Nutrients Issues and Drinking Water

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Overview

- Extent of Problem and Sources
  - Drinking Water Component of Problem
- Tools to Address the Problem
- Key Findings
- Call to Action

Note: Credit to State–EPA Nutrients Innovation Task Group
14,000 Nutrient–related Impairment Listings in 49 States
- 2.5 Million Acres of Lakes and Reservoirs
- 80,000 Miles of Rivers and Streams

Over 47% of Streams Have Medium to High Levels of Phosphorus and Over 53% Have Medium to High Levels of Nitrogen

168 Hypoxic Zones in U.S. Waters

78% of Assessed Continental U.S. Coastal Area Exhibits Eutrophication Symptoms
Concentrations of Nitrogen Nationally

WSA Survey Results:
Total Nitrogen Concentrations

Total Nitrogen (µg/L):
- 0 - 100
- 100 - 260
- 260 - 360
- 360 - 800
- 800 - 900
- 900 - 1500
- 1500 - 10,000
- 10,000+
Hypoxic Zone Locations

Coastal Eutrophic and Hypoxic Areas of North America and the Caribbean

Eutrophic and Hypoxic Areas
- Areas of Concern
- Documented Hypoxic Areas
- Systems in Recovery

Data compiled from various sources by R. Diaz, M. Selman and Z. Sugg.
Algal Bloom Occurrences in the United States (WHOI 2007).
Drinking Water Impacts

- Increased treatment costs
  - Large & Small Systems
  - Private Wells

- Major impacts on ground and surface drinking water supplies from nitrates & co-occurring contaminants

- Rate of nitrate violations in community water systems has doubled over past 7 years

- Harmful algal blooms (algal toxins)

- Precursors for DBPs; significant & costly
Community Water System (CWS) Drinking Water Nitrate Violations

![Graph showing the number of violations from 1998 to 2008. The number of violations increases from 600 in 1998 to over 1200 in 2008.](image-url)
ASDWA Findings

- Extensive data on nitrates in finished water; correlations to sources sometimes available
- Nitrate data for private wells exists in some locations
- Nitrate data for drinking water sources not routinely collected but available in many places
- Algal toxin data not routinely collected but some comprehensive studies done in some locations
- Relatively little direct correlation data for nutrient-driven DBP precursors and DBPs
- Cost data to address impacts extensive in many places (especially for DWSRF program)
Sources

- **Municipal Wastewater Treatment**
  - Treat over 18 million tons of human waste annually
  - Of more than 16,500 municipal treatment system permits, however, only about 4% have numeric limits for nitrogen and 9.9% for phosphorus

- **Atmospheric Nitrogen Deposition**
  - Regulated under the CAA, mobile and stationary account for 55% and 45% of NOx emissions respectively to the atmosphere
Sources (cont.)

Urban Stormwater

- 80% of the U.S. population live on 10% of the land with urban population heavily impacting coastal areas
- 50% of the existing urban landscape will be redeveloped by 2030
- An additional 30% of needed built environment does not exist
- Urban Stormwater is a major source of nutrient pollution in heavily populated areas and is expected to increase dramatically with accelerating population
Agricultural Livestock
- Livestock production in U.S. is a $130 billion industry
- Generates over 1 billion tons of manure annually
  - 96 million cattle, 68 million pigs, and 9.4 billion chickens
- Substantial portion of livestock production is largely unregulated by the decent CAFO Rule

Agricultural Row Crops
- Row crop agriculture is a $120 billion industry
- Agricultural stormwater runoff and irrigation return flows exempt from the Clean Water Act
- Subject to variable controls at the state level
Relative Nutrient Source Contributions

**Gulf of Mexico**

- **Phosphorus**
  - Natural: 8%
  - Crops: 43%
  - Urban and population-related sources: 12%
  - Livestock: 37%

- **Nitrogen**
  - Natural: 4%
  - Atmospheric Deposition: 21%
  - Urban and population-related sources: 9%
  - Livestock: 5%
  - Crops: 66%

**Chesapeake Bay**

- **Phosphorus**
  - Natural: 3%
  - Crops: 19%
  - Urban stormwater: 31%
  - Municipal wastewater: 21%
  - Livestock: 26%

- **Nitrogen**
  - Atmospheric Deposition: 21%
  - Urban stormwater: 11%
  - Municipal wastewater: 25%
  - Livestock: 26%
Tools and Authorities

- **Incentives**: voluntary agreements, corporate stewardship, trading

- **Non-regulatory**: volunteer monitoring, nutrient load reduction strategies, tracking of implementation plans

- **Existing Regulatory**: point source controls, NPDES & WQS regulations,

- **Alternative Regulatory**: NPS regulations; required minimum agricultural best practices

- **Legislative**
Key Findings

- Knowledge, collaboration, and incentives will fail absent Joint accountability
- Current tools underused and poorly coordinated
- Additional tools rarely used
- Current regs disproportionately address certain sources in watershed to exclusion of others
- Localized aspects of state NPS programs quite successful, *but* broader application undercut by absence of common multi-source accountability frameworks within and across state lines
Call to Action

- **Common Accountability**
  - All major sources of nutrients must be held accountable for their contributions to the problem

- **Full Use of Existing Tools**
  - Support a more consistent and full utilization of existing tools from state to state and source to source (e.g., TMDLs, WLAs & LAs, PS & NPS controls; agricultural incentives & requirements).

- **Profound Change**
  - Combating the challenge of nutrient pollution will require a profound change in how we share accountability between sources, within watersheds, and across state lines

- **National and Local Leadership**