

# Nutrients: A National Overview

## Need for Strong Partnerships & Joint Accountability

### The Problem.....



### Nutrient Summit

Springfield, Illinois - September 13, 2010

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US Environmental Protection Agency

# Outline

- **Overview of the Problem**
- **Nutrient Impacts**
- **N & P Sources**
- **Nutrient Innovation Task Group Analysis**
- **Growing Pressure & Stakeholder Demands**
- **Looking Forward**



# Science and Analysis to Date

- **National Oceanic and Atmospheric Administration**
  - Effects of Nutrient Enrichment in the Nation's Estuaries (Bricker et al 2007)
- **National Research Council**
  - Mississippi River Water Quality – Challenges & Opportunities (NRC 2008)
  - Urban Stormwater Management (NRC 2008)
- **EPA Science Advisory Board**
  - Reactive Nitrogen in the United States (USEPA 2009)
  - Hypoxia in the Northern Gulf of Mexico (USEPA 2007)
- **USEPA**
  - National Coastal Condition Report III ((USEPA 2008)
  - Wadeable Streams Assessment (USEPA 2006)
- **Nutrients Innovations Task Group Report (2009)**
- **Numerous Articles, State Reports, and University Studies**

# **National & State Efforts to Date**

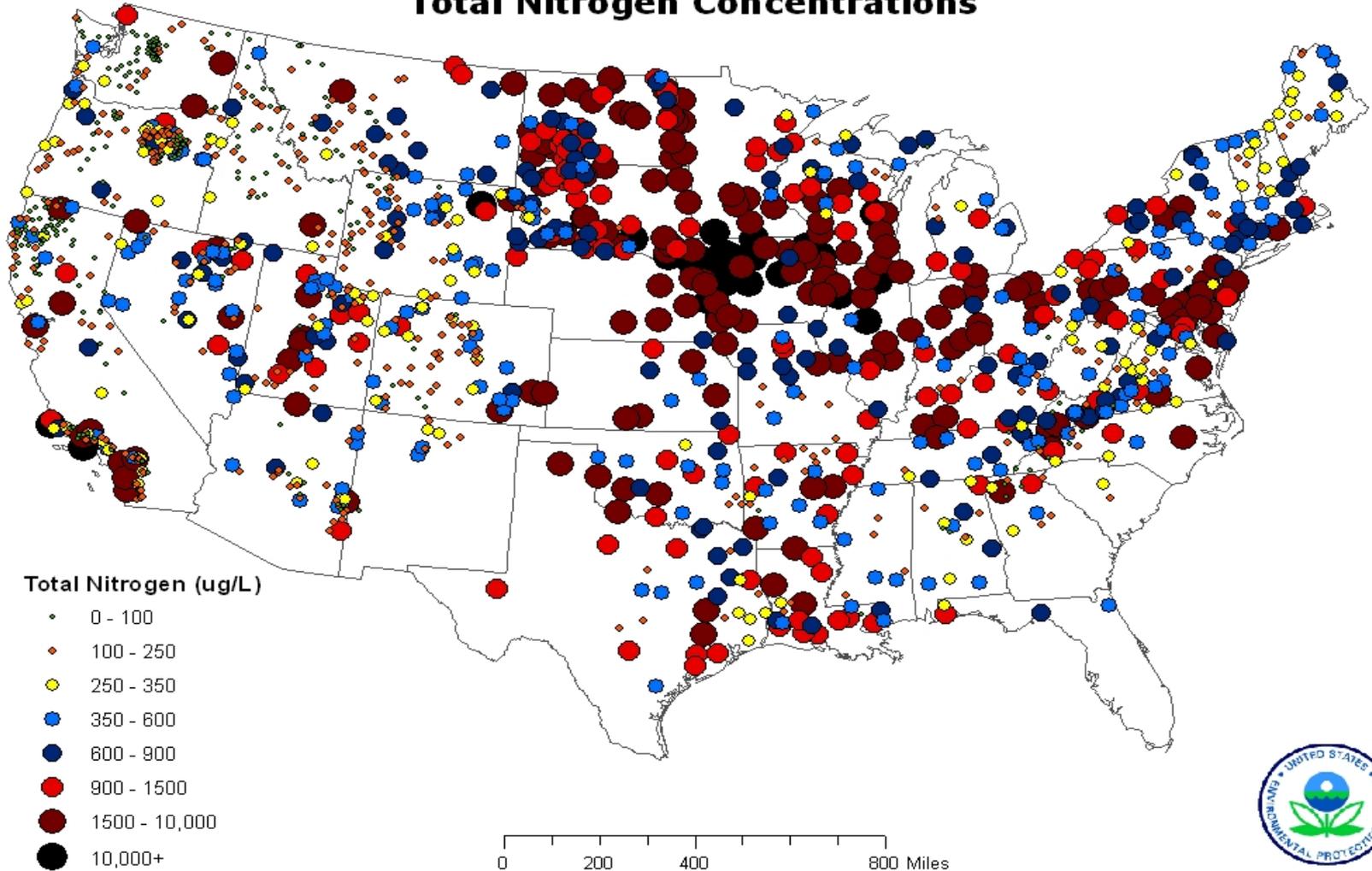
- **Investment in Research and Science**
- **Commitment to Development of Guidance, Technical Asst. and Information Transfer**
- **Number of State and Local BMP Pilots and Technology Demonstration Projects**
- **Continued State Innovation, Testing, and Exploration of Incentive, Cost-share, Limit of Technology, Trading, and Collaborative Approaches**
- **State Oversight and Regulatory Models**

# National Scope of Nutrient Problem

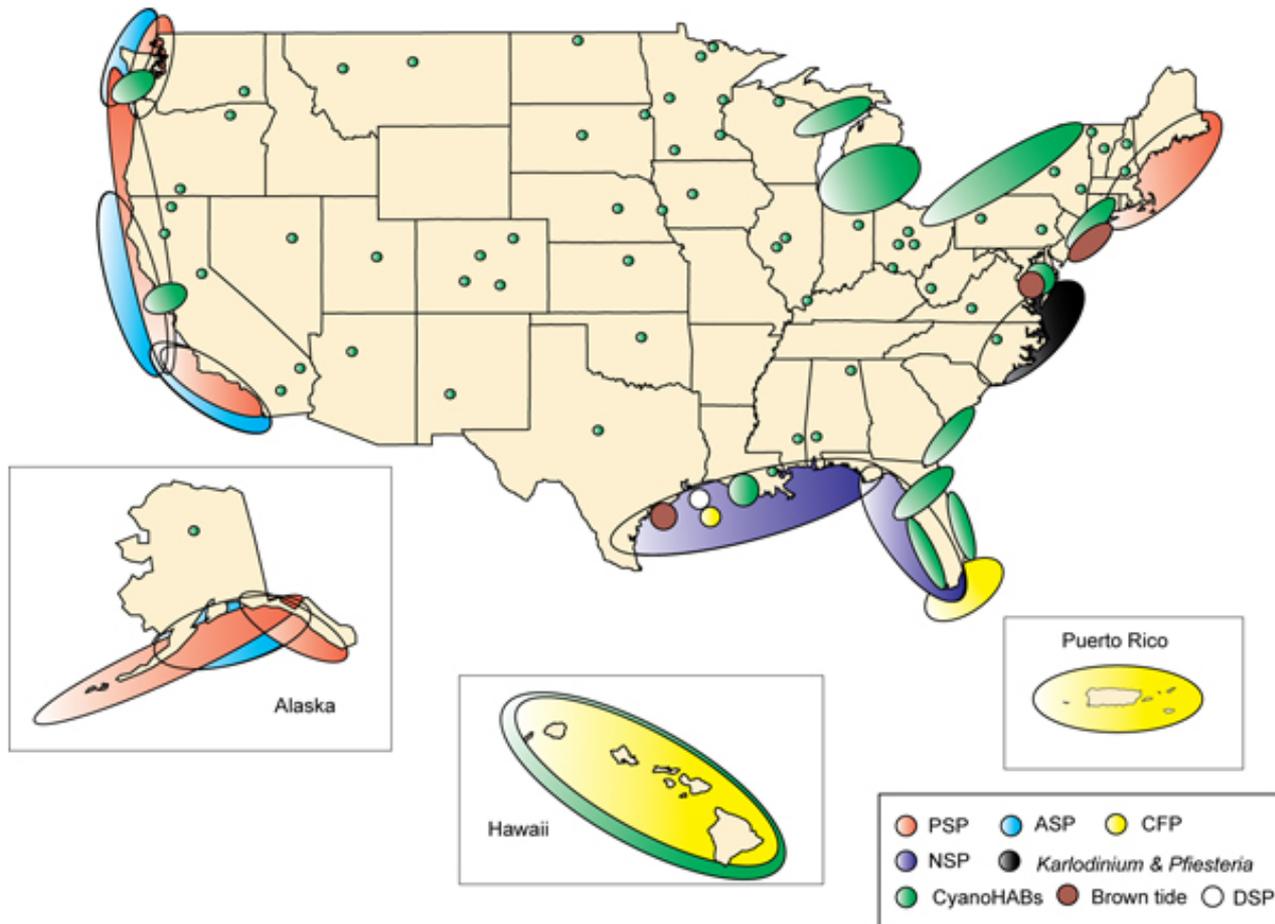
- **14,000 Nutrient-related Impairment Listings in 49 States**
  - 2.5 Million Acres of Lakes and Reservoirs
  - 80,000 Miles of Rivers and Streams
  - And This is an Underestimate . . .
- **Over 47% of Streams Have Medium to High Levels of Phosphorus and Over 53% Have Medium to High Levels of Nitrogen**
- **78% of Assessed Continental U.S. Coastal Waters Exhibit Eutrophication**

# Concentrations of Nitrogen Nationally

**WSA Survey Results:  
Total Nitrogen Concentrations**



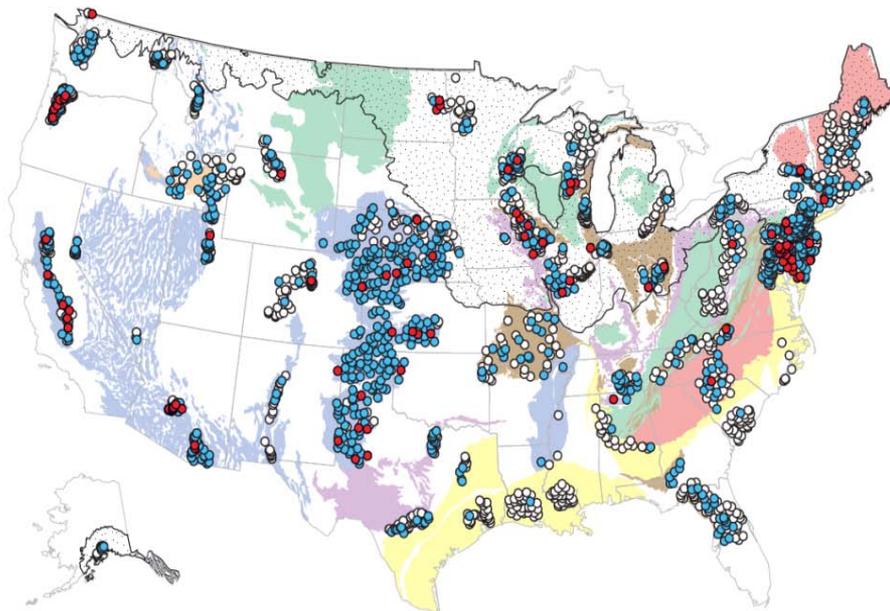
# Algal Bloom Occurrences in the United States (WHOI 2007).



# National Drinking Water Impacts

## ▶ Public Health Risks:

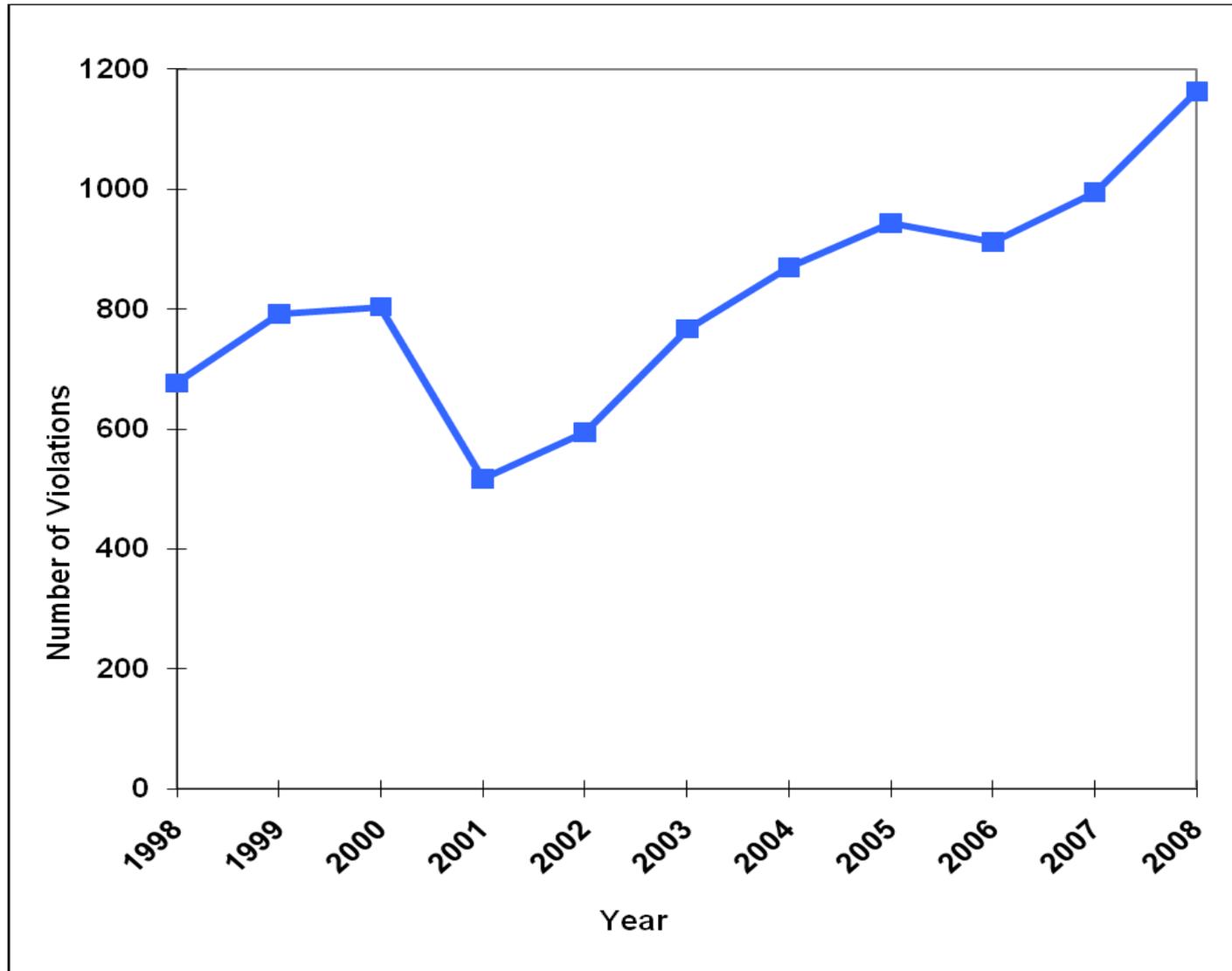
- Disinfectant by-products; significant & costly
- Contaminated drinking water supplies
- Rate of nitrate violations in community water systems has doubled over past 7 years
- Harmful algal blooms
- Increased treatment costs



(MCL of 10 mg/l exceeded as N in 4.4 percent of the wells)

- Large Systems
- Small Systems
- Private Wells

# Community Water System (CWS) Drinking Water Nitrate Violations



# National Population Growth

- **Nutrient Impacts Reflect Doubling of U.S. Population Over Past 50 Years**
- **Additional 135 Million People by 2050**
- **Nutrient Pollution Expected to Accelerate**

Year	U.S. Population
1950	152 million
2008	304 million
2050	439 million

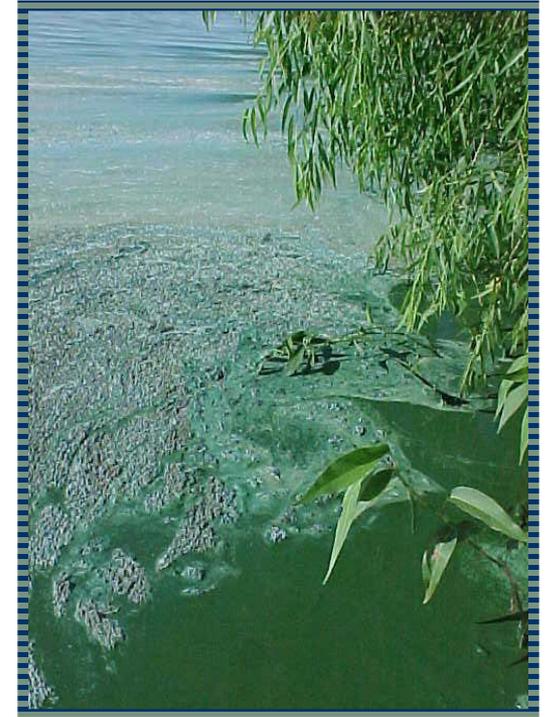
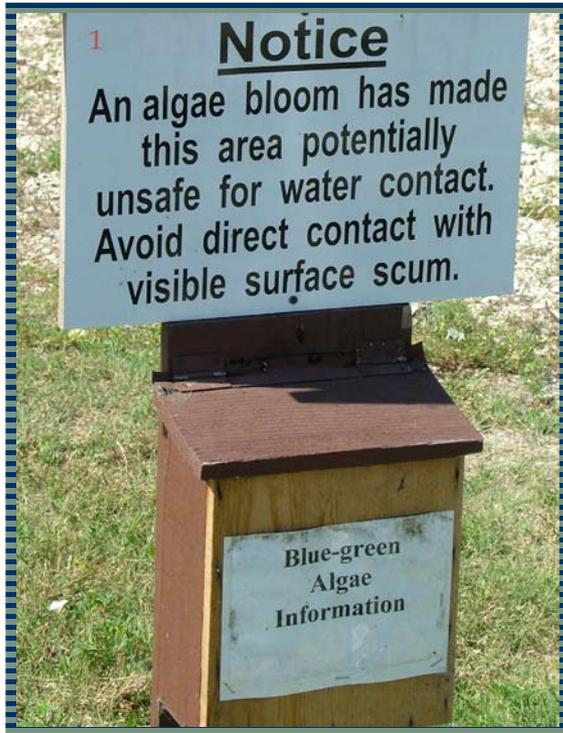
# *Microcystis* bloom - August 2003



★ Toledo Water Intake



# Impaired Reservoirs – Examples



# Impaired Streams – Examples



# Wisconsin DNR



# Impacts on Downstream Waters



*Microcystis* Bloom – Goodby's Creek at the St. Johns River, Jacksonville, FL – September 14, 2005

# Sources of Nutrient Pollution

- **Urban Stormwater**
  - 80% of U.S. Population on 10% of Land
  - 50% of Urban Areas Will be Redeveloped by 2030
  - 30% of Additional Needed Housing Stock Not Yet Built
  - Expected to Grow Dramatically With Increased Urbanization
- **Municipal Wastewater Treatment**
  - Among Most Heavily Regulated Sectors
  - Treat over 18 million tons of human solids annually
  - About 4% with numeric limits for N and 10% for P
- **Air Deposition**
  - Approx 20% of Nitrogen Loadings in Chesapeake and Gulf

# Sources of Nutrient Pollution

- **Livestock Production Activities**

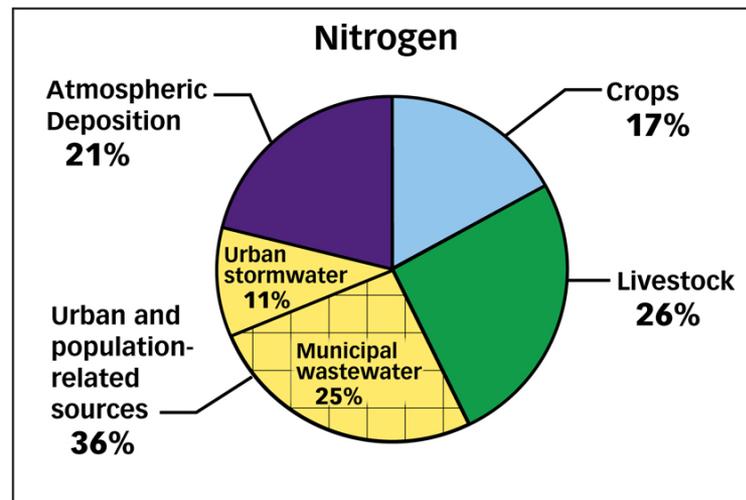
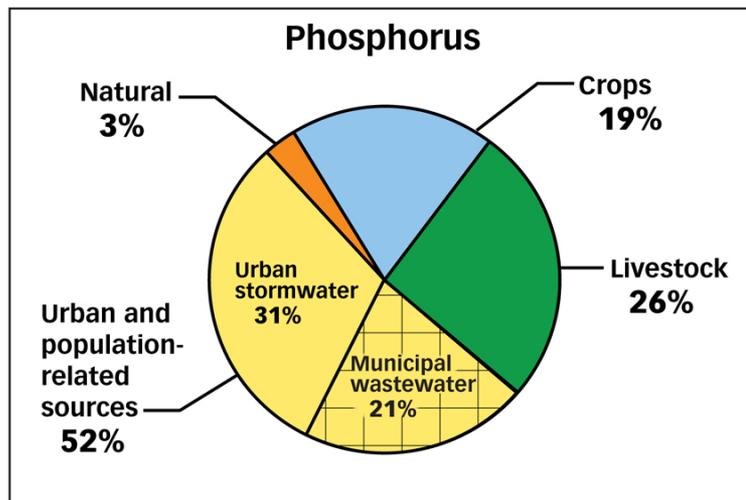
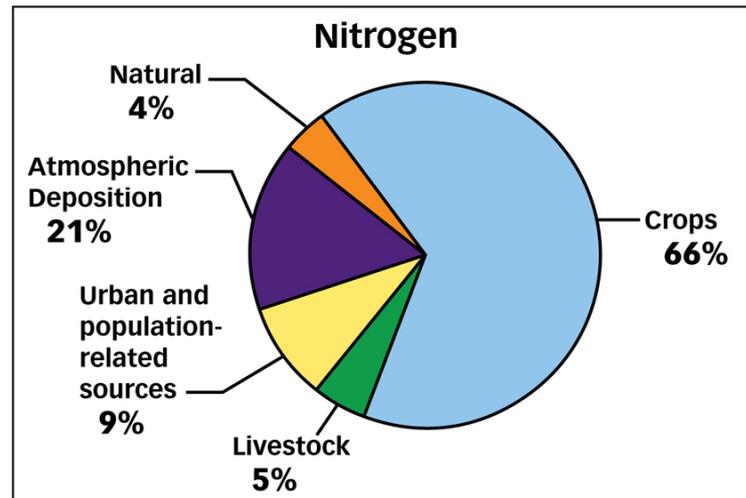
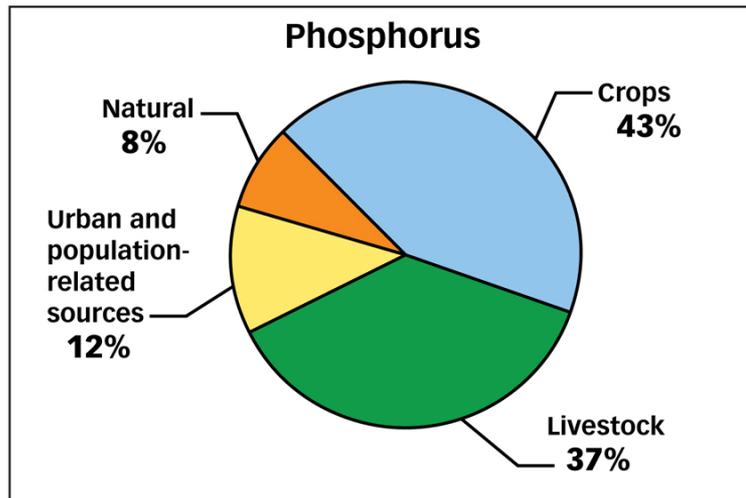
- \$130 billion industry for farmers
- 1 billion tons of manure annually
- Substantial portion not covered by CAFO rule

- **Agricultural Row Crops**

- \$120 billion industry for farmers
- Inefficient fertilizer utilization – about 30% of applied N
- Stormwater runoff and irrigation return flows exempt under CWA with highly variable controls at State levels

# Relative Nutrient Source Contributions

## Gulf of Mexico

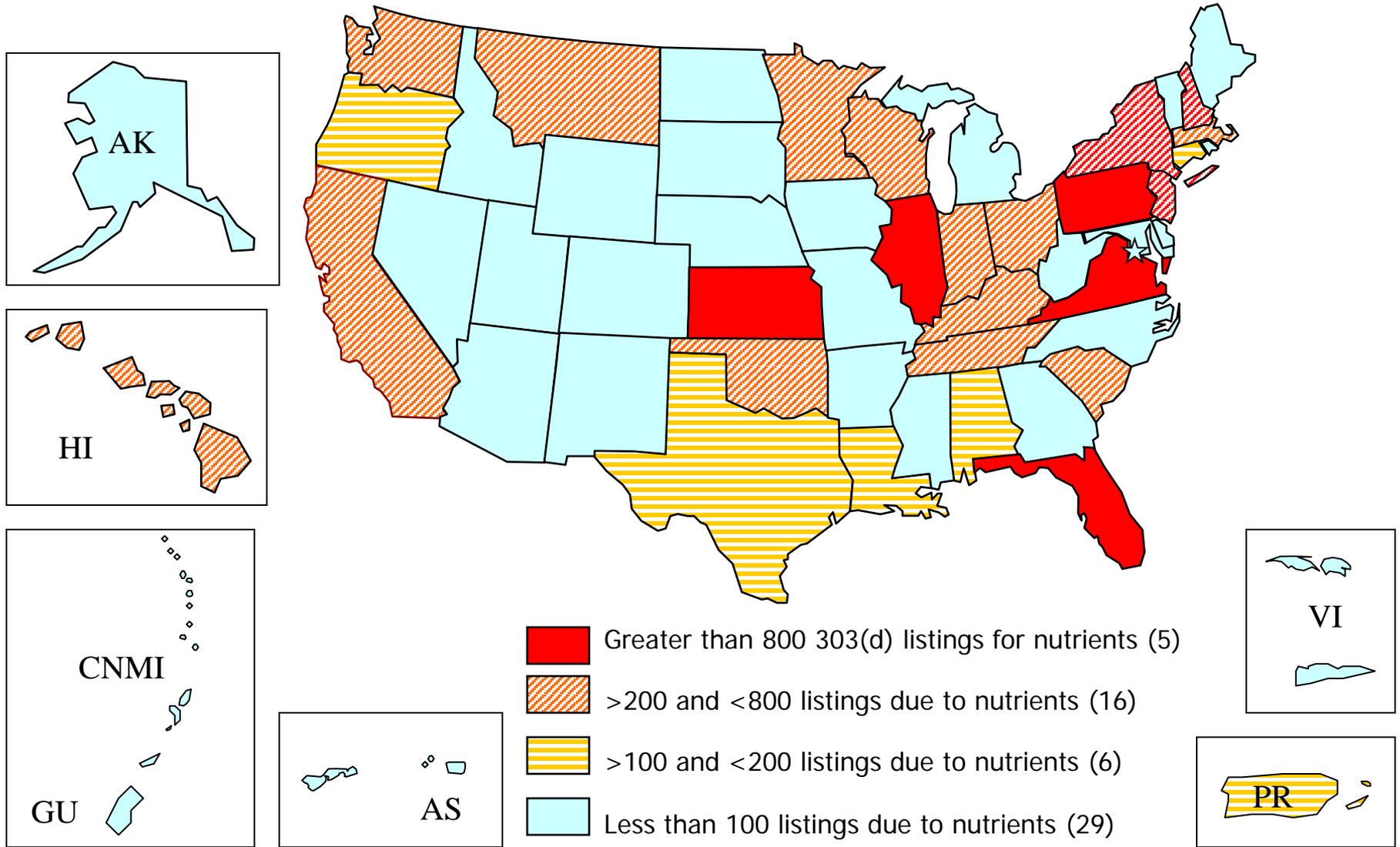


## Chesapeake Bay

# Tools and Authorities

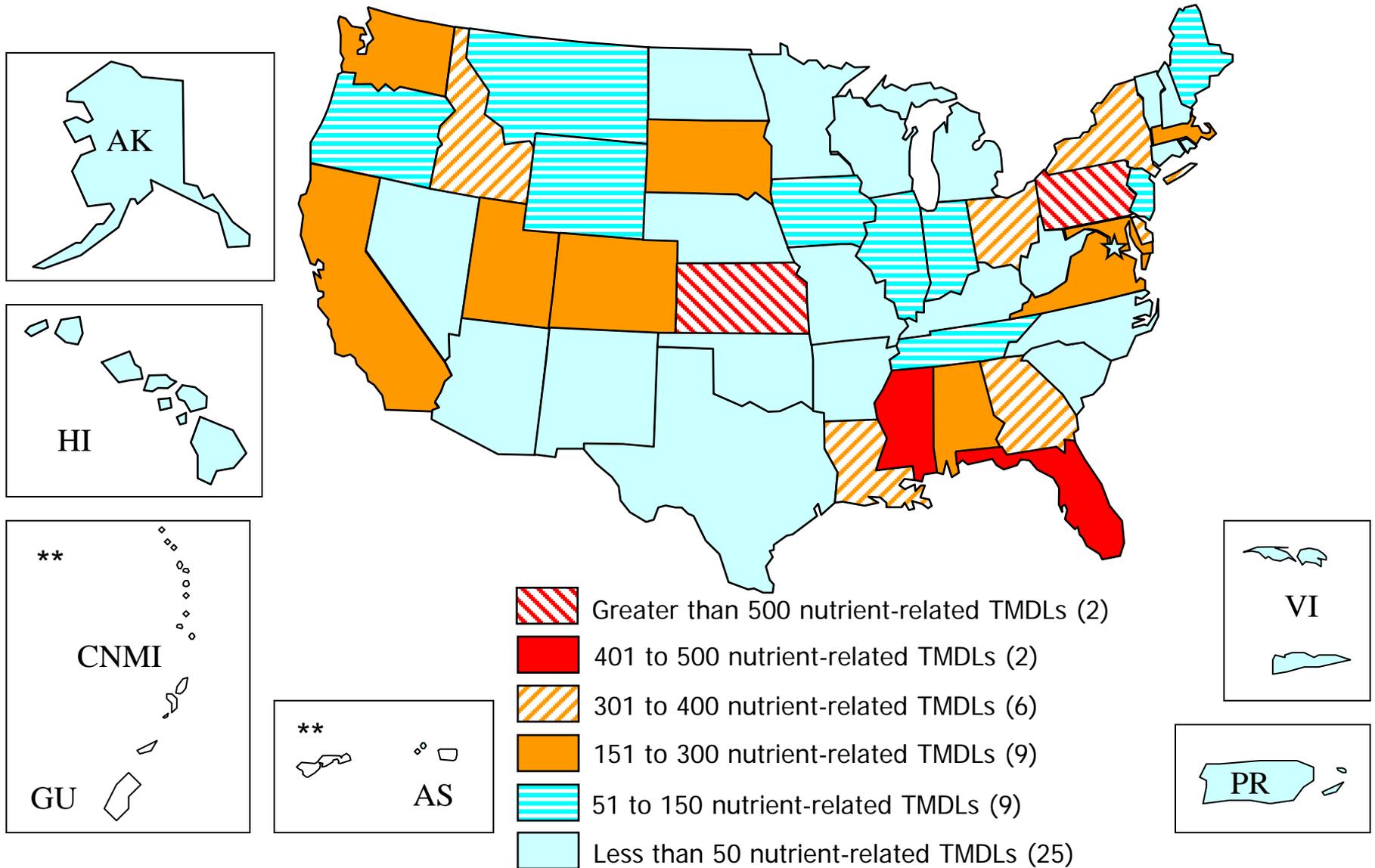
- **Incentives: voluntary agreements, corporate stewardship, trading**
- **Non-regulatory: volunteer monitoring, nutrient load reduction strategies, tracking of implementation plans**
- **Existing & Alternative Regulatory: point source caps, NPDES & WQS regulations, NPS regulations**
- **Legislative: Federal & State**

# States' 303(d) Listed Water Quality 'Nutrient-related' Impairments are inconsistent (e.g., see MRB mainstem)



Based on the most recent available information in Expert Query (ATTAINS).

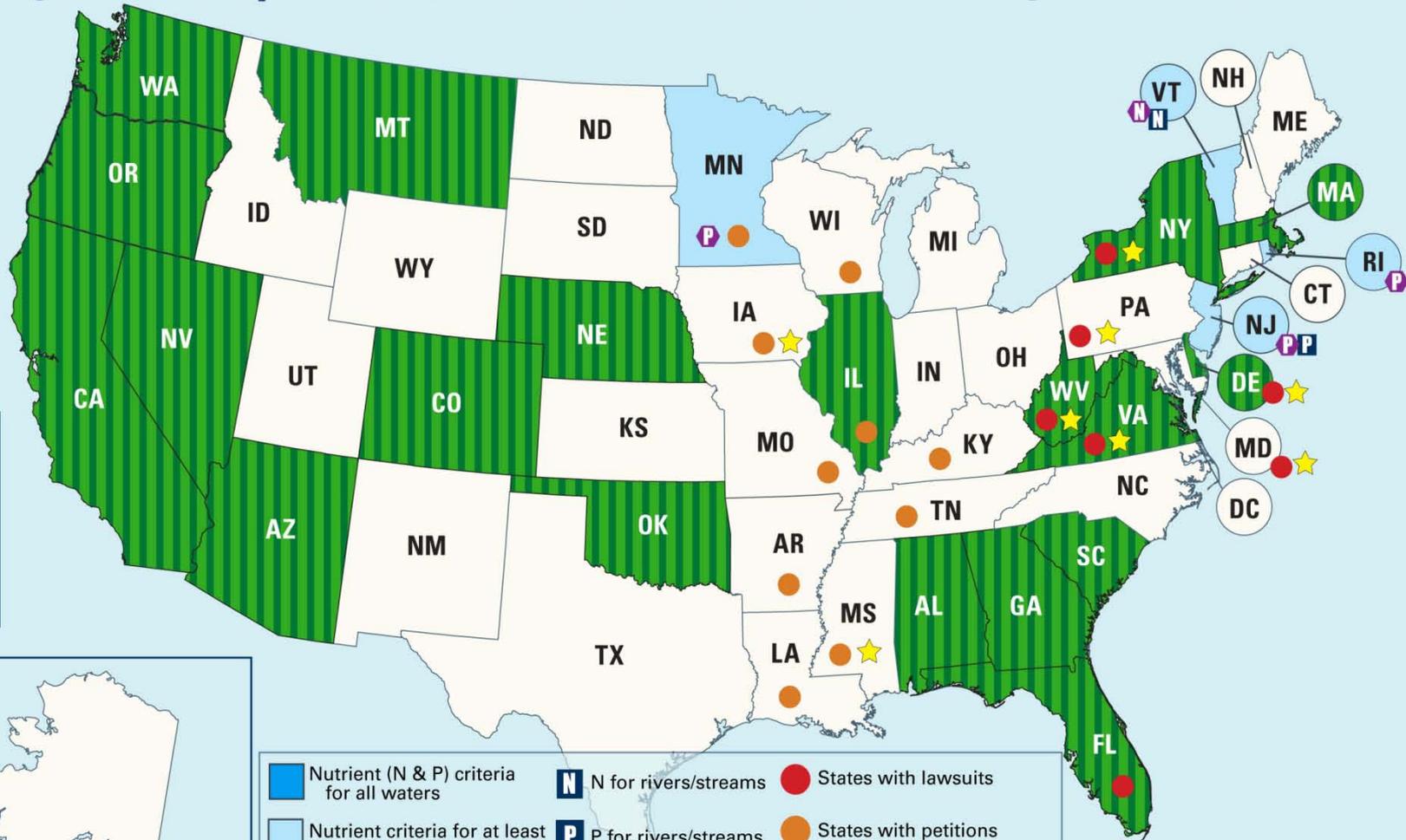
# The number of Nutrient-related' TMDLs completed is very inconsistent from state to state



Based on information in Expert Query (ATTAINS) as of 01/14/2010. 7,261 TMDLs were nutrient-related. Nutrient-related is defined as 'nutrients, organic enrichment/oxygen depletion, noxious plants, algal growth, and ammonia'. \*\* CNMI, GU, and AS have no nutrient-related TMDLs

# Progress Toward State Development of Numeric Nutrient Criteria

*including lawsuits, petitions, and alternative accountability frameworks*



Nutrient (N & P) criteria for all waters	N for rivers/streams	States with lawsuits
Nutrient criteria for at least one type of waterbody	P for rivers/streams	States with petitions
Some site-specific criteria	N for lakes	States pursuing alternative accountability frameworks
No nutrient criteria	P for lakes	

# Tools and Authorities

Partially Utilized	Under Utilized
NPDES	Urban Stormwater Controls
Numeric Nutrient Criteria	Technology-based Requirements
303 Assessments & listings	CZARA section 6217 Implementation Reqs
TMDLs	Limits on Discharges to Impaired Waters
Livestock	Antidegradation

# Key NITG Findings

- Knowledge, Collaboration, and Incentives Will Fail Absent Joint Accountability
- Current CWA Tools Underused; Additional Tools Rarely Used
- Current Regs Disproportionately Address Certain Sources to the Exclusion of Others
- Parts of State Nonpoint Source Programs Highly Successful, But Broader Application Undercut by Absence of a Common Multi-State Framework of Mandatory Point and Nonpoint Source Accountability

# Call to Action

- **Joint Accountability**
  - All Major Sources of Nutrients Must be Held Accountable for their Contribution to the Problem
- **Fuller Use of Existing Tools**
  - Supporting and Requiring a More Consistent and Full Use of Existing Tools from State to State and Source to Source is Essential
- **Profound Change**
  - Succeeding Against the Challenge of Nutrient Pollution Will Require a Profound Change in **How We Partner** and **How We Share Accountability** Between Sources, Within Watersheds, and Across State Lines
- **National & State Leadership**

# Larger Context:

## Litigation, Petitions, and Environmental Reports

- **NRDC Secondary Treatment Petition – Nov. 2007**
- **Mississippi River Watershed Petition – July 2008**
  - **EPA Numeric Standards for MN, WI, IL, IA, MO, AR, KY, TN, MS, LA**
  - **Sierra Club Petition in Support – 40,000 Signatures**
- **Florida Wildlife Federation's Lawsuit - July 2008**
- **PA TMDL Nutrients Litigation – Summer 2009**
- **Wisconsin Notice of Intent to Sue – November 2009**
- **Kansas Notice of Intent to Sue – Spring 2010**
- **Missouri Notice of Intent to Sue – Summer 2010**
- **Possible LA Litigation to Force Listing of Coastal Waters**
- **EPA I.G. Numeric Nutrient Standards Report (August 2009)**

# Progress in 2009/2010

- **Chesapeake Bay Executive Order**
  - Draft TMDL – August 2010
  - Final Chesapeake Bay Strategy Spring 2010
  - Stronger Federal Partnerships
- **Florida**
  - Determination – January 2009
  - Final inland flowing water standards – Fall 2010
  - Final coastal waters and estuarine standards - August 2012
- **Water Quality Standards Program**
  - State-EPA Nutrients Innovation Task Group Report – August 2009
  - IG State Numeric Standards Report – August 2009
  - Ongoing Support for State Numeric Nutrient Standards
  - Partnering with Stakeholders to Develop Accountability Frameworks
- **Rulemakings**
  - CAFO regulatory revisions initiated
  - Post-Construction proposal begun with ICRs and listening sessions
- **Guidance**
  - Final POTW Nutrient Treatment Effectiveness Manual – Winter 2009
  - Chesapeake Bay 502 Non Point Source BMPs – Summer 2010

# Looking Ahead – Key Priorities

- **Nutrient Accountability Frameworks**
- **State Numeric Nutrient Standards**
- **Drinking Water Risks and Economic Impacts**
- **Stronger State & Federal Partnerships to Engage a Broad Set of Stakeholders and Secure Greater Results**
- **Broader EPA–USDA Coordination**
- **Continued Commitment to Science**

**For More Information:**

[www.epa.gov/waterscience/criteria/nutrient](http://www.epa.gov/waterscience/criteria/nutrient)