

# North Dakota's Nutrient Reduction Strategy

Presented to the  
2016 ND Water Quality Monitoring Conference  
March 4, 2016

# 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)**
- **Need to find ways to reduce the delivery of nutrients to our lakes, rivers and wetlands.**

# Nutrient Pollution on a National Scale

- **50% U.S. streams have medium to high levels of N and P;**
- **Lakes and reservoirs – 5 million acres impaired;**
- **78% of assessed coastal waters are impacted by nutrient pollution;**
- **Drinking water violations have doubled in the past eight years because of high levels of nitrate-nitrogen;**
- **The occurrence and severity of nuisance algal blooms is on the rise; and**
- **Algal toxins have potentially serious human health and ecological effects.**





Chesapeake Bay



Lake Erie



Gulf of Mexico



Lake Winnipeg

# North Dakota Lakes and Reservoirs

- Currently, 42 lakes and reservoirs assessed as impaired or threatened due to nutrients
  - 24 with a nutrient TMDL written



# North Dakota Rivers and Streams

- Based on biological and chemical monitoring data
- 51 river and stream segments (1,400 stream miles) listed for biological impairments, some due to nutrients
- Other indicators related to nutrients (e.g., bacteria, sediment)




# **Why a Nutrient Management Strategy for North Dakota?**

- **Lawsuits regarding nutrients (e.g., criteria, TMDLs, permits)**
- **Ever increasing number of waterbodies with blue-green algal blooms and cyanotoxin risks**
- **Impacts to Lake Winnipeg in the Red River Basin and Gulf of Mexico in the Missouri River Basin**
- **Response to Nancy Stoner memo dated March 16, 2011**



# Stoner Memo Highlights

- Reaffirms EPA's commitment to partnering with state's
- Recognizes that a one-size-fits-all solution to nitrogen and phosphorus pollution is neither desirable nor necessary
- Supports actions by states to protect their waters
  - Provides technical and financial assistance
- Recognizes the need for flexibility in key areas, but the need for certain minimum required elements in state programs




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

MAR 16 2011

OFFICE OF WATER

**MEMORANDUM**

**SUBJECT:** Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions

**FROM:** Nancy K. Stoner  
Acting Assistant Administrator 

**TO:** Regional Administrators, Regions 1-10

This memorandum reaffirms EPA's commitment to partnering with states and collaborating with stakeholders to make greater progress in accelerating the reduction of nitrogen and phosphorus loadings to our nation's waters. The memorandum synthesizes key principles that are guiding and that have guided Agency technical assistance and collaboration with states and urges the Regions to place new emphasis on working with states to achieve near-term reductions in nutrient loadings.

Over the last 50 years, as you know, the amount of nitrogen and phosphorus pollution entering our waters has escalated dramatically. The degradation of drinking and environmental water quality associated with excess levels of nitrogen and phosphorus in our nation's water has been studied and documented extensively, including in a recent joint report by a Task Group of senior state and EPA water quality and drinking water officials and managers.<sup>1</sup> As the Task Group report outlines, with U.S. population growth, nitrogen and phosphorus pollution from urban stormwater runoff, municipal wastewater discharges, air deposition, and agricultural livestock activities and row crop runoff is expected to grow as well. Nitrogen and phosphorus pollution has the potential to become one of the costliest and the most challenging environmental problems we face. A few examples of this trend include the following:

- 1) 50 percent of U.S. streams have medium to high levels of nitrogen and phosphorus.
- 2) 78 percent of assessed coastal waters exhibit eutrophication.
- 3) Nitrate drinking water violations have doubled in eight years.

<sup>1</sup> An Urgent Call to Action: Report of the State-EPA Nutrients Innovations Task Group, August 2009.

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# Strategy Goal

- **To develop and implement cost-effective approaches to reduce the delivery of nutrients via point source effluents and nonpoint source runoff.**



# Strategy Development Process

- **Initiated November 2012**
- **Stakeholder driven**
  - **35 member planning team**
  - **5 workgroups**
    - **Prioritization**
    - **Criteria**
    - **Point Sources**
    - **Agriculture and Nonpoint Sources**
    - **Education and Outreach**

# Strategy Framework and Core Components

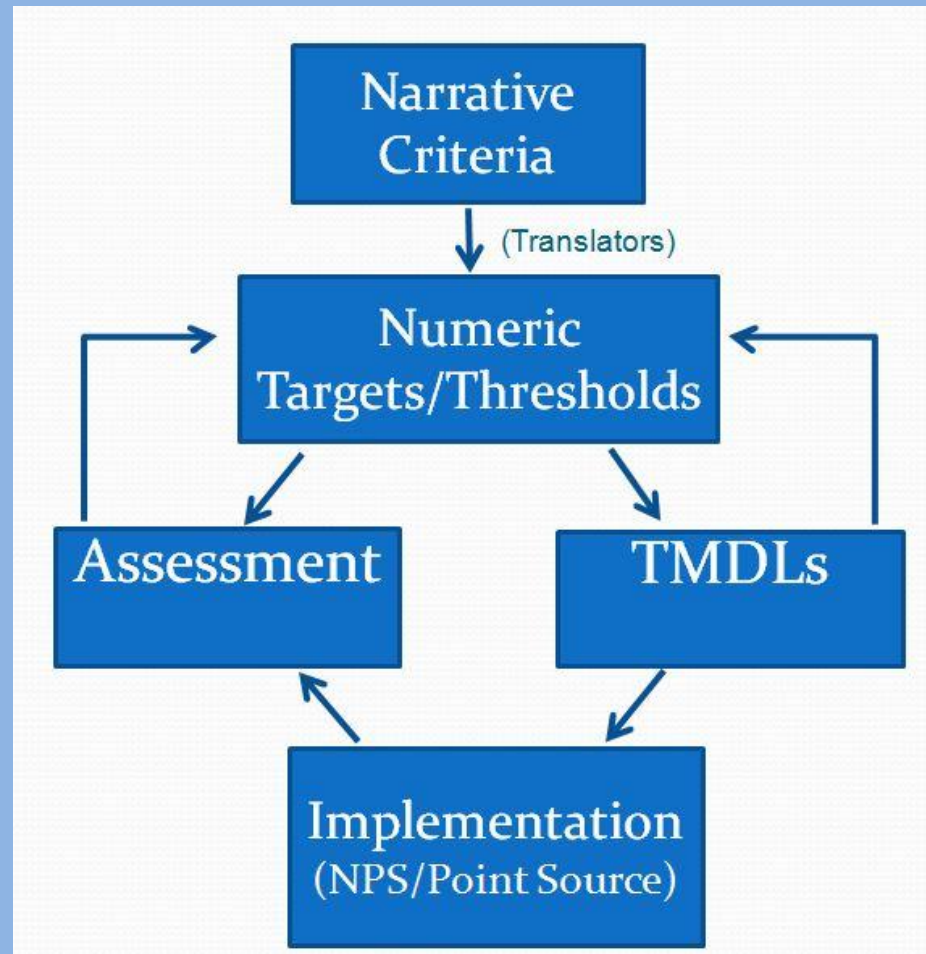
- **Core components**
  - Nutrient criteria
  - Setting targets
  - Prioritization
  - Source reduction strategies
- **Implementation Framework**
  - Follows the watershed approach
  - Recognizes adaptive management
  - Education and outreach
  - Accountability measures and reporting

# Strategy Core Components

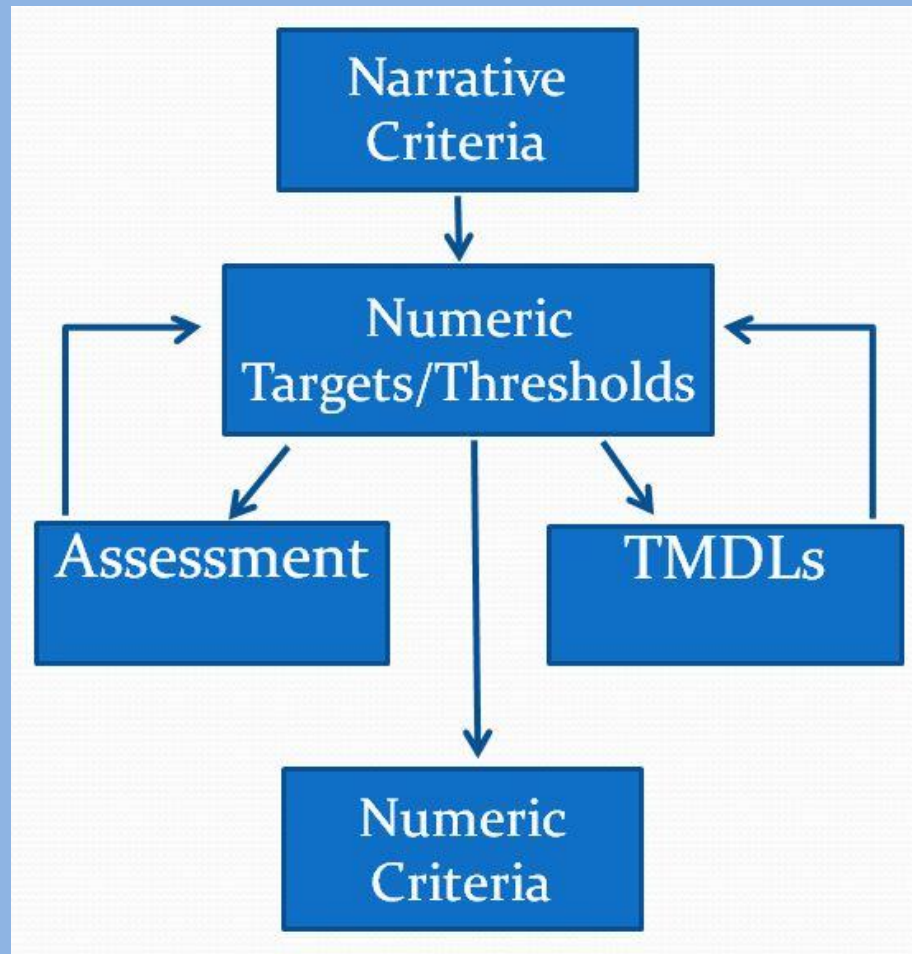
- **Nutrient Criteria**
  - **Numeric criteria**
    - Reference condition
    - Mechanistic modeling
    - Stressor-response
  - **Narrative criteria as a precursor**
    - “free from nutrients attributable to municipal, industrial, or other discharges or agricultural practices, in concentrations or loadings which will cause accelerated eutrophication resulting in the objectionable growth of aquatic vegetation or algae or other impairments to the extent that it threatens public health or welfare or impairs present or future beneficial uses”



# Nutrient Criteria



# Nutrient Criteria



# Strategy Components

- **Setting Nutrient Targets**
  - **Used to derive load allocations**
    - Total maximum daily loads
    - Watershed restoration plans
    - Watershed protection plans
  - **Numeric criteria**
  - **Thresholds developed as a means of translating the narrative criteria**

# Strategy Core Components

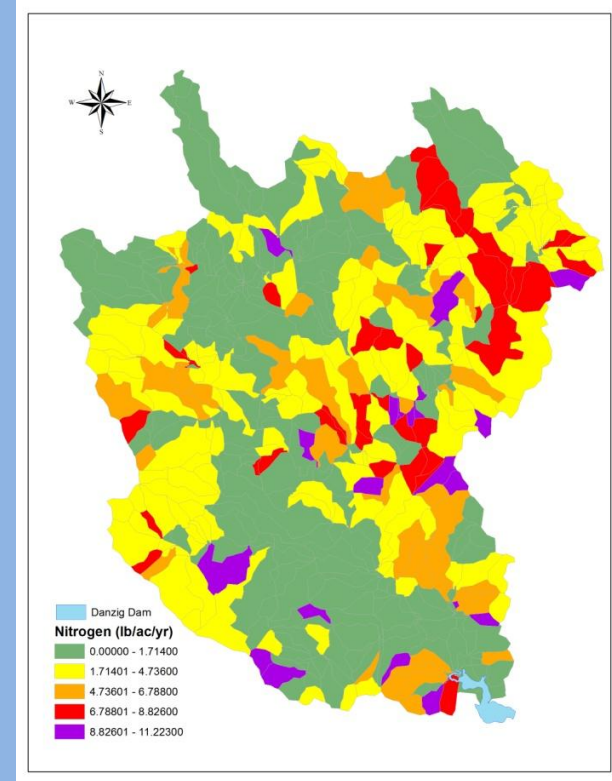
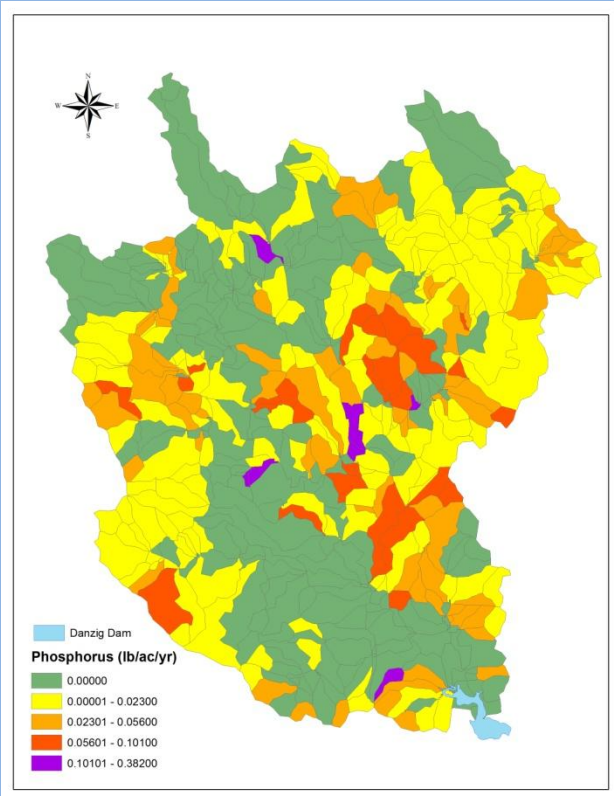
- **Prioritization**
  - “Bang for the buck”
  - **Watershed prioritization**
    - **State, regional and basin**
    - **Recovery Potential Screening Tool**
      - **HUC 8 and HUC 12**
      - **3 indicator categories**
        - » **Ecological**
        - » **Stressor**
        - » **Social (restoration potential)**
    - **USGS SPARROW Model**



# Prioritization

- **BMP prioritization**
  - **Field or catchment scale**
  - **Watershed planning and implementation**
    - **PTMApp**
    - **AnnAGNPS**

# Prioritization



# Strategy Core Components

- **Source Reduction Strategies**
  - **Municipal and Industrial Point Sources**
  - **AFO/CAFOs**
  - **Stormwater**
  - **Septic Systems**
  - **Agricultural Nonpoint Sources**
    - **BMPs**

# Implementing the Strategy

- **Basin Water Quality Management Framework**
  - **Watershed Approach**
  - **Adaptive Management**
    - **Monitor**
    - **Assess**
    - **Target**
    - **Implement**
    - **Monitor**
    - **Reassess**
  - **Education and Outreach**
  - **Accountability and Verification**
    - **Measuring Success**
    - **Recognizing Failure**



# Next Steps

- Finish the Draft Strategy
- Planning Team Review and Comment
- Stakeholder Review and Comment
- Stakeholder meeting(s)
  - Identify Actions
- Finalize the Strategy
- Implement the Strategy

# Questions?

