

Nutrient Management for North Dakota

Presented to the
83rd Annual North Dakota Water and Pollution Control
Conference
Bismarck, ND
October 12, 2011



Outline

- Scope and Impact of Nutrients
- Nutrient Criteria as a Nutrient Management Tool
- NDDoH Approach to Developing Nutrient Criteria

Nutrients

- Nutrients, in appropriate amounts, are essential to the growth and health of aquatic communities
- Excess nutrients, however, can result in:
 - Proliferation of blue-green algae blooms which can cause toxins (cyanotoxicity)
 - Excessive algae and/or plant growth resulting in organic enrichment, low DO and fish kills
 - Excessive algae and plants can cause diurnal low DO or high pH
 - Increased drinking water treatment costs
 - Disinfection by-products concerns
 - Recreation impairments and aesthetics
 - Groundwater contamination (nitrates)

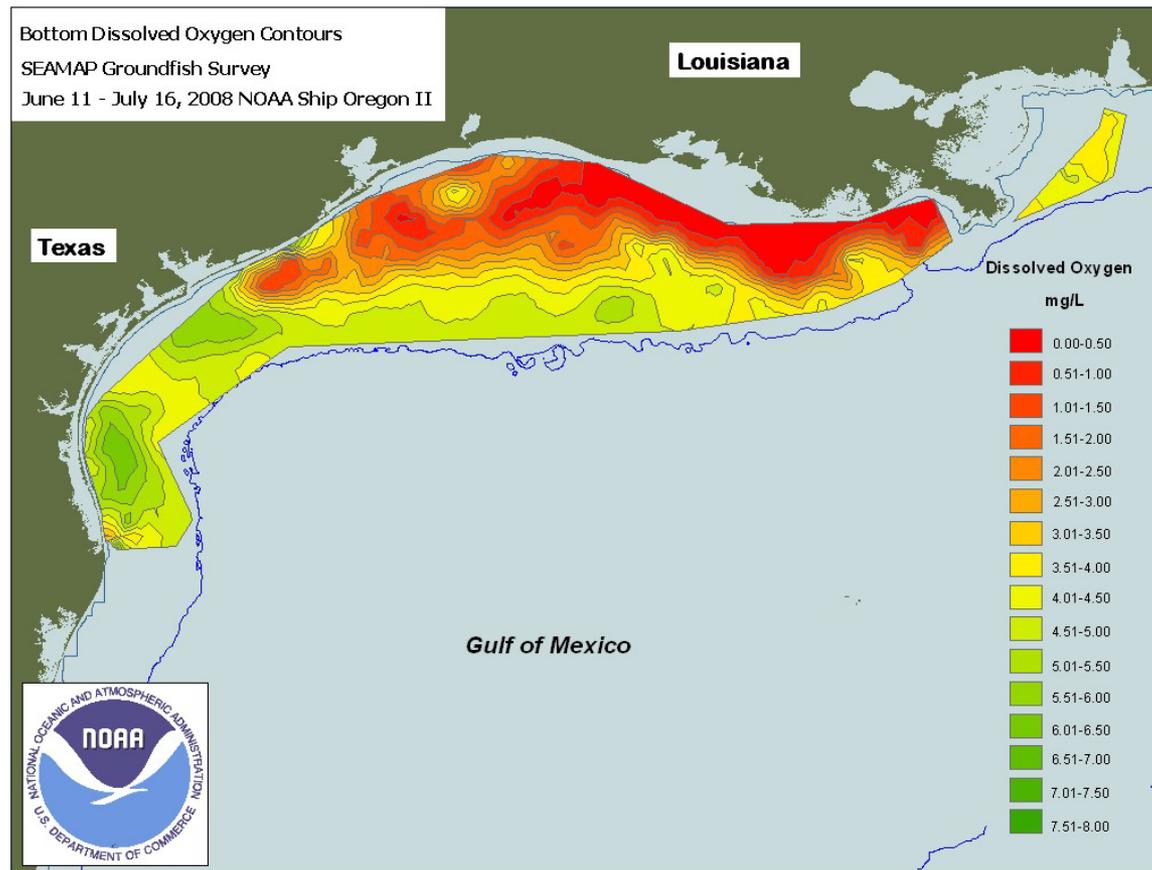
Nutrients

- Excess nutrients are unique to aquatic resources
- Considered a pollutant
- But without an acute or chronic toxicity endpoint like other pollutants or standards (e.g., metals, ammonia, DO)

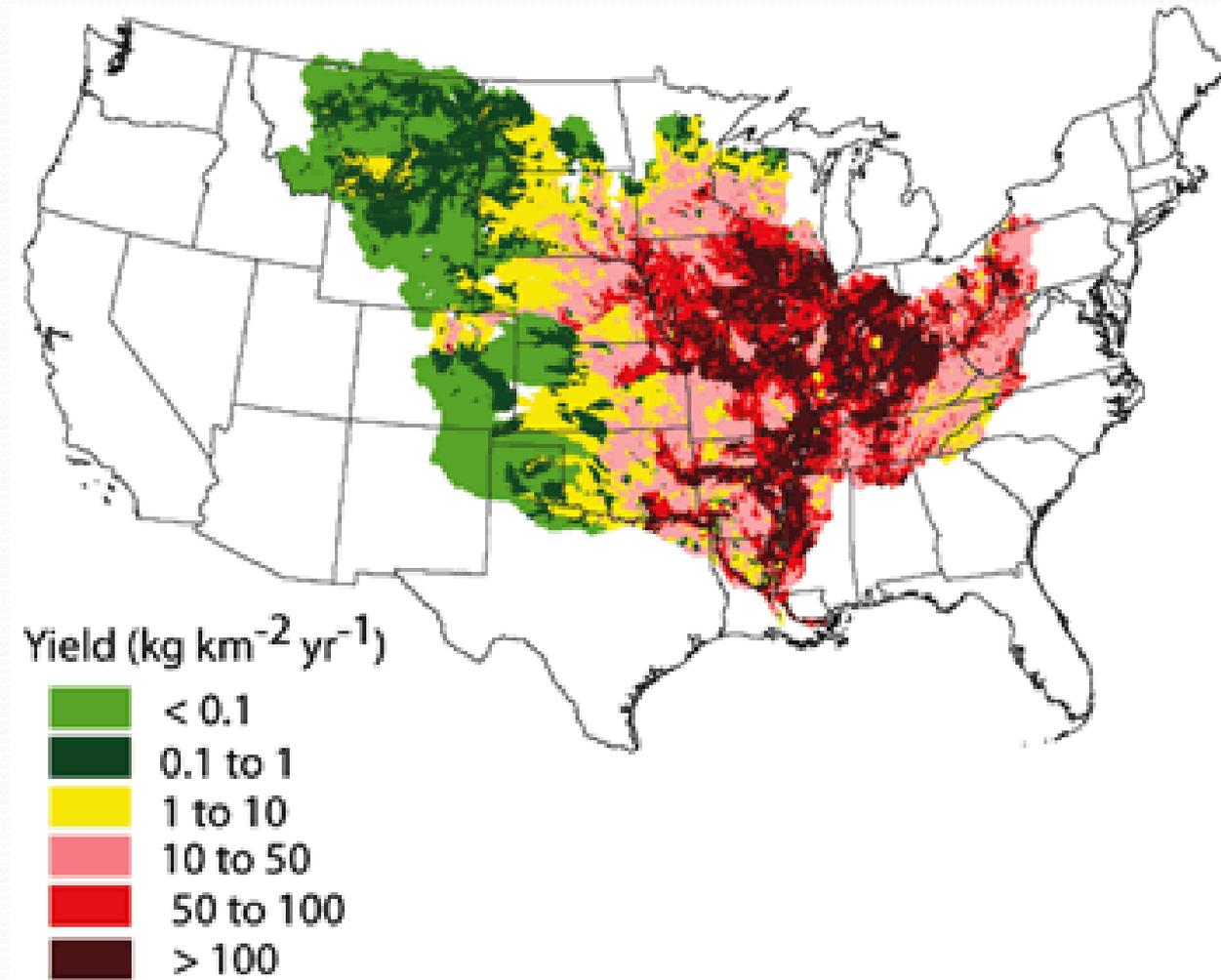


Scope of the Nutrient Problem

Gulf of Mexico Hypoxic Zone



Phosphorus Sources to the Gulf



Scope of the Nutrient Problem

- National Resource Survey Results
 - Wadable Rivers and Streams
 - National Wadable Streams Assessment
 - 42% of river and stream miles in poor biological condition, 25% fair and 28% good
 - Major stressors were nutrients, riparian disturbance, and streambed sediment

Scope of the Nutrient Problem

- Lakes and Reservoirs
 - 2007 National Lake Survey
 - 50% of lakes and reservoirs are eutrophic (30%) or hypereutrophic (20%), 37% are mesotrophic, and 13% oligotrophic
 - When comparing the 1972 National Eutrophication Survey lakes (mainly lakes with POTWs)
 - 50.4% saw phosphorus decrease, 25.9 % increased, and 23.6% saw no change

Lake Winnipeg Algal Bloom



Lake Josephine Algal Bloom-August 2010

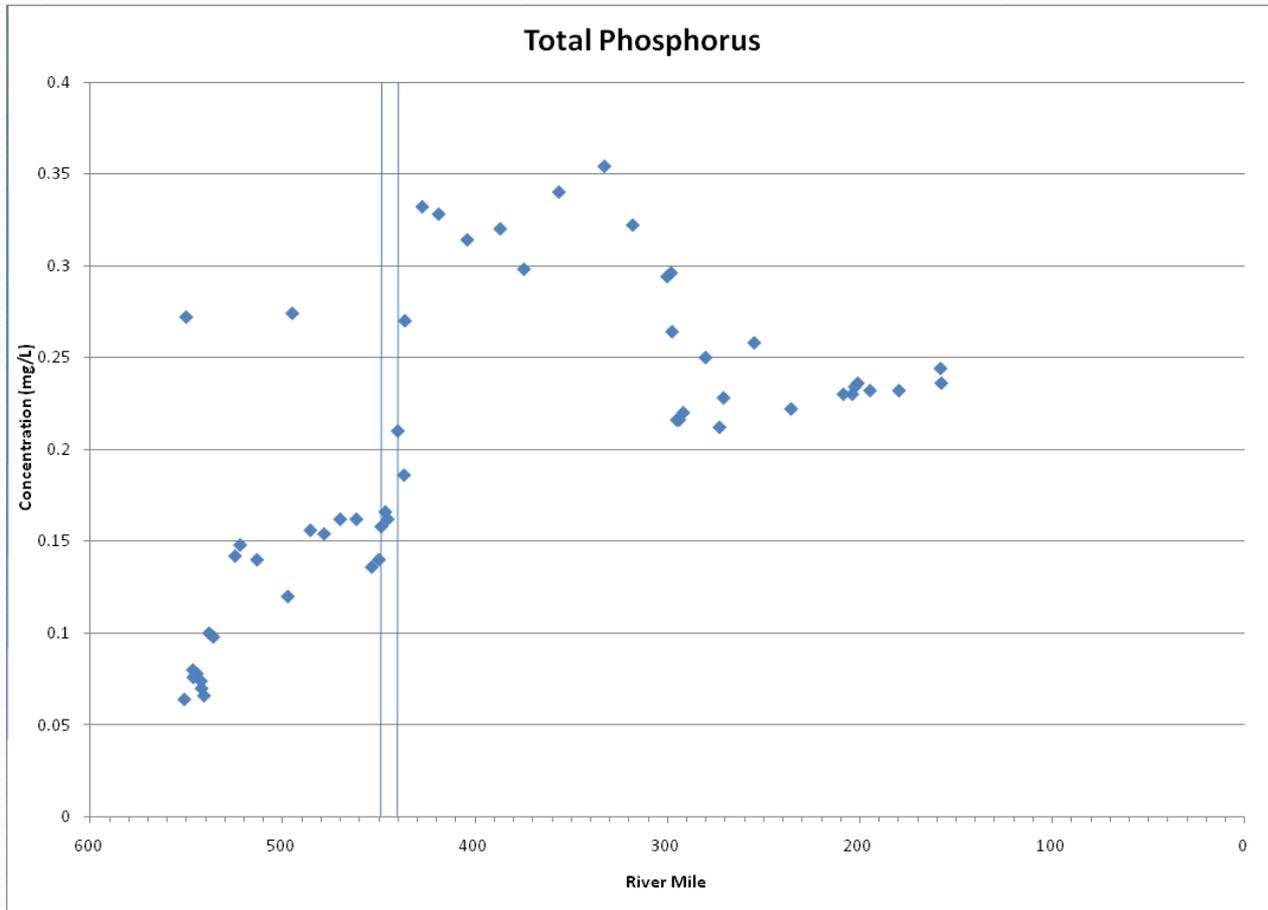


Sources of Nutrients

- POTWs
 - Lack permit limits for N or P
- Industrial Discharges
- Urban Stormwater
- Atmospheric Deposition
- Agricultural Nonpoint sources
 - Livestock
 - Cropland

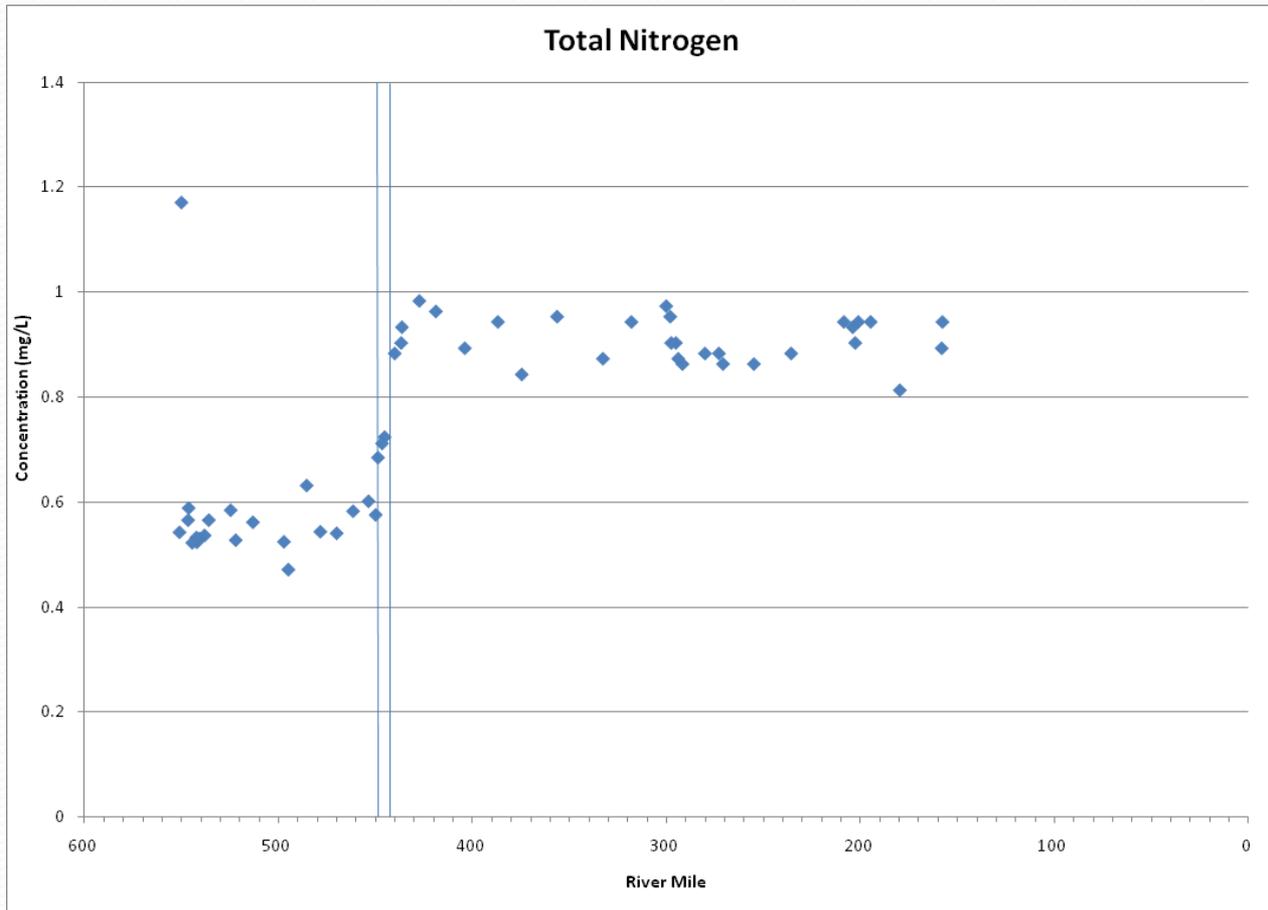
Red River Mainstem

August 18 – 31, 2010



Red River Mainstem

August 18 – 31, 2010



Nutrient Management

- Nutrient Criteria Approach
 - Regulatory
 - Impacts on point sources
 - Temporal and spatial variability in nutrient concentrations
 - Substantial resources, both in terms of time, people and money to develop
 - Susceptible to litigation

Nutrient Management

- Nutrient Reduction Plan (an alternate approach)
 - Voluntary vs. regulatory
 - Collaborative
 - Series of stakeholder meetings beginning this winter
 - Point and nonpoint sources
 - Integrate criteria for priority waterbodies
 - Recognized as a management tool, rather than the solution
 - Useful when setting restoration/TMDL goals.

North Dakota Nutrient Criteria Development Goal

- To develop scientifically defensible nutrient criteria for surface waters, which are protective of the resource, and consistent with federal guidance

North Dakota's Approach to Criteria Development

- Described in detail in the *State of North Dakota Nutrient Criteria Development Plan* (May 2007)
- Provides the conceptual framework
- Tailored to the unique physiographic characteristics and water resources of this region (i.e., northern plains)
- Based upon **cause (stressor) – effect (response)** relationships
 - Need to demonstrate linkage between excess nutrient concentrations and the reasons for resource impairment (e.g., excessive algae in a lake, IBI score) and the loss of beneficial uses

The end!

