



# Fact Sheet: Analysis of TMDL Implementation Rates in EPA Region 5

## Background: TMDLs and their implementation

The goal of the Clean Water Act (CWA) is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters. Toward this goal, the CWA requires development of Total Maximum Daily Loads (TMDLs) for impaired waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of the load reduction needed from various sources of the pollutant. TMDLs are in the form of technical documents that summarize the analysis and lay the groundwork for beginning to plan restoration. Over 40,000 TMDLs have been developed, and the number is continually increasing.

EPA and state water programs have effectively tracked the identification of impaired waters and the development of TMDLs, but it has been particularly challenging to track TMDL implementation – the actions taken through point source (PS) control permits and nonpoint source (NPS) control practices to reduce pollutant loads and meet the goals of a TMDL. Implementing a TMDL is very often a complex assortment of control actions carried out by multiple organizations and funding sources, with no central authority for tracking. Case-specific accounts of implementation are numerous, but the actual rate of implementing TMDLs nationally or regionally has remained virtually unknown because full census and tracking of every implemented practice would be an overwhelming if not impossible task, costing millions per year. Yet, EPA and state TMDL programs see TMDL implementation rates and patterns as valuable information for determining whether the TMDL program is leading to action on the ground and what else might be done for program improvement.

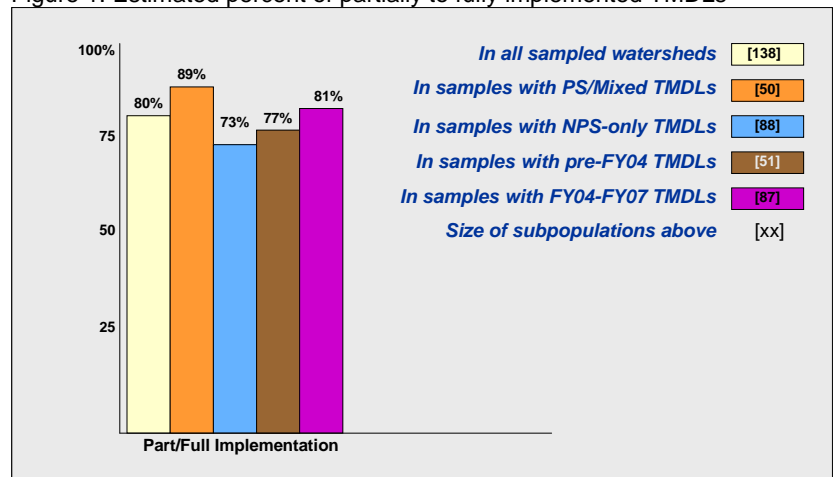
## A sample-based method for estimating TMDL implementation rates

To gain insight on implementation rates at an affordable cost, EPA’s TMDL Program Results Analysis Project conducted a sample-based analysis of TMDL implementation rates and characteristics in the six EPA Region 5 states (Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin). A probabilistic sample was drawn from all TMDLs established through FY2007. Sampled TMDLs were allocated proportionally to states based on each state’s total TMDL production. Regional but not specific state-level statistics were targeted. Subpopulations of interest were sampled to contrast older (through FY2003) versus newer (FY2004 – FY2007) TMDLs, and NPS-only TMDLs versus PS-related (PS-only and mixed PS/NPS) TMDLs. The project team extracted information on each of the 138 sample TMDLs and their proposed NPS and PS controls from EPA data systems in advance of working with each state to verify implementation rates and patterns across the entire EPA Region. All six states’ water programs collaborated extensively in compiling the study data.

## Overall implementation rates

This assessment demonstrated that, within a +/- 10% margin of error at a 90% Confidence Interval, an estimated 80% of Region 5 TMDLs were at least partially implemented (Figure 1). Full implementation was uncommon. No implementation was observed in approximately 20% of the sample, but the diffuse nature of control practices typical of many TMDLs made complete verification of every practice difficult. Among subpopulations, implementation rates did not differ significantly between older or newer TMDLs, but the mixed TMDLs implementation rate exceeded the NPS-only rate by 16%. The high, 88% rate in PS-related TMDLs may have been related to the mandatory nature of PS control permits versus the voluntary nature of NPS controls. Statistical weighting methods enabled % estimates for the whole region rather than the study sample alone.

Figure 1: Estimated percent of partially to fully implemented TMDLs



**Completion of an implementation plan**

This assessment also addressed the rates at which TMDLs in the sample were found to have a finalized implementation plan (Figure 2), although a plan was not considered actual implementation of on-the-ground actions. The estimated overall rate observed in the regional sample was that nearly 80% of the Region's TMDLs have a completed implementation plan. Among the subpopulations, older TMDLs with plans (99%) exceeded newer TMDLs with plans (77%). The NPS-only TMDLs with plans (92%) also exceeded the PS-related TMDLs with plans (67%).

**Implementation in multi-TMDL efforts**

TMDLs generated as part of large watershed, multi-TMDL efforts accounted for an estimated 96% of all the Region's TMDLs. These also comprised 16% more of the newer TMDLs subpopulation than the older TMDLs subpopulation (Figure 3). Multi-TMDL efforts are gaining in popularity nationwide and are believed to be more effective ways to complete numerous TMDLs, coordinate among adjacent restoration efforts, and remain cost-effective.

**Exploring associations with land cover**

Post-analysis steps included exploring GIS data on the watershed traits of each sampled TMDL for other possible associations with patterns of implementation, and evaluation of possible subcategorization of the 'partially implemented' samples to provide more detailed information. Analysis of predominant land cover in the samples' watersheds did not reveal significant differences among implementation rates associated with urbanized, heavily agricultural, lightly agricultural, and rural non-agricultural watersheds (Figure 4). However, untested associations with other combinations of land cover pattern may still be related to differences in implementation rates.

**Further refinement of 'partly implemented'**

Study results were initially compiled with all partial implementation in one category, which varied widely from early stages to nearly full implementation. Efforts to further subcategorize samples that were initially classified as partially implemented were partially successful in showing that substantial implementation had occurred in many of the sampled TMDLs, but unsuccessful in finding ways to further quantify partial implementation (e.g., percent implemented) across all sampled TMDLs based on loading reduction or numbers of implementation practices planned versus carried out. These efforts at category refinement were substantially limited by data gaps and by the difficulty of consistently comparing widely variable TMDLs to one another.

Figure 2. Estimated percent of TMDLs that have an implementation plan

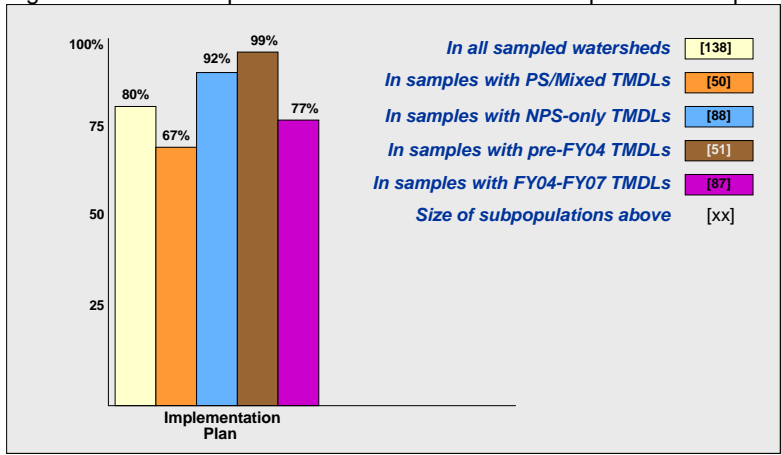


Figure 3. Partially to fully implemented TMDLs created as part of multi-TMDL efforts, as distinct from single-waterbody TMDLs.

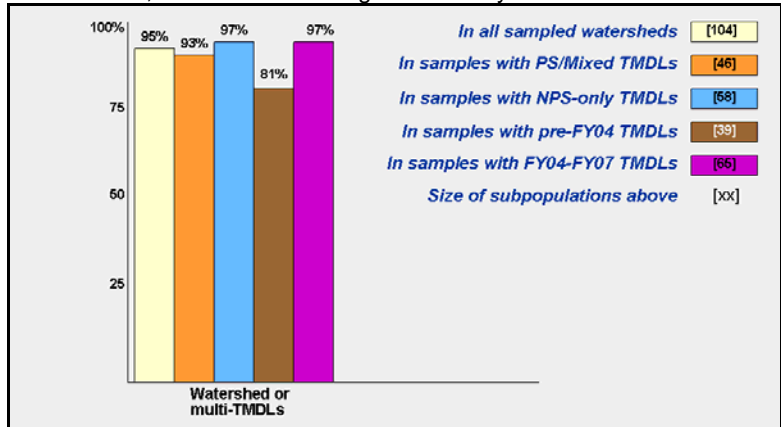
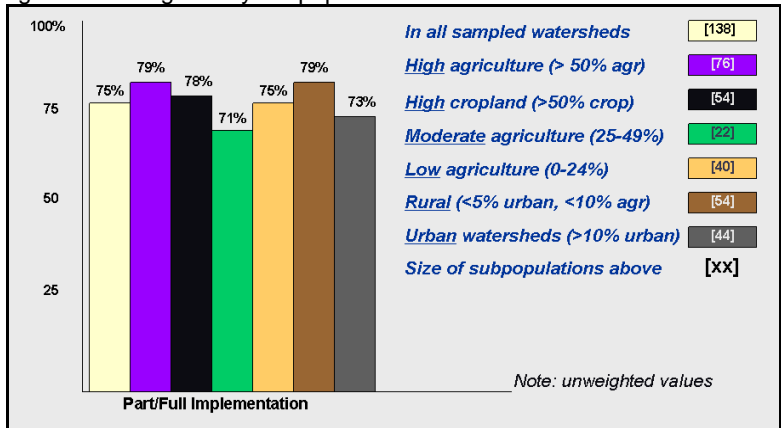


Figure 4. Implemented TMDLs reaggreated by watershed land cover; figures not weighted by subpopulation.



For more about TMDLs and impaired waters, including a downloadable full-length version of the report "Analysis of TMDL Implementation Rates in EPA Region 5," visit: