Development of a Total Maximum Daily Load and Watershed Management Plan for the Lower Fox River Basin and Green Bay Area of Concern

The 638 mi² Lower Fox River Basin is located in northeastern Wisconsin and encompasses the following counties: Brown, Calumet, Outagamie, and Winnebago, and most of the Oneida Nation Reservation. The Lower Fox River drains into Lower Green Bay; the Green Bay Area of Concern (AOC) includes a little over 21 mi² of southern Green Bay out to Point au Sable and Long Tail Point. The Lower Fox River Basin and Green Bay AOC are impaired by excess phosphorus and sediment loading. Sources of phosphorus and sediment loading to the river and bay include treated effluent from permitted municipal and industrial point source dischargers and polluted runoff from nonpoint sources, such as pastures and crop land, rural and urban land, and construction sites.

Phosphorus is an essential nutrient for plant growth; however, excess phosphorus in the river and bay increases the occurrence of unwanted algae blooms. Excess algae growth severely depletes the supply of oxygen in waterbodies, endangering fish and other aquatic life. Excess sediments in the river and bay reduce light availability to critical aquatic plants, restricting their ability to grow. Aquatic plants serve as vital habitat and food sources for fish, birds, frogs, turtles, insects, and other kinds of wildlife. They also produce life-giving oxygen, help stabilize bottom sediments, protect shorelines from erosion, and take up nutrients that would otherwise be available for nuisance algae growth.

**Process for Developing the TMDL & WMP**

1. **Define Goals of the TMDL and WMP**
   - **A. Define Restoration Goals**
   - **B. Identify Restoration Scenarios**
   - **C. Perform Cost Analysis of Restoration Scenarios**
   - **D. Develop Load Allocation**
   - **E. Determine Load Allocations**
   - **F. Develop Load Allocation**
   - **G. Develop Load Allocation**

2. **Define Scenarios for TMDL and WMP**
   - **A. Calibration and Validation of SWAT**
   - **B. Refine Geographic Coverage**
   - **C. Perform Cost Analysis of Restoration Scenarios**
   - **D. Develop Load Allocation**
   - **E. Determine Load Allocations**

3. **Develop TMDL and WMP Reports**
   - **A. Prepare Draft TMDL and WMP Reports**
     1) Identification of Waterbody
     2) Identification of Pollutants
     3) Water Quality Targets
     4) Load Calculations
     5) Load Allocations
     6) Water Quality Targets
     7) Margin of Safety
     8) Repeatability Assurances
     9) Monitoring Plan
     10) Implementation Plan
     11) Public Participation
   - **B. Finalize TMDL and WMP Reports**

4. **Revise TMDL & WMP**
   - **A. Review TMDL and WMP Reports**
   - **B. Finalize TMDL and WMP Reports**

**Timeline for the Development of the TMDL and WMP**

**2008**

- **JAN**: Define TMDL/WMP Goals
- **FEB**: Modeling Analysis
- **MAR**: Implementation Planning
- **APR**: Draft TMDL/WMP Reports
- **MAY**: Public Meeting

**2009**

- **JAN**: Finalize TMDL & WMP
- **FEB**: Review TMDL/WMP
- **MAR**: Public Meeting

**Map of the Lower Fox River Basin and Green Bay**

The Wisconsin Department of Natural Resources (WDNR) is developing a total maximum daily load (TMDL) for the Lower Fox River Basin and Green Bay AOC to address the phosphorus and sediment impairments. A watershed management plan (WMP) will also be developed simultaneously with the TMDL to address the phosphorus and sediment impairments on the segments within the boundary of the Oneida Nation Restoration (TMDL) for the Lower Fox River Basin and Green Bay AOC to address the phosphorus and sediment impairments. Point source facilities have already begun to reduce their discharge of phosphorus as part of their permit requirements established by WDNR. Additional reductions from point source facilities may be needed to restore water quality in the river and bay, reducing phosphorus and sediment leading to the Lower Fox River Basin and Green Bay AOC will require significant reductions in polluted runoff from nonpoint sources.

**TMDL Resources**

For more information regarding the Lower Fox River and Green Bay TMDL, contact Nicole Richmond at (608) 266-0152, or Nicole.richmond@wisconsin.gov, or visit the following Web site: dnr.wi.gov/water/wm/wqs/303d/FoxRiverTMDL

**ATMDL** is the total amount of a pollutant that a waterbody can receive without violating water quality standards. The TMDL for a waterbody is a natural formula:

\[
\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}
\]

where the Total Maximum Daily Load is equal to the sum of the Waste Load Allocation (WLA) from point sources, plus the Load Allocation (LA) from nonpoint sources, plus a Margin of Safety (MOS), which accounts for uncertainty between pollutant loads and the quality of the receiving waterbody.