Wisconsin's Nutrient Reduction Strategy

November 2013

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A Framework for Nutrient Reduction and Management

This document was developed by the Department of Natural Resources with contractual assistance from the University of Wisconsin – Extension. Substantial input from staff of other federal, state and local agencies was provided, especially on work groups convened to fill programmatic gaps and to enhance coordination. It was the intent of the Department of Natural Resources to provide information on nutrient reduction activities within Wisconsin regardless of the level of government or particular agency. To keep the document to a reasonable size, all programs and activities could not be described in detail. For more information, the reader is encouraged to go to websites identified in the text.

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This strategy and any updates of this strategy are available at:
http://dnr.wi.gov/topic/surfacewater/nutrientstrategy.html

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Executive Summary

Key Points in Wisconsin's Nutrient Reduction Strategy

Introduction

- Wisconsin's Nutrient Reduction Strategy was developed in response to the *Gulf Hypoxia Action Plan 2008* call for each state in the Mississippi River Basin to develop a strategy by 2013 to reduce the amount of phosphorus and nitrogen carried in rivers from the state to address the biological "dead zone" in Gulf of Mexico. It was also developed in response to the call from the U. S. Environmental Protection Agency (EPA) for states to develop frameworks for nutrient reduction as outlined in the March 2011 memo from Nancy Stoner, Acting Assistant Administrator for Water. Although EPA will review and provide comment on this strategy, it does not require EPA approval. Having a completed strategy may make Wisconsin eligible for additional federal funding and may be necessary to retain existing grants.
- Wisconsin's Nutrient Reduction Strategy was developed to not only meet the federal Gulf of Mexico hypoxia nutrient reduction goals, but to meet intra-state needs for Wisconsin's lakes and streams and groundwater. It also includes needs for the Great Lakes consistent with Annex 4 of the Great Lakes Water Quality Agreement of 2012.
- Past implementation efforts have reduced by about 23 percent the amount of phosphorus from Wisconsin watersheds to the Mississippi River and by about 27 percent to Lake Michigan. By continuing to implement existing state and federal programs, Wisconsin can meet the 45 percent reduction goal for the Mississippi River Basin.
- This strategy does not call for new regulations for either point sources or nonpoint sources. It builds on existing programs and existing requirements, including those adopted in the last few years.
- This strategy is generally organized around the eight elements outlined in EPA's March 2011 memo. However, it also addresses the essential strategy components to implement the *Gulf Hypoxia Action Plan 2008*. It is intended to be a "living" document that changes to reflect new developments and advances in Wisconsin's nutrient reduction efforts.

State Nutrient Reduction Strategy Components and EPA Framework Elements[1]	
Essential Strategy Components Identified by States	**EPA Framework Elements**
Characterizing Watersheds and Identifying Nutrient Sources and Contributions	1. Prioritize Watersheds on a Statewide Basis for Nitrogen and Phosphorus Loading Reductions
Priority Setting	
Evaluating and Selecting Appropriate Analytical Tools	
Establishing Quantitative Reduction Targets	2. Set Watershed Load Reduction Goals Based upon Best Available Information
Establishing Current Status and Historical Trends	
Examining Current Regulations, Programs, and Policies	
Identifying and Documenting Appropriate Management Practices and Technical Assistance Programs (Input Management, Water Management, Proven and Innovative Nonpoint Source BMPs, Point Source Management)	3. Ensure Effectiveness of Point Source Permits in Targeted/Priority Sub-watersheds for WW facilities, CAFOs, and Urban Storm water
	4. Agricultural Areas
	5. Storm Water and Septic Systems
	6. Accountability and Verification Measures
Designing and Implementing Effective Monitoring	
Identifying and Creating Economic Incentives and Funding Sources	
Additional Strategy Components Identified by States	**EPA Framework Element**
Involving and Engaging Stakeholders	
Effective Education and Outreach	
Tracking and Reporting Progress	7. Annual Public Reporting of Implementation Activities and Bi-annual Reporting of Load Reductions and Environmental Impacts Associated with Each Management Activity in Targeted Watersheds
Developing Numeric Nutrient Standards	8. Develop Work Plan and Schedule for Numeric Criteria Development

Figure ES.1 Comparison between Gulf Hypoxia Task Force components and March 2011 EPA memo elements.

Chapter 1. Targeting/Priority Setting

- Nutrient contributions come from both point sources and nonpoint sources throughout much of the state. For the Mississippi River basin portion of Wisconsin, 80% of the nonpoint source contribution of phosphorus comes from 20 of the 30 major river (HUC 8) basins. Similarly for the Lake Michigan basin, 80% of the nonpoint source contribution comes from nine of the 13 major river (HUC 8) basins. The relative point source and nonpoint source nutrient contributions vary greatly by basin

[1] Gulf Hypoxia Coordinating Committee

This strategy uses the federal agency watershed coding system, the Hydrologic Unit Classification (HUC) system. The number of digits in the code increases as the size of the watershed decreases. The average size of a HUC 10 watershed in Wisconsin is about 150 square miles (100,000 acres) while the size of a HUC 12 watershed is about 30 square miles (20,000 acres).

- Initial lists of high priority "top group" HUC 10 watersheds comprising about 10 percent of the state's watersheds were developed for the Mississippi River Basin and Lake Michigan Basin for phosphorus and nitrogen to surface waters and for nitrates in public drinking water wells. The initial list and subsequent updates of the list may be used in selection of future federally-funded implementation projects.

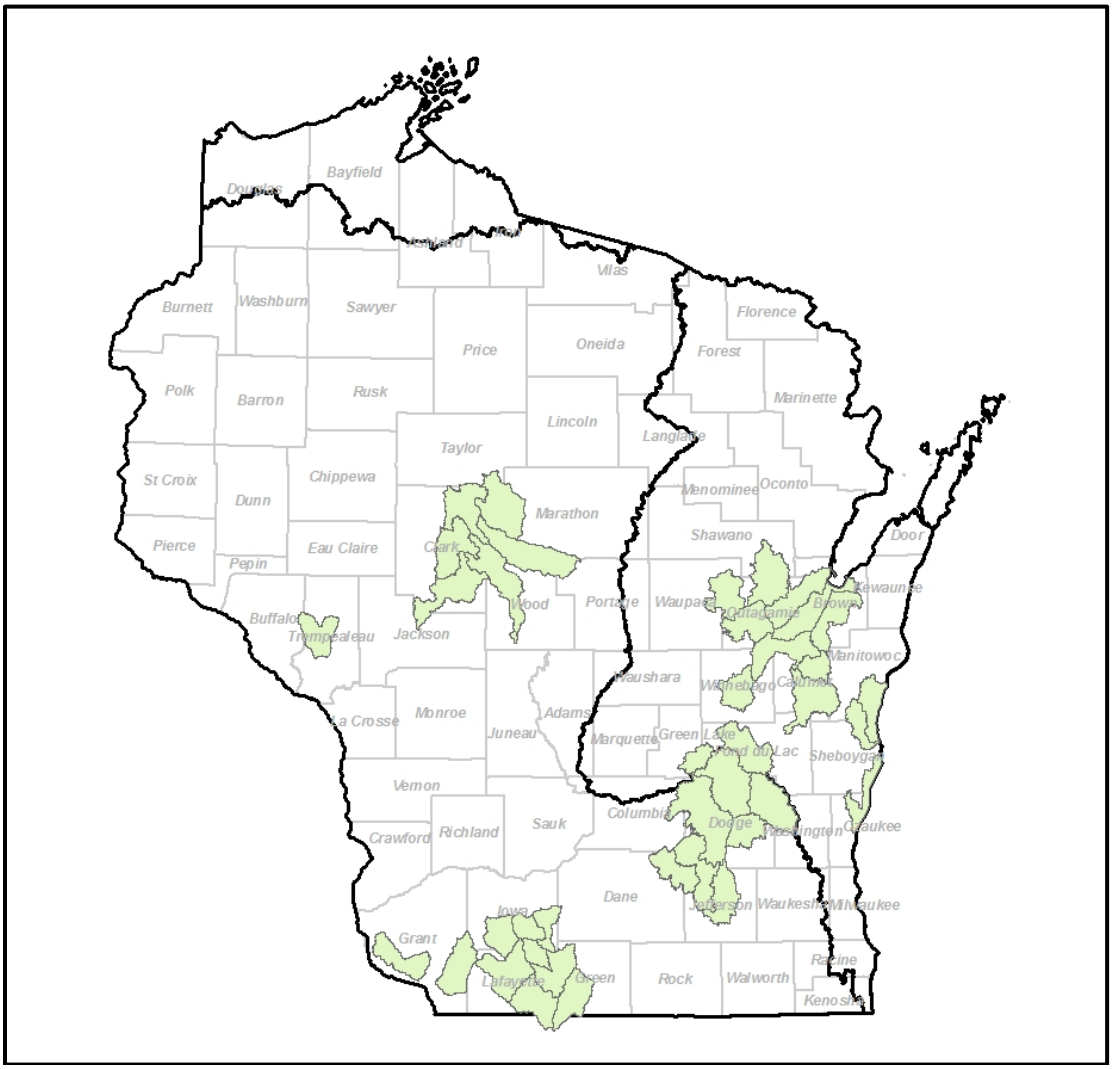

Figure ES.2 -- Top Group Watersheds for Phosphorus

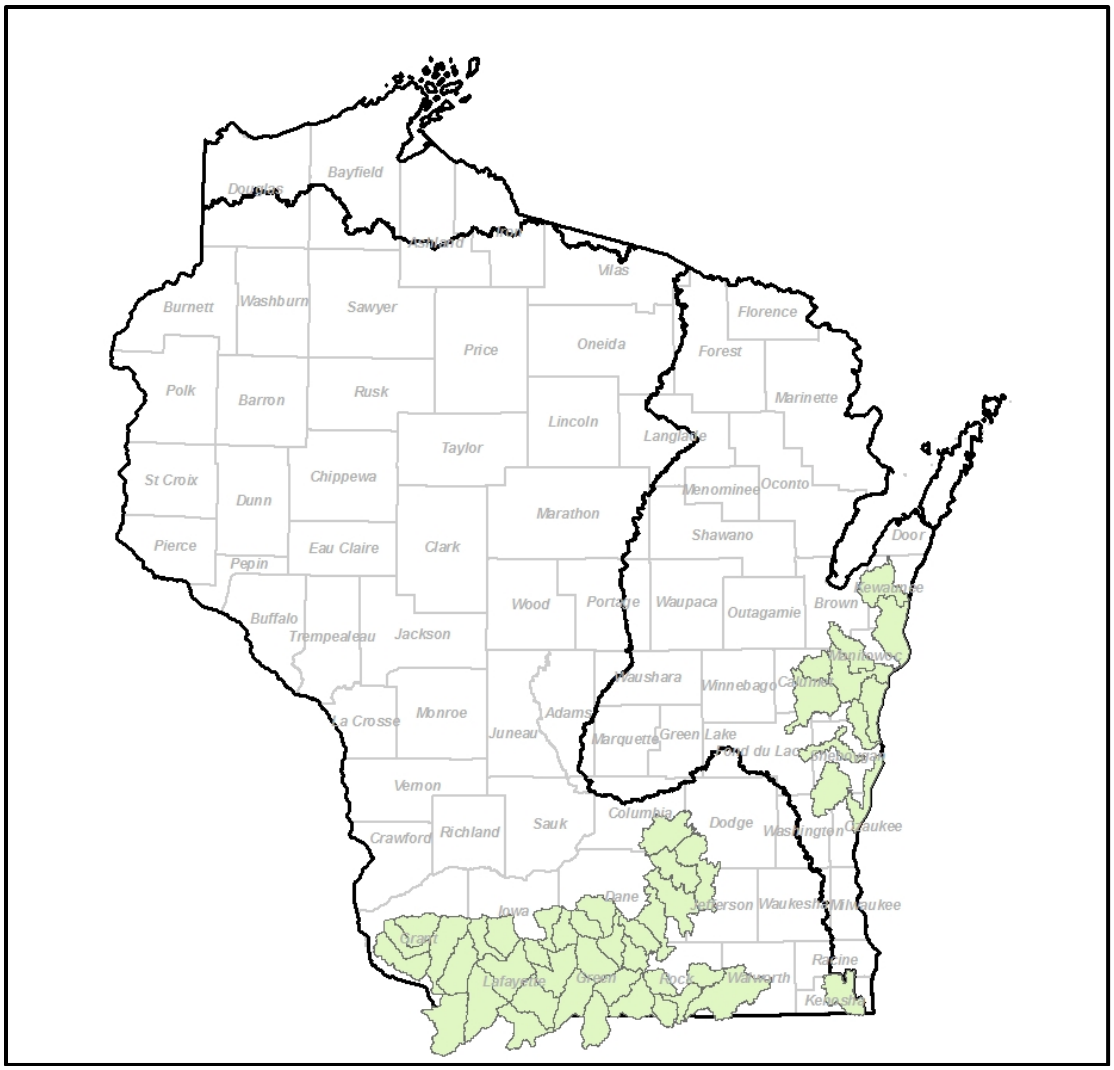

Figure ES.3 Top Group Watersheds for Nitrogen

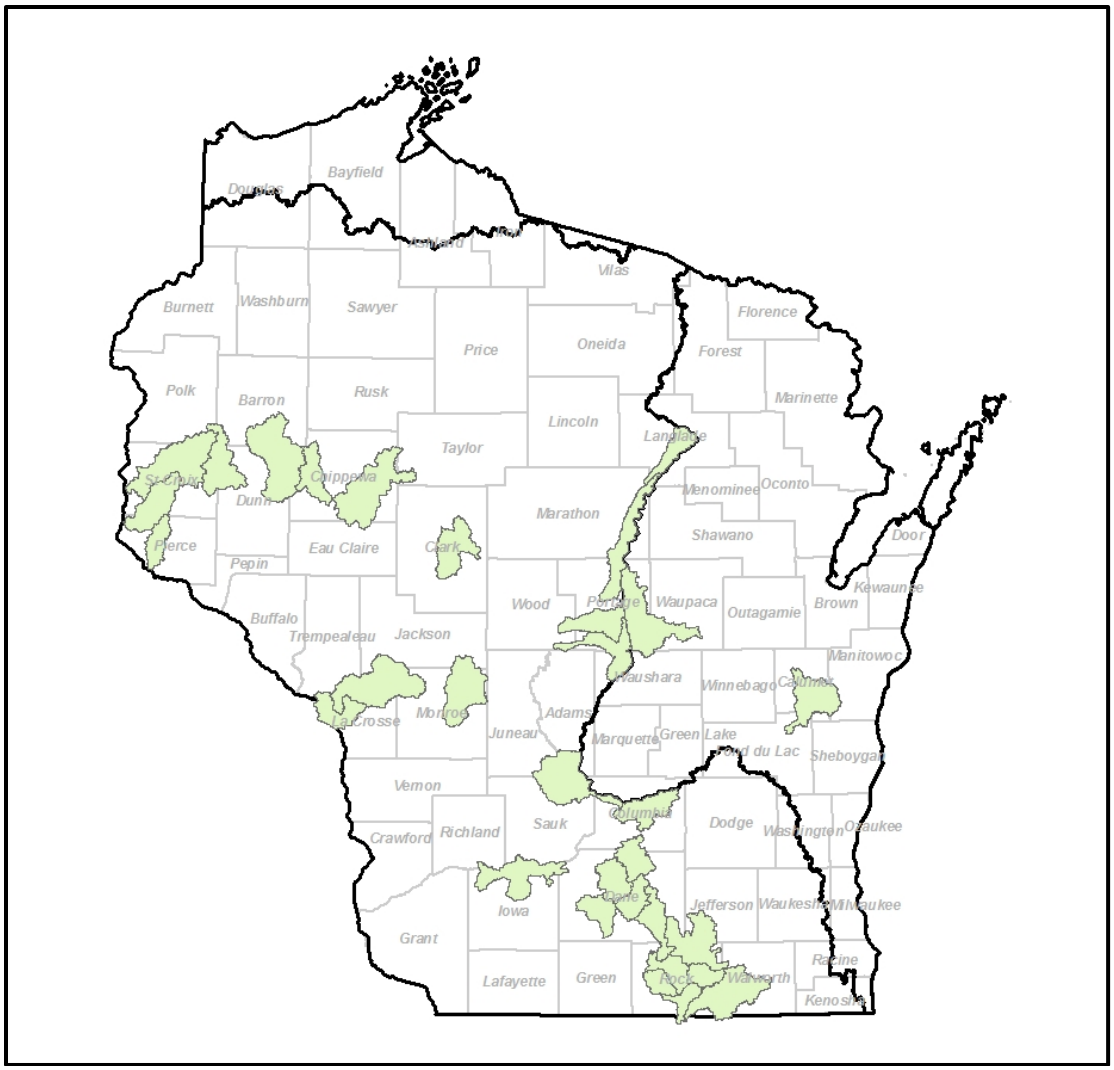

Figure ES.4 Top Group Watersheds for Drinking/Groundwater

Chapter 2. Setting Nutrient Reduction Targets

- Recent stream water quality monitoring conducted by DNR shows a broad range of phosphorus and nitrogen concentrations as illustrated in Figures ES.5 and ES.6. About half of Wisconsin streams meet the phosphorus water quality standards criterion. There are no water quality standards criteria for total nitrogen or nitrate.

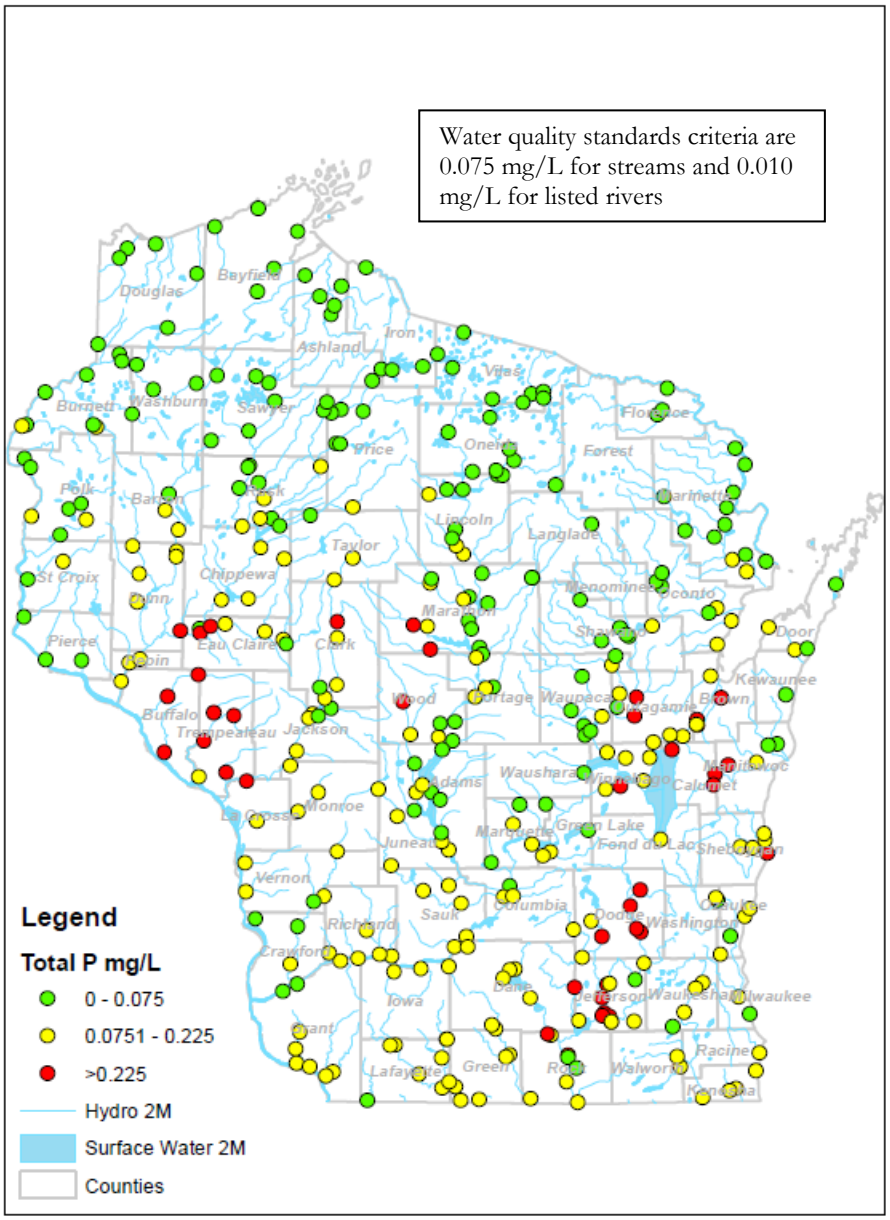

Figure ES.5 Stream Phosphorus Concentrations (median May – October)

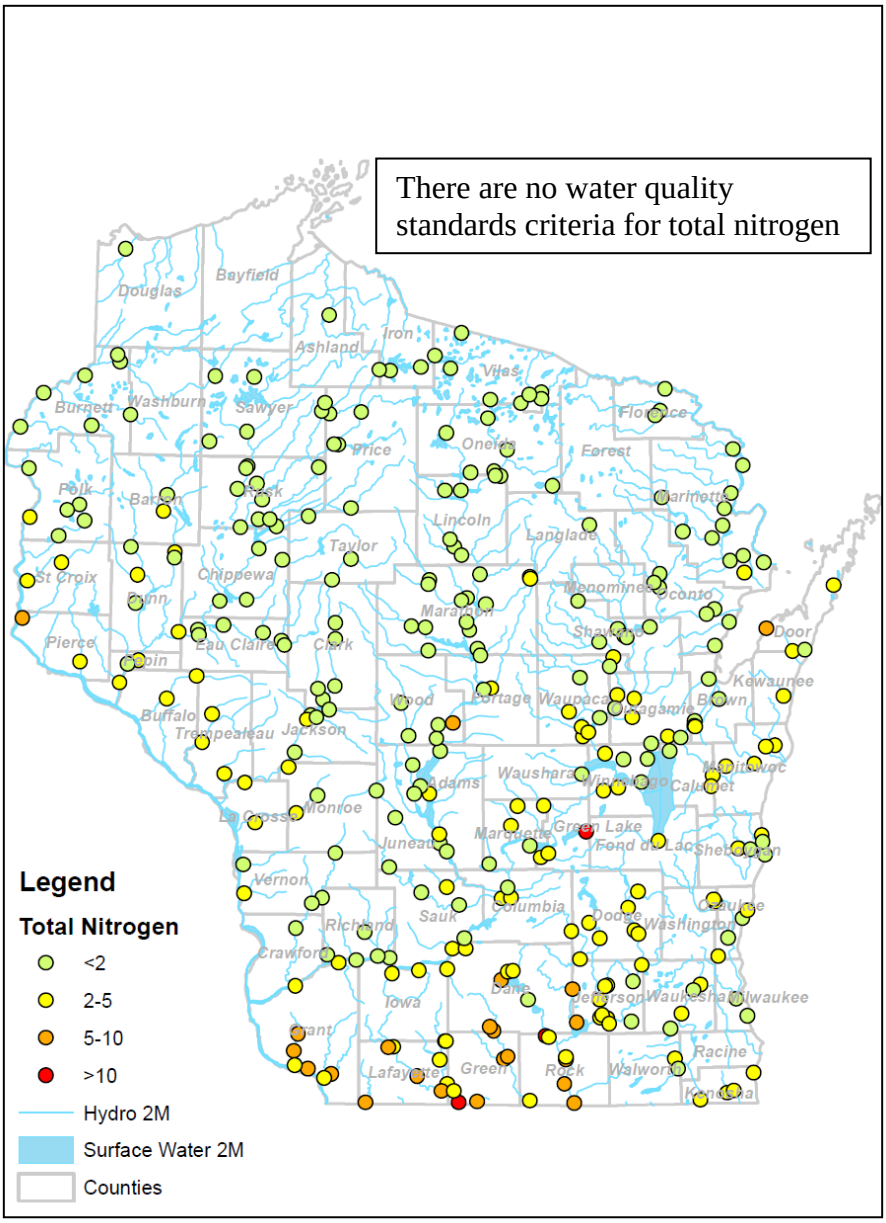

Figure ES.6 Stream Nitrogen Concentrations (median May-October)

- As shown in Figure ES.7, many of Wisconsin's public drinking water systems have elevated nitrate concentrations with some exceeding the enforcement standard of 10 mg/L.

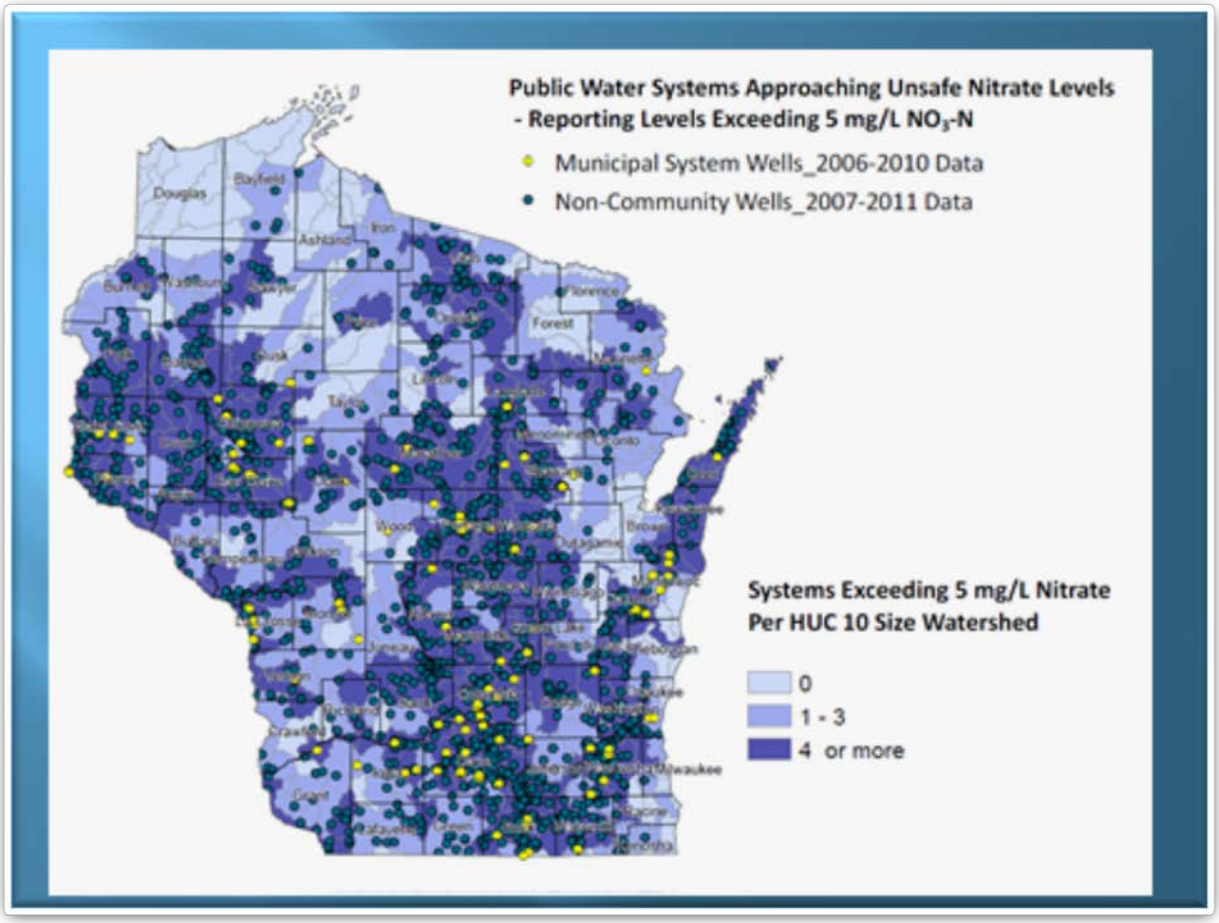

Figure ES.7 Public Water Systems with Nitrate Concentrations exceeding 5 mg/L

- An initial analysis shows that existing Wisconsin point source and nonpoint source programs have the potential to meet the Gulf Hypoxia goal of 45% load reduction for phosphorus using 1995 as a base year. For the Mississippi River Basin, about a 23% reduction has already been achieved through implementation of Wisconsin's point source phosphorus removal requirements and through a number of nonpoint source management programs. For the Lake Michigan Basin, an estimated 27% reduction has been achieved.

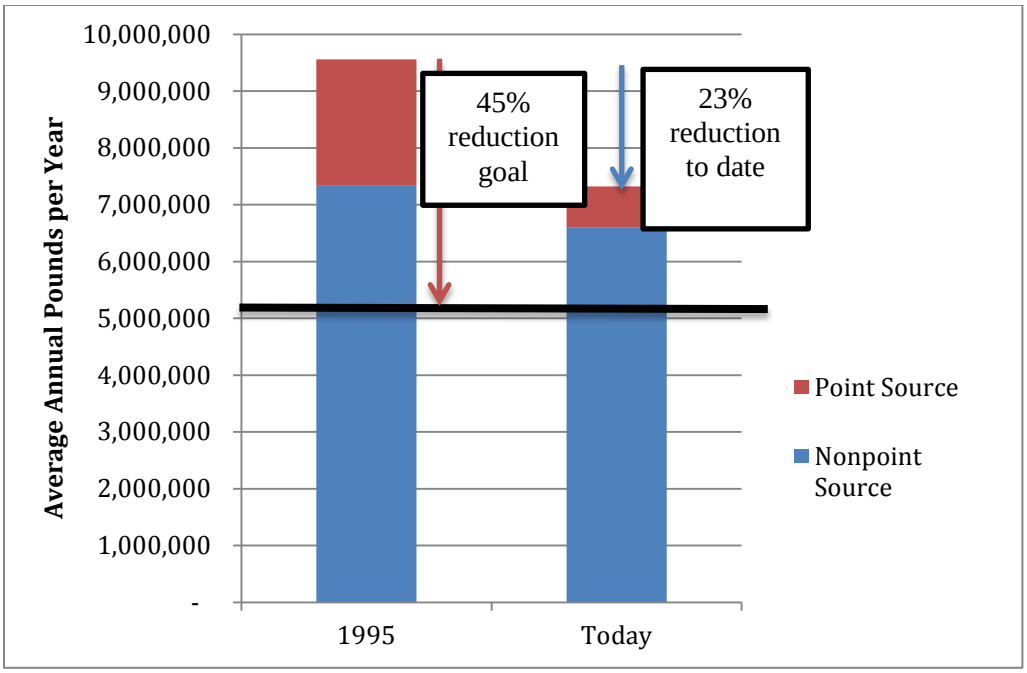

Figure ES.8 Gulf Hypoxia Phosphorus Load Reduction Goal and Estimated Progress to Date

- Trend analysis of data collected over more than three decades at long-term river monitoring sites shows a decrease in phosphorus concentrations for much of the southern half of the state. In contrast, nitrogen concentrations have increased somewhat.

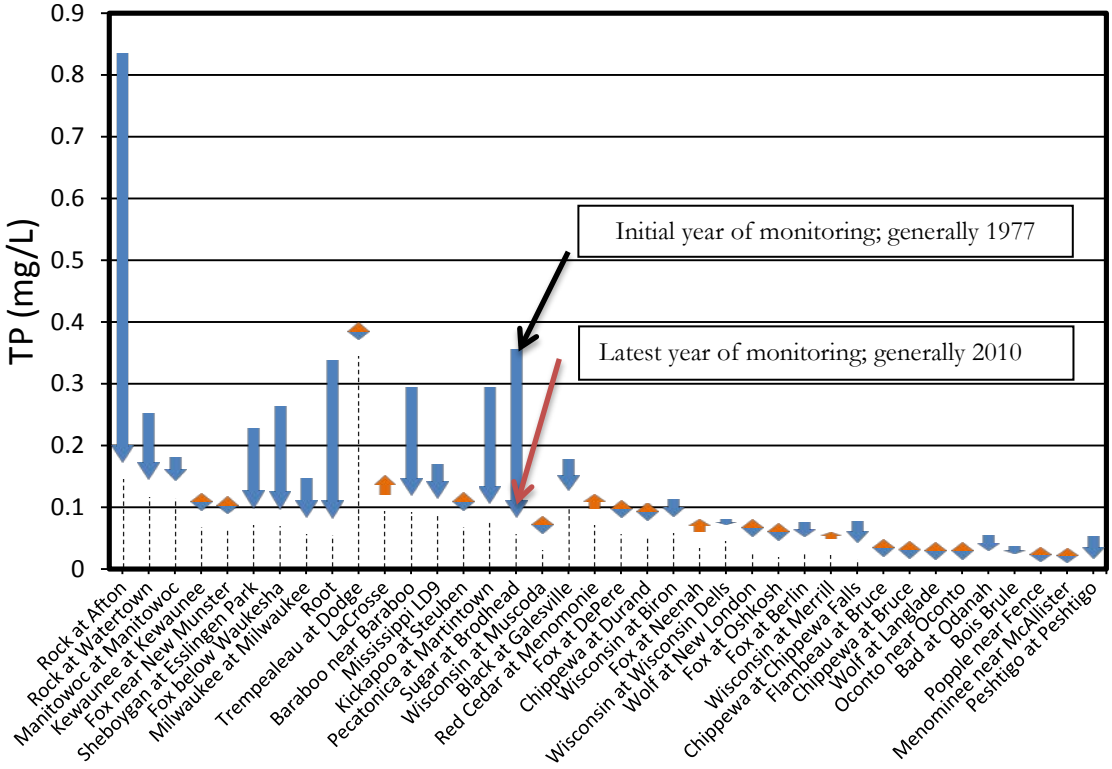

Figure ES.9 Total Phosphorus Concentration Trends at Wisconsin River Long-term Trend Sites

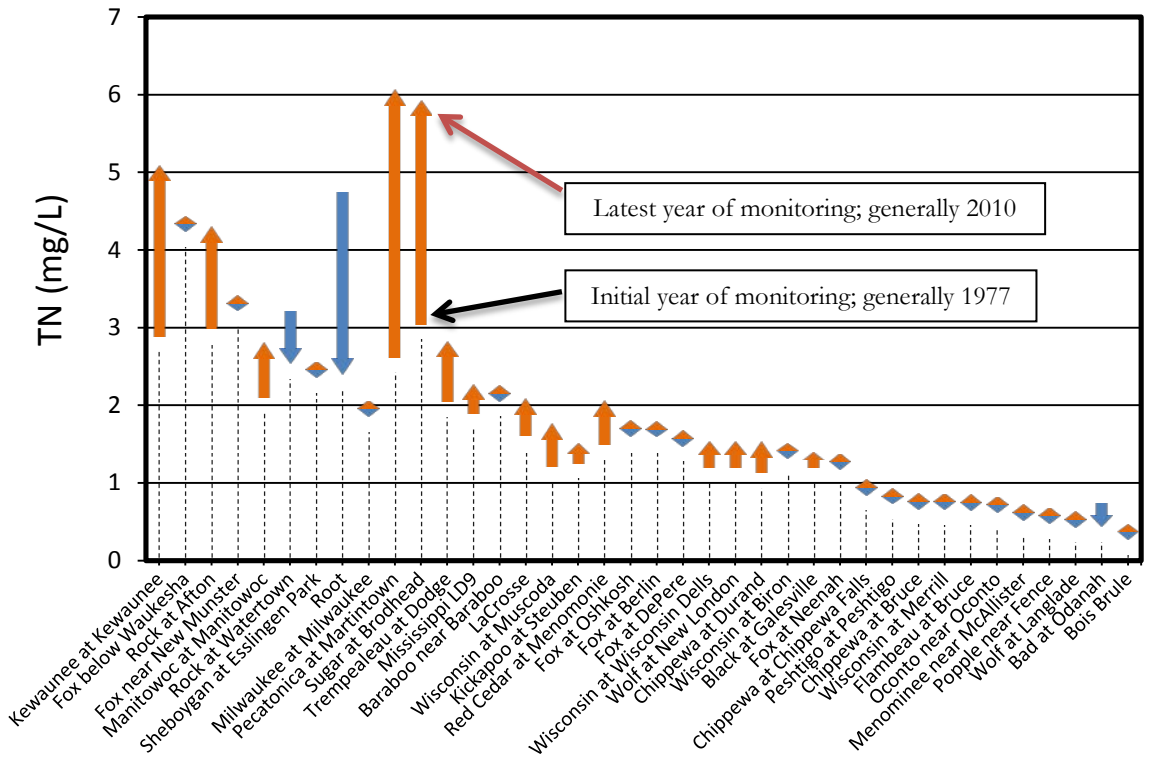

Figure ES.10 Total Nitrogen Concentration Trends at Wisconsin River Long-Term Trends Sites

Chapter 3. Point Source Permits

- Wisconsin has point source programs in place to manage phosphorus from municipal and industrial wastewater facilities, Concentrated Animal Feeding Operations (CAFOs), and municipal urban storm water. In 2010, Wisconsin adopted administrative rules requiring further discharges of phosphorus to meet water quality standards. Innovative, cost-effective compliance alternatives have been developed and approved by EPA.

Chapter 4. Agricultural Nonpoint Nutrients

- Wisconsin also has a number of federal, state and local agricultural and rural nonpoint source programs to control nutrients. Control of phosphorus was enhanced by the 2011 adoption of a phosphorus index for farmlands as part of its suite of state-adopted enforceable performance standards and prohibitions.
- In 2013, federal and state agricultural nonpoint source financial and technical assistance grants will exceed $50 million.
- This strategy recommends that a Nitrogen Science Summit be convened to identify what technical tools need to be developed to better manage nitrogen in an efficient and cost-effective manner. Although such a science summit was conducted by Iowa, many of their conclusions do not apply to Wisconsin's predominantly livestock agriculture.

Chapter 5. Integrating Point Source and Nonpoint Source Management

- Wisconsin has placed a priority on integrated point source and nonpoint source management through:
  - TMDL development and implementation;
  - Development and use of tools, such as PRESTO, to identify the relative importance of point source and nonpoint source contributions of phosphorus at both large and small watershed levels;
  - Implementation of the watershed adaptive management option, a point source compliance alternative; and
  - Allowance of water quality trading, another point source compliance alternative.

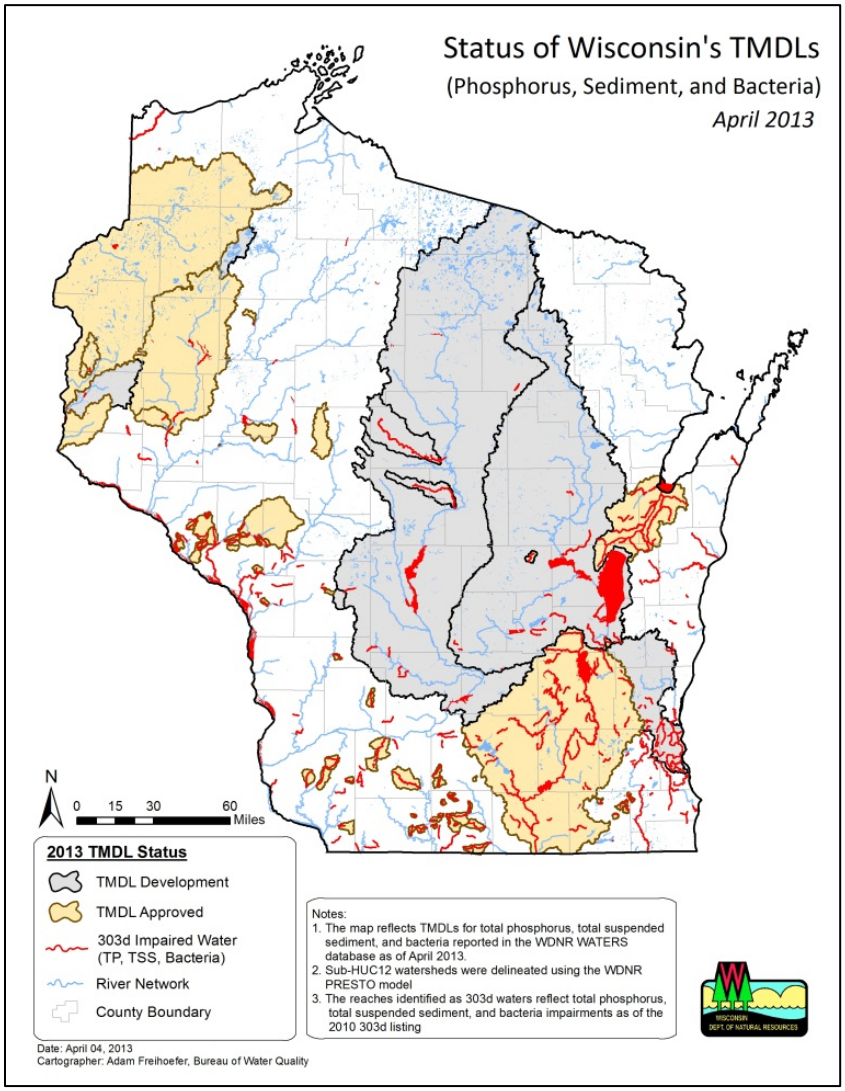

Figure ES.11 Status of Waters Impaired by Phosphorus, Sediment and Bacteria

Chapter 6. Storm Water and Septic Systems

- Wisconsin has programs in place to manage on-site disposal systems, phosphorus in lawn fertilizer and phosphorus in detergents. A number of Wisconsin's nonpoint source performance standards apply to non-permitted urban areas.

Chapter 7. Accountability and Verification Measures

- A multi-agency work group is developing an integrated tracking for agricultural nonpoint sources. It is based on county systems for tracking compliance with Chapter NR 151, Wis. Adm. Code, performance standard and prohibitions and Farmland Preservation/Working Lands Initiative. Information reported to state agencies is aggregated at the HUC 12 small watershed level along with point source tracking information. Development of the agricultural nonpoint source system will continue as a multi-agency, state-federal-local effort throughout 2013. Point source reporting for phosphorus discharges is well established. Nitrogen discharge reporting has been increased for major facilities in the Mississippi River Basin.

Chapter 8. Water Quality Monitoring

- Water quality monitoring is an integral component of many of the elements in this strategy and will continue as a multi-agency effort. DNR will continue to use its River Long-term Trend sites to analyze trends and is considering ways to enhance this fixed-station network. Many of these River Long-term Trends sites are parts of multi-state networks for the Great Lakes and Mississippi River. Other monitoring activities are identified to address nutrient-related concerns in in-state lakes, streams and rivers.

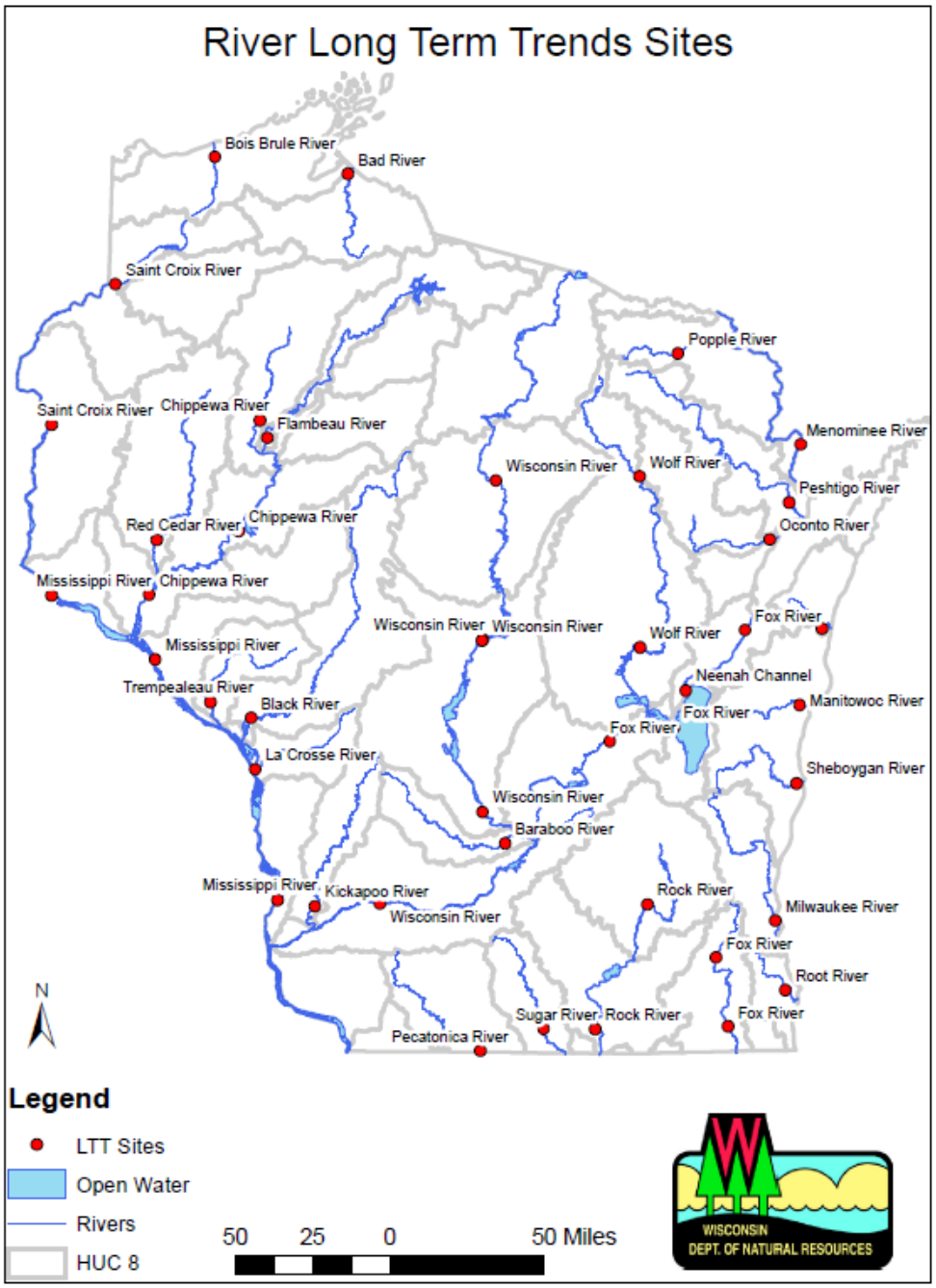

Figure ES.12 Wisconsin's River Long-Term Trends Monitoring Sites

Chapter 9. Reporting

- Wisconsin will report on nutrient reduction progress through an annual nutrient summit and information on a website, consistent with the EPA reporting element. The annual nutrient

reduction summit may be held in conjunction with period point source phosphorus control summits.

Chapter 10. Numeric Nutrient Water Quality Criteria

- In 2010, Wisconsin adopted numeric phosphorus water quality standards criteria for rivers, streams, lakes, reservoirs and the Great Lakes. DNR continues to research the impact of nitrogen on biotic stream systems.