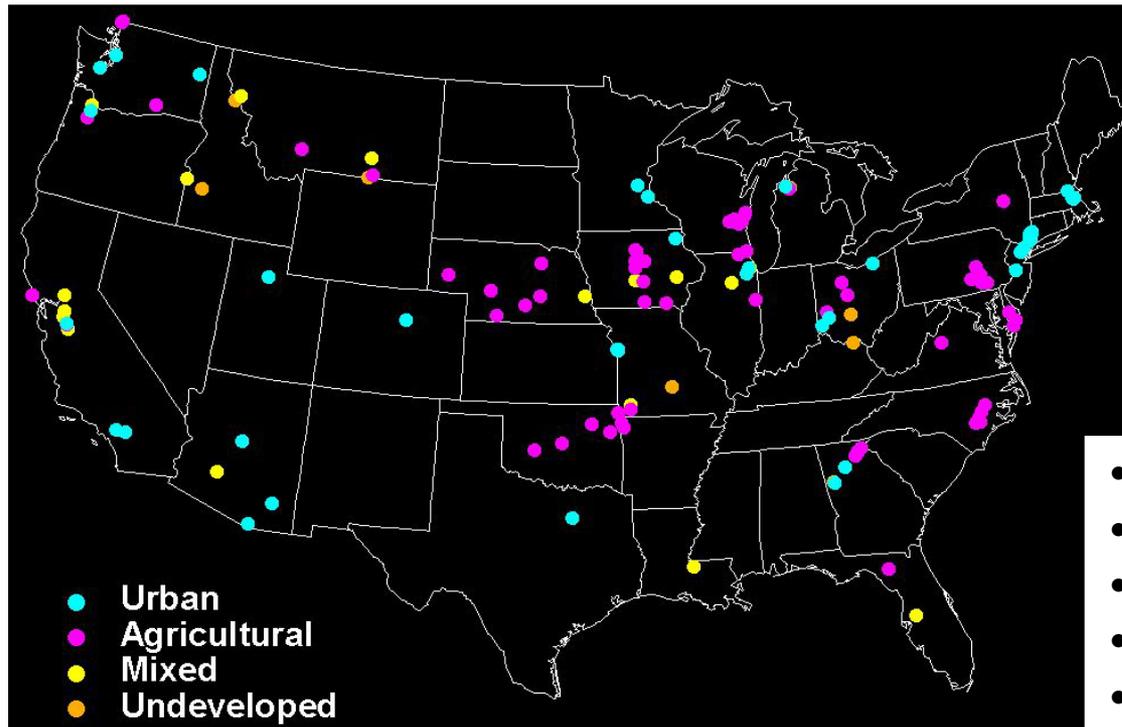
## Management Relevance—Pesticide Regulation by USEPA



# Convey Findings—Professional publications, news releases, interested party review

---

Pharmaceutically and hormonally active compounds in streams.



TOXICS Program  
Most frequently cited paper  
in ES&T 2002

- Developing new analytical methods for water samples.
- Evaluating if these compounds enter streams across the Nation.
- Information is used to improve future monitoring and assessment activities.

- Antibiotics
- Human Drugs
- Veterinary Drugs
- Hormones
- Detergents
- Plastics
- Antioxidants
- Fire retardants
- Disinfectants
- Fumigants
- Fragrances
- Insecticides/Repellants

## Collaborate Communicate & Coordinate

---

- Participate in and funding for National Water Quality Monitoring Council (Methods Board, WQDE, NEMI), and USGS has co-sponsored the biannual NWQMC Conference for 5 years.
- NAWQA has over 50 liaison committees, involving more than 1000 organizations and individuals.
- Through the Federal Cooperative Program, USGS collaborates with more than 1400 agencies, providing consistent methods and data, and eliminating potential duplication of efforts.