

TMDL Development for the Lower Fox River Basin: Restoring Our Water Heritage through a Watershed Approach

Key Points for the Lower Fox River TMDL Process

Restoration & Water Quality Goals:

If we reduce TP and TSS loading to the waters of the Lower Fox River Basin we can expect to see:

- Reduced density and frequency of nuisance blue-green algae blooms resulting in lowered health risks to humans and animals – especially pets.
- Increased water clarity will lead to an expanded area of growth of plants preferred by migratory waterfowl.
- Increased habitat for invertebrates, fish, and waterfowl.
- Increased water clarity and better recreational opportunities (e.g., swimming, boating).
- Increased dissolved oxygen concentrations that will support a more diverse and robust community of fish and other aquatic life.
- Sustainable fisheries and water resources for future generations.

What was the process for developing this watershed TMDL?

In 2006, WDNR, EPA, and local stakeholders started to develop the TMDL based on over 30 years of data from Green Bay Metropolitan Sewerage District and the Lower Fox River Watershed Monitoring Program. EPA hired The Cadmus Group, a contractor, to assist DNR in developing a TMDL for the LFR Basin. This TMDL is for the Lower Fox River Basin only (from the outlet of Lake Winnebago to Lower Green Bay). WDNR has begun monitoring to establish a TMDL for the Upper Fox and Wolf Basins.

Steps to completing a watershed TMDL:

1. Involve stakeholders
2. Define water quality targets
3. Determine sources of TP and TSS
4. Allocating the loads
5. Public Participation during TMDL Development
6. TMDL Approval (State and Federal)
7. TMDL Implementation Planning

Why do we need a TMDL?

- All the waters within the Lower Fox River (LFR) Basin drain to Green Bay - the largest freshwater estuary in the world.
- The LFR Basin has 14 waters (including the Lower Fox River and Green Bay Area of Concern) on the federal “303(d)” or “Impaired Waters List” polluted by excessive phosphorus (TP) and total suspended solids (TSS) loading.
- The waters in the LFR Basin are on the list due to excessive TP and TSS loading causing low dissolved oxygen (DO) levels, degraded habitat and poor water quality.
- All “impaired waters” need Total Maximum Daily Loads, or TMDLs, as required by the federal Clean Water Act.
- A TMDL is the maximum amount of a particular pollutant, in this case TP and TSS, which a water body can assimilate and still meet water quality standards.
- A TMDL is a tool that can guide restoration efforts that lead to a better water-based recreational environment for the Lower Fox River and Green Bay area.
- Cleaner water can ensure quality of life benefits, which also lead to an increase in tourism, and the desirability of working and living in the Lower Fox River Basin.

1. Involve Stakeholders

- An Ad-hoc Science Team helped complete modeling and analysis to define numeric targets for the TMDL (numeric targets outlined below).
- An Outreach Team was developed for the Lower Fox River TMDL, chaired by Vicky Harris from the UW-Sea Grant Institute. This was an open group for others to join. Members discussed fact sheets, website content, conducted various surveys of stakeholders and reviewed results to form communication strategies.
- Stakeholder input was relied on during the TMDL development phase.
- A technical team was formed to provide input into the allocation process and review restoration scenarios to assist WDNR in TMDL development. Team members were asked to keep others informed as much as possible during this process. On December 2, 2009, an open technical meeting was held to discuss preliminary options for allocation scenarios and portions of the TMDL were changed based on the input received at this meeting.
- Future involvement from stakeholders will be needed for the TMDL implementation planning process.

2. Define Water Quality Targets

Since no numeric water quality standards existed at the time when TMDL development began, numeric water quality targets were needed to determine the TMDL. The Ad-hoc Science Team (made up of staff from WDNR, University of Wisconsin-Green Bay, UW-Milwaukee Water Institute, Green Bay Metropolitan Sewerage District, UW-Sea Grant, Oneida Nation and the United States Environmental Protection Agency (US EPA)) helped derive water quality targets for the TMDL:

Tributary Streams in the Lower Fox River Basin	0.075 mg/l (TP)	TBD for each tributary stream (TSS)
Lower Fox River (main stem from the outlet of Lake Winnebago to the mouth of Green Bay)	0.10 mg/l (TP)	20 mg/l (TSS)
Lower Green Bay (Area of Concern) Narrative Target for the TMDL	Water clarity and other conditions suitable for support of a diverse biological community, including a robust, expanded area of submerged aquatic vegetation in shallow water areas.	

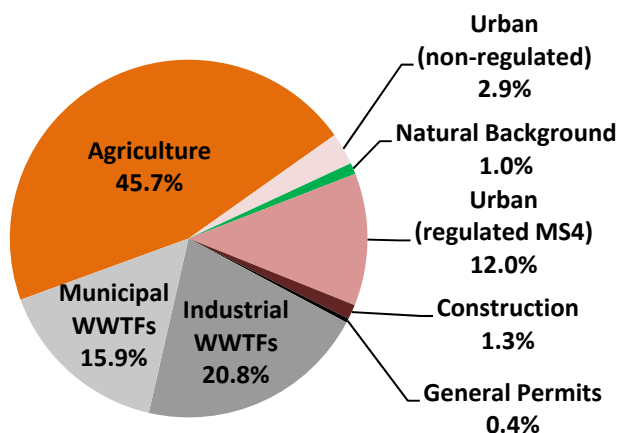
- The water quality targets for the streams and the Lower Fox River mainstem were selected based on monitoring data from the Lower Fox River watershed and the relationship between TSS and TP loads and water clarity in Lower Green Bay.
- Defined numeric targets were consistent with those proposed for statewide water quality criteria for phosphorus.
- Achieving these targets will restore habitat for fish and aquatic life and improve water clarity (therefore improving recreational conditions).
- Natural background levels for TP in this area range from 0.03-0.06 mg/L.
- Lake Winnebago and upstream sources will be addressed in the upcoming Upper Fox/Wolf River Basin TMDL to be developed in the next few years as resources allow.

3. Determine Sources of TP and TSS

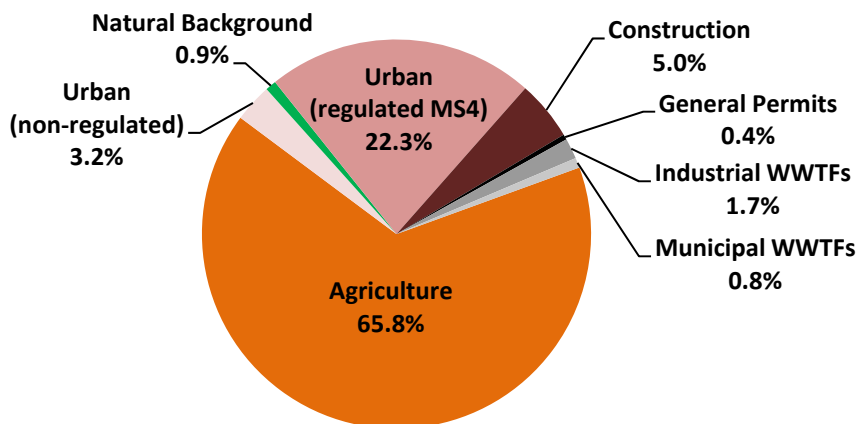
A Technical Team, comprised of stakeholders from varying technical backgrounds, was formed to review modeling data, discuss options for approaching TMDL development and provide feedback at various points. Sources and current loads for TP and TSS were determined by using the Soil and Water Assessment Tool (SWAT) model:

- Pollutants in the LFR Basin come from a variety of rural and urban sources. A large portion of waters are polluted by TP and TSS from runoff from nonpoint sources such as residential yards, streets, parking lots, farm fields, and barnyards.
- Point sources, which include municipal and industrial dischargers, have pipes that empty waste water to local streams and rivers, contributing to TP loading in the LFR Basin.
- In this TMDL, Lake Winnebago is being treated as an “input” similar to a point source. 57% of TP and 42% of TSS loading comes from Lake Winnebago. TMDL monitoring is ongoing to develop an upstream TMDL for the Upper Fox/Wolf River Basins.
- WDNR has identified a 40% TP reduction goal and a 48% TSS reduction goal for loading at the outlet of Lake Winnebago.
- Natural Background (forests and wetlands) was included in this analysis and is considered an uncontrollable source; no reduction was assigned in the TMDL for this source. However, management activities in these areas can help prevent loading from these natural areas.

Sources of TP within the Lower Fox River Basin include:



Sources of TSS within the Lower Fox River Basin include:



4. Allocating the Loads

- In the LFR Basin, reductions are needed from all sources and costs are variable depending on each source (see individual handouts for each source).
- A TMDL must be developed to meet water quality standards.

Lower Fox River TMDL Summary Tables

Total Phosphorus (TP)

	Agriculture	Municipal and Industrial Dischargers	Municipal Separate Storm Sewer Systems (MS4s)
% Contribution to Lower Green Bay (from LFR Basin only)	~46%	~16% (municipal treatment facilities) ~20.8 % (industrial treatment facilities)	~12%
Range of reductions needed from “current loads” to meet TMDL	~39% to 86%	No reductions from current load to ~75%	~30% to 63%
Applicable Existing Rules and Regulations for Implementation	NR 151, NRCS, DATCP and County Ordinances	NR 106, NR 217, NR 212, NR 102	NR 151, NR 216

Total Suspended Solids (TSS)

	Agriculture	Municipal and Industrial Dischargers	Municipal Separate Storm Sewer Systems (MS4s)
% Contribution to Lower Green Bay (from LFR Basin only)	~66%	~0.8% (municipal treatment facilities) ~1.7% (industrial treatment facilities)	~22%
Range of reductions needed from “current loads” to meet TMDL	~8% to 75%	No reductions from current load (NOT permit limit)	~40% to 65%
Applicable Existing Rules and Regulations for Implementation	NR 151, NRCS, DATCP and County Ordinances	NR 106, NR 217, NR 212, NR 102	NR 151, NR 216

5. Public Participation during TMDL Development

- A kick-off meeting was held in the beginning of the project, as well as a meeting on December 2, 2009 to encourage parties to attend and informally comment on the draft TMDL allocation scenarios.
- Throughout development, Technical Team Meetings for the TMDL were posted on WDNR's "Meeting and Public Hearing Calendar" website:
<http://dnr.wi.gov/org/caer/ce/news/hearmeet.html>
- Parties that were participants on any of the teams were encouraged to share information with constituents and invite them to participate in meetings.
- WDNR will hold a 30-day public comment period beginning in late June and a public informational hearing on July 12, 2010 at the Grand Chute Town Hall at 1:00 pm.

6. TMDL Approval Process

- All TMDLs involving waters of the state need to be approved by WDNR.
- Once approved by the state, TMDLs are sent to US EPA for federal approval.
- Once approved by US EPA, the TMDL is considered final and automatically amended to Wisconsin's Areawide Water Quality Management Plans.

7. TMDL Implementation Planning

- US EPA does not require an implementation plan be submitted with TMDLs.
- However, the LFR TMDL report will contain an implementation section that includes: reasonable assurance and an analysis to determine where wetlands could be restored and reduce TP and TSS loading in the LFR Basin.
- WDNR recognizes that implementation of TMDLs is the primary issue for citizen advocates, businesses and municipal leaders.
- Many different efforts are underway to incorporate TMDLs into longstanding programs, including revisions to NR 151, the development of phosphorus water quality criteria (NR 102, NR217), and the use of select grants (i.e. Targeted Runoff Management) to accelerate the establishment of clean water management practices throughout the state.
- An active dialogue is underway to prioritize implementation-related questions and create guidance that is reasonable and supported by existing state and federal rules and regulations.
- When planning for implementation, costs may be a critical factor in finding the "biggest bang for the buck" to work incrementally towards meeting the TMDL goals.
- Individual farms, cities and municipalities will be able to explore options that work the best for them to achieve performance standards and meet water quality goals.
- A monitoring component will be included in the TMDL to measure compliance along the way. Sampling frequency and locations will be chosen as resources allow. Other ways of measuring success may consider changes in practices, attitudes and behaviors in the Basin.
- Implementation will take an adaptive management approach, as it may take decades to meet water quality standards in impaired watersheds.