TMDL Database Development Outcomes and Rules Promulgation Report

Reporting the outcomes achieved with the Clean Water Fund appropriation for development of "an enhanced TMDL database to manage and track progress" and rule promulgation

Minnesota Pollution Control Agency

November 2010

Legislative Charge

Many constituencies within and outside of MPCA desire timely information about the Agency's progress in assessing surface water quality and developing Total Maximum Daily Loads (TMDLs) addressing impairments. To improve MPCA's ability to meet these varied information needs, the Legislature appropriated $500,000 from the Clean Water Fund for the FY2010-2011 biennium for development of "an enhanced TMDL database to manage and track progress" (H. F. No. 1231, Article 2, Sec. 4(b)).

The appropriation allocated $63,000 of the $500,000 specifically for promulgation of rules ("Of this amount, $63,000 the first year is to promulgate rules."). The outcomes achieved with that portion of the appropriation are also addressed in this report.

"By November 1, 2010, the commissioner shall submit a report to the chairs of the house of representatives and senate committees with jurisdiction over environment and natural resources finance on the outcomes achieved with this appropriation."

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Background

The federal Clean Water Act and state Clean Water Legacy Act require the Minnesota Pollution Control Agency (MPCA) to assess the condition of the state's lakes, rivers, and streams and identify those that do not meet applicable water quality standards. For each pollutant contributing to a waterbody's "impairment," MPCA must determine the Total Maximum Daily Load (TMDL) of that pollutant which the waterbody can accommodate and still meet its standards. The Agency must then outline steps to reduce the pollutant's presence to at least the TMDL level. For waters that are not impaired, MPCA must define protective measures to ensure their continued attainment of quality standards.

Watershed Focus

MPCA employs a watershed-oriented approach to assessing surface water quality, developing TMDLs, and defining restoration and protection needs. Each of Minnesota's 81 major watersheds is assessed intensively every 10 years, based on a staggered schedule that addresses, on average, eight watersheds per year. By concentrating its efforts geographically in this manner, the Agency achieves internal economies of scale, more concerted local involvement, and a holistic view of the interrelated water quality issues within a hydrologic system. The TMDLs for all impairments in a major watershed are usually developed in a single scientific project, resulting in an integrated restoration/protection plan for the watershed.

Fragmented Data Management

The watershed management process is inherently data intensive. The MPCA specialists working on each phase generate new data and draw on existing data from the preceding phases; other organizations participating in the process contribute data at every stage and wish to be informed about progress and particulars.

Provisions for electronic handling and sharing of all this data have not kept pace with the surface water program's rapid maturation over the last few years. MPCA currently has eight separate data systems, each holding data critical to the overall picture, but there are few interconnections among them. Other important data is maintained only in spreadsheets or text files (e.g., TMDL study reports). As a consequence, staff often must spend considerable time piecing information together manually from disparate sources, and data is not easily accessible by the public.

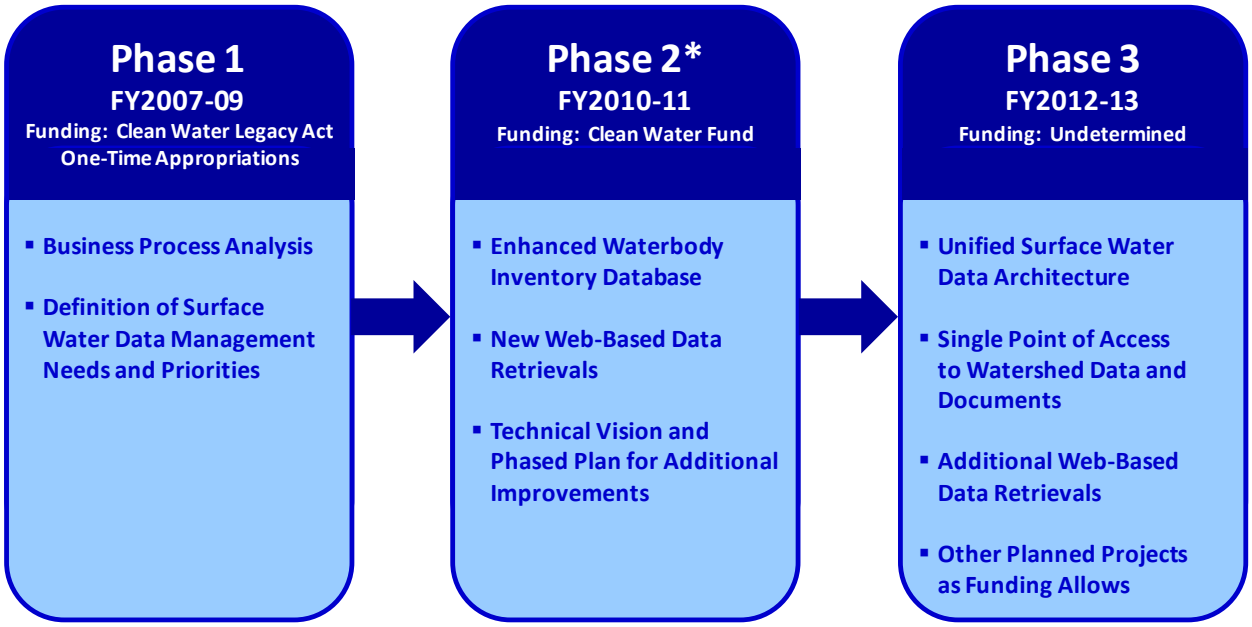
The Watershed Data Integration Project

In 2006 (FY07) MPCA began a multi-year process to improve data system support for surface water management (Figure 1). Phase 1 of this "Watershed Data Integration Project" (WDIP) performed two foundational tasks: a business process analysis of the surface water management program; and focus group discussions to identify needs and priorities for data management improvement.

Phase 2 then focused on developing selected high-priority improvements identified in Phase 1, designing a comprehensive integrated data architecture for the future, and creating a master plan for the additional work required. In Phase 3 and succeeding phases, MPCA will implement additional improvements in accordance with that plan, if funding for the necessary contractor support can be obtained.

Phase 2 activities were funded entirely by a legislative appropriation of $437,000 from the Clean Water Fund for development of "an enhanced TMDL database to manage and track progress." The remainder of this report describes the outcomes achieved with that appropriation. The scope of these outcomes is considerably broader than an enhanced TMDL database, constituting essential groundwork for improvements across the full range of watershed management activities, including TMDL development.

Figure 1. MPCA's Watershed Data Management Project



* The outcomes achieved in Phase 2 are the subject of this report.

Outcomes Achieved

Phase 2 of MPCA's Watershed Data Integration Project, in progress until the end of the biennium, will produce the following outcomes with the appropriation provided for FY2010-11.

Outcome 1: Enhanced Waterbody Inventory Database

The linchpin for surface water data management is an automated inventory of the waterbodies—lakes, wetlands, and river/stream segments—which have been or will be assessed to determine their condition. This central master list contains basic descriptive information about each waterbody, including a unique identification number referenced in other databases, providing a reliable means of linking together waterbody-level details stored in different locations. To strengthen this essential foundation for data integration, MPCA has made several important improvements to its existing waterbody inventory. For example:

- Obsolete data fields were removed and useful new fields added, aligning the inventory's contents with current business practices and information needs.
- The database was moved to the "core" (enterprise-level) sector of MPCA's data architecture, and many data table and field names were changed to conform with Agency-wide naming conventions. These steps position the waterbody inventory as a central, shared resource and make it subject to more stringent data integrity protections.
- The data structure was modified to allow individual stream segments or lakes to be represented as located in multiple political subdivisions—i.e., they cross municipality, county, or legislative district lines—allowing more accurate retrieval of the waters (or impairments) within a given jurisdiction.
- In 2011 a graphical user interface will be added to facilitate data entry and updating by authorized staff, and to provide additional quality control safeguards.

Outcome 2: New Web-Based Data Retrievals

Since 2003 MPCA has provided web-based access to water quality monitoring data via its "Environmental Data Access" (EDA) web pages. Other information of widespread interest, such as lists of impaired waters and TMDL projects, can be found elsewhere on the public site, but usually embedded in lengthy PDF or Excel documents.

In the last few months, the Agency has designed a new generation of web-based tools that allow internal and external users to perform flexible retrievals to meet their specific information needs. In the requirements definition process, MPCA solicited ideas and comments from many of its local government and non-profit partners in surface water restoration/protection.

The new data access tools will be implemented in phases. The first group, scheduled for introduction early in 2011, will enable visitors to the web site to quickly and easily:

- Determine whether a particular waterbody is impaired and, if so, the status of the TMDL project(s) addressing the impairment(s);
- Examine information regarding a waterbody's assessment, including the parameters that were evaluated and the assessment team's comments supporting the impaired/not impaired decision;
- Retrieve a custom list of impairments (e.g., for a specified watershed, county, legislative district), with links to information about the project(s) addressing them;
- Retrieve a custom list of TMDL projects (e.g., by geographic area and/or project status), with links to project details;
- Retrieve a list of the impairments addressed by a particular TMDL project.

If funding permits, MPCA will significantly expand data access capabilities in future phases of the Watershed Data Integration Project, as discussed below.

Outcome 3: Technical Vision and Phased Plan for Additional Data Management Improvements

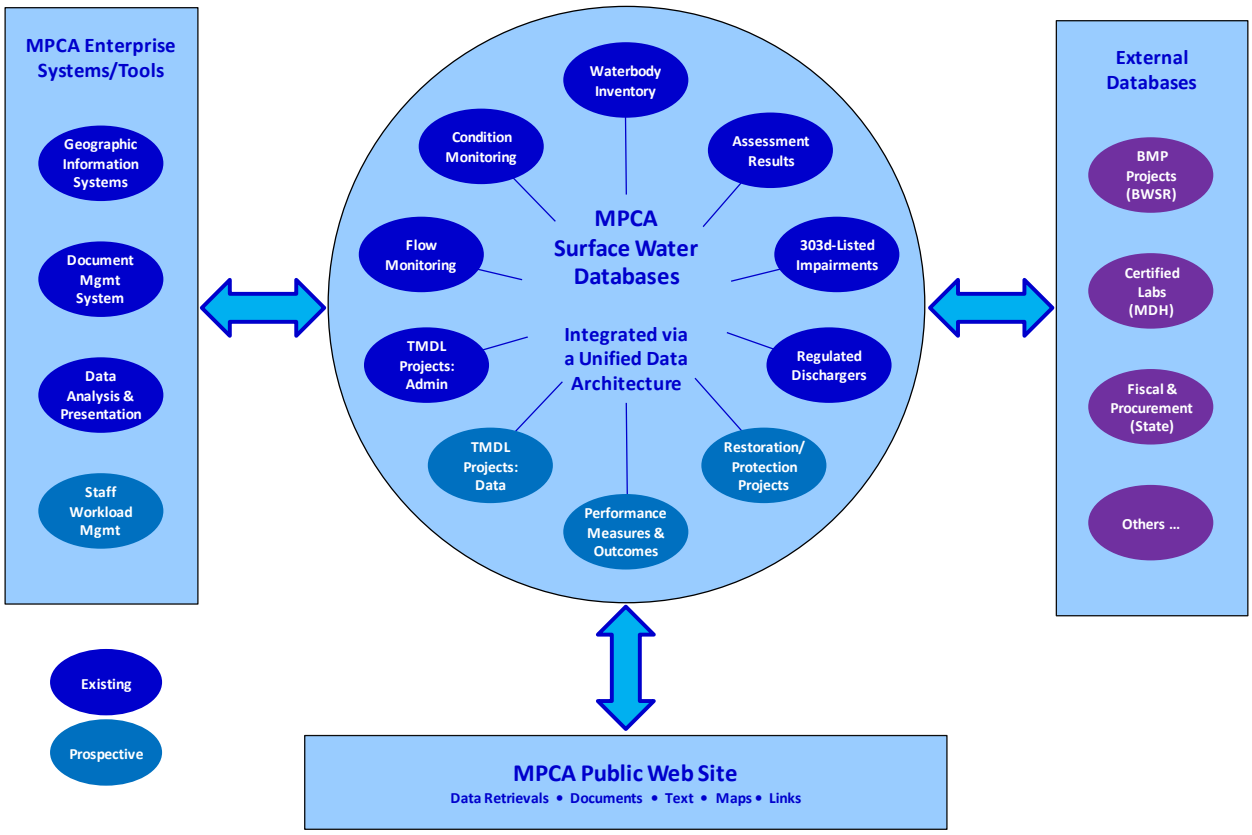
Outcomes 1 and 2 describe the tangible improvements MPCA is achieving with the legislative appropriation for Phase 2 of the Watershed Data Integration Project. Meanwhile, the Agency has also devoted a portion of the funding to analysis and planning for subsequent phases of the project. Early in 2011 that forward-looking work will culminate in a detailed technical vision document and a phased development plan for additional data integrations and public access improvements, the blueprints for desired future construction.

Figure 2 shows the overall WDIP vision at a very high level. The technical vision document and development plan will address the following topics, among others, in greater detail.

Unified Watershed Data Architecture

The new web-based retrievals described above require specialized new data structures that merge data from disparate sources, but such after-the-fact integration is only a short-term expedient. MPCA's longer-range objective is to transition all relevant data to a comprehensive Oracle data architecture that integrates the data from all phases of the surface water management process—monitoring, assessment, TMDL development, and restoration—and thereby dramatically reduces the need for costly ad hoc integrations. (The goal is not to create one monolithic system, but rather a properly organized and efficient data structure underlying all surface water-related systems, current and future.)

Figure 2. General Vision for MPCA's Watershed Data Integration Project



Single Point of Access to Watershed Data and Documents

Under MPCA's watershed-based approach to surface water protection, the monitoring, assessment, TMDL study, and implementation activities for a given watershed are essentially phases of a single large project. A unified data architecture will make it possible to view, in one location, the full picture for each watershed project at any point during its 10-year cycle. For example, the Agency envisions a web-based "central file room" where project participants and the interested public will have convenient online access to all of the data and documents associated with each phase of the work for a given watershed.

Additional Web-Based Data Retrievals

As resources allow, MPCA will develop additional web-based data access features to meet both internal and external needs. Examples include capabilities to:

- Retrieve a list of the impairments located downstream from a specified location, such as a wastewater or stormwater discharge pipe;
- Retrieve a list of the regulated dischargers located upstream from an impaired waterbody;
- Retrieve a custom list of numeric pollutant reduction targets ("allocations" derived from TMDLs)—e.g., for a specified source or source type, or for a given pollutant, or within a watershed, county, or other geographic area;
- Retrieve a custom list of Best Management Practice implementations within a specified area, with associated details for each (requiring integration with BWSR's eLink database and other sources);
- Retrieve metrics showing the extent, pace, and cost of progress, e.g., in developing TMDLs, in reducing pollutant inputs, and, ultimately, in returning impaired waters to good health and preventing new impairments.

Section 2: Rule Promulgation

Background

The appropriation bill allocated $63,000 of the $500,000 specifically for promulgation of water quality pollutant trading rules.

Outcomes Achieved

Draft water quality Pollutant Trading Rules and a Draft Statement of Need and Reasonableness (SONAR) have been developed. The proposed water quality pollutant trading rules will enable the trading of pollutants among wastewater treatment plants and other wastewater treatment plants or nonpoint sources of pollution. On October 21, 2010, the Agency Water Quality Policy Forum authorized the team to proceed to rule making. The proposed rule's Notice of Hearing in the State Register is planned for January, 2011.

Process Used in Development of Proposed Rules

The Agency used an Advisory Team to assist in the development of and to provide feedback on the proposed rules. The Advisory Team met five (5) times and included representatives from the Minnesota Department of Natural Resources (MDNR) and the Minnesota Department of Agriculture(MDOA), several watershed and soil conservation districts, city representatives from throughout the state, the Nature Conservancy, The University of Minnesota, Minnesota Chamber of Commerce, and several Minnesota businesses and industries. The Agency also hired a private consultant to assist in the development of a portion of the rule which assures trades result in equivalent pollutant reductions between the sources of pollutants involved in a trade.