# TOTAL MAXIMUM DAILY LOAD (TMDL) MODELING; A PATH FORWARD

**Executive summary:**

Ambiguity is the enemy of action. Watershed management is extremely complex, and there has much ambiguity in the definition of the problem of nutrient pollution, the responsibility of the various watershed land uses, and the effective means of addressing solutions. The development of sophisticated monitoring technology and the use of advanced computer modeling now allow the TMDL program to end the uncertainty, and identify an equitable and effective means of improving Wisconsin waters. Once the TMDL process is completed, the procedures for effecting nutrient loss reductions are familiar and can be applied, and financing of implementation costs are, to a large extent, available. TMDL monitoring will document improvements which will not be otherwise readily observable.

- "Under the Clean Water Act, WI is required to develop TMDLs for all waters on the Impaired Waters List. TMDL or Total Maximum Daily Load is the maximum amount of a pollutant that a body of water can receive while maintaining water quality standards. A pollution "budget" for a body of water or watershed that creates reductions needed from each pollutant source to meet water quality objectives. A TMDL study and implementation plan provides a strategic framework and prioritizes resources for water quality improvement." The TMDL process has two distinct phases; analysis, and implementation. It is important to recognize the two, the differing agencies involved, and to frame the process as a single initiative, insuring full benefit.

- A responsible CAFO farmer in Manitowoc County has exclaimed; "I do what the DNR tells me to do, I have put in buffers, and I feel I do a good job. Farmers used to be America's heroes, and now we are the enemy. What do they want me to?"  The TMDL model may recognize this gentleman for his responsibility, will make clear if this operation has room for improvement, and will be able to identify the extent of further actions.

- 83% of Manitowoc County Land use is agricultural. The major cities are on the shore of Lake Michigan, and discharge water treatment effluent and much of the urban run-off directly into that water body. Consequently, the focus of the TMDL process will be on agricultural practices. However, the assignation of responsibility will not be generalized, and further actions will be targeted and effective.

- The TMDL monitoring will be in place to reward those responsible land users with the recognition that they do not contribute to the problem, when that may not be otherwise apparent. Phosphorous pollution has so permeated Manitowoc waters that it will take decades for observable improvements in the watershed. Manitowoc's seepage lakes take 75-100 years for a water re-charge. The low slopes characterizing the landscape have led to sinks of settled nutrients. Without a TMDL, neither land users nor policy makers would be able to valuate the remedial actions based on generalized stream data, as P levels across the watershed will decline only slowly.

- As many of Manitowoc County waters are already impaired by phosphorous over-burden, a program to address the rectification of the waters needs to be included in the TMDL implementation program. These actions for lakes may include wetland settling zones, muck dredging, alum (aluminum sulfate) treatments, and site specific aeration. Stream bank stabilization programs, apart from the buffer installation, will be required to reduce erosion and resultant phosphorous pollution.

- Historical weather data has shown that storm patterns have been changing over the two preceding decades. Future policies should be forward thinking in planning for implementation practices.

- Neighboring States, especially Minnesota, have begun legislating Best Management Practices (BMPs) which will be the actions required during the implementation phase of a TMDL program. Care should be taken to insure access to Federal funds is not compromised by such legislation, but those programs should be studied for their effectiveness.