Fact Sheet:

The Clean Water Act "Impaired Waters Restoration Pipeline"

The Total Maximum Daily Load (TMDL) program, defined by Section 303(d) of the federal Clean Water Act (CWA), is a cornerstone of the CWA's restoration approach for impaired surface waters. A 303(d)-listed water is an impaired water body that does not meet Water Quality Standards (WQS), and a TMDL is a technical analysis that calculates the reduction in pollutants necessary for an impaired water body to again meet WQS. The national totals of impaired waters, and waters for which a TMDL has been developed, both number in the tens of thousands.

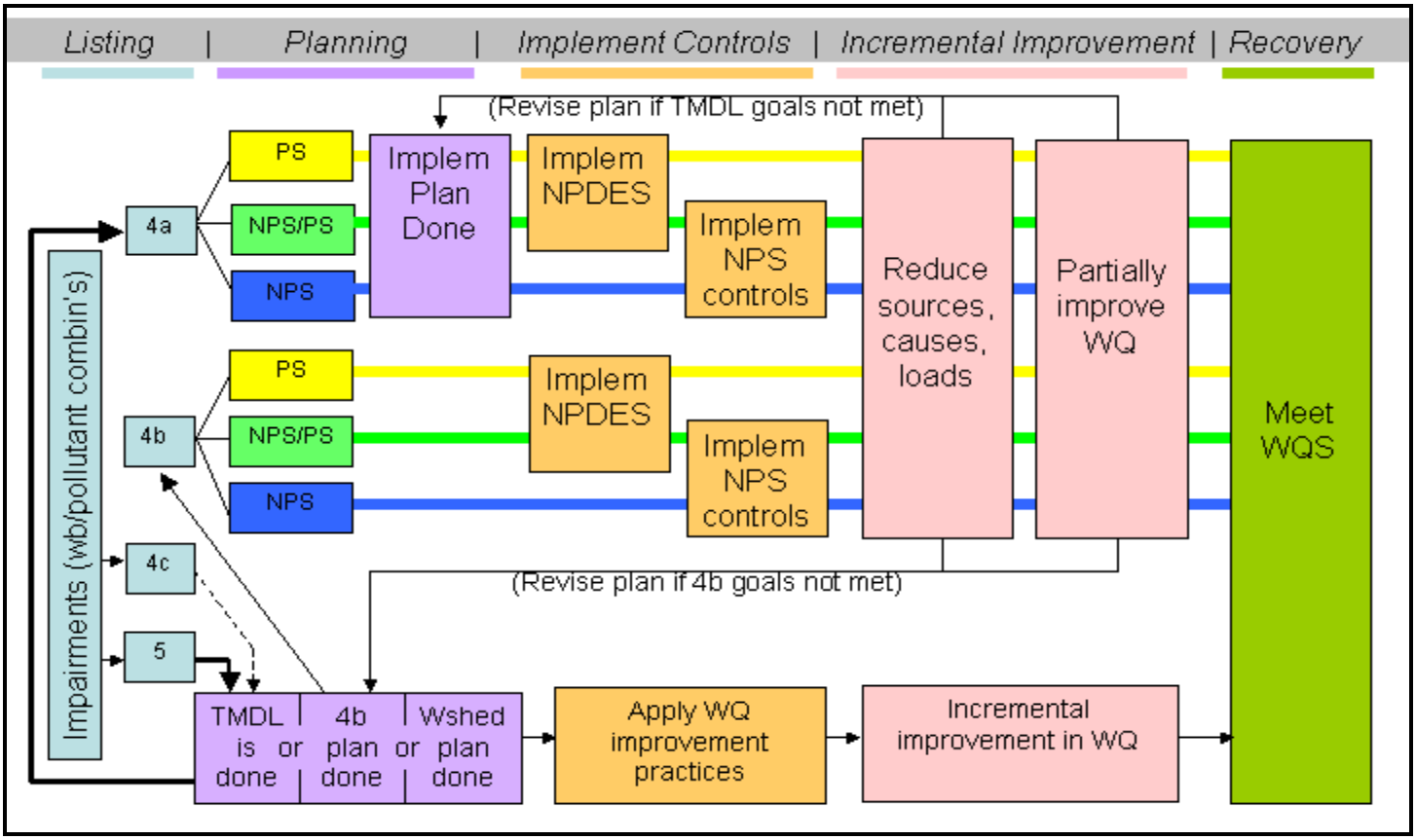
The TMDL program is actually one of several CWA programs that work together in a complex sequence to accomplish restoration. Understanding the interactions of these programs is helpful in evaluating TMDL program progress and results as a key part of the CWA's broad-based effort to restore and maintain US waters. This fact sheet provides a tour through the 'Impaired Waters Restoration Pipeline' by way of a process diagram, provided in a simplified version (below) and a detailed version (back of page).

The TMDL program does not operate in isolation from other sections of the CWA. Using data from their CWA monitoring programs, States (meaning states, territories and authorized Tribes) report to EPA biennially on the condition of all their waters (impaired, unimpaired, and uncertain) and organize them into standardized, numbered categories based on condition and available information. The subset of waters impaired by pollutants is the focus of the TMDL program, but waters with non-pollutant impairments (e.g., flow alteration, habitat degradation) can also have TMDLs. Additional CWA programs play major roles in the restoration process. For example, National Pollutant Discharge Elimination System (NPDES) permits are part of the process for controlling point sources, and nonpoint source (NPS) Best Management Practices (BMPs) and watershed plans are often funded by CWA's Section 319 NPS Control Program. Integrating these programs can be complicated, but it increases the Clean Water Act's effectiveness in restoring impaired waters.

The simplified pipeline diagram. The diagram below shows that impaired waters pass through five main stages as they are listed, acted upon, and restored under the Clean Water Act. Generally moving from left to right, the sequence involves listing (which includes 303(d) impaired waters assessment, listing and reporting), planning (which includes TMDL development and approval, followed by developing an implementation plan), implementing controls (for point and non-point pollution contributing sources), undergoing incremental improvement (tracked by monitoring efforts), and achieving recovery (fully attaining WQS). The program activities related to each of the five stages appear in white above each stage; note that TMDLs have a key role in planning restoration while other programs (including programs outside CWA) later implement controls and track recovery based on what is generally designed in the TMDL.

A more detailed look at the pipeline: the TMDL Program's broader CWA context (see back of page). The more detailed diagram parallels the five stages of the simplified pipeline above, but provides more insight into how program components interact and how the procedural details may differ among waters with point, non-point or mixed impairments. Note the following details in particular:

- Initially at far left, all known impairments or 'water body/pollutant combinations' are identified using state monitoring data and assessment methodologies, then listed under specific list categories as part of biennial state Integrated Reports to EPA;
- Pollutant-caused impairments requiring TMDLs are placed in Category 5, the formal CWA 303(d) list. Impairments caused by non-pollutants (for which TMDLs are optional) are placed in Category 4c;
- Impaired waters in Category 5 may undergo three types of further action. Many undergo development of a TMDL, which delists them from Category 5 and moves them to Category 4a preparatory to implementation. Some undergo development of a 4b plan, which is a TMDL alternative based on commitment to other required actions expected to meet WQS. The third type includes impaired waters that await TMDL or 4b development; these may improve in the meantime due to other actions such as watershed plans, restoration, or better pollution control due to increased awareness of the impairment;



- The program process for impaired waters with completed TMDLs (4a) differs based on whether the impairment is caused by point sources, nonpoint sources or mixed sources. All involve an implementation plan. NPDES permits are mandatory for the point source and the point source components of mixed source waters. Non-regulatory nonpoint controls are customarily implemented for the mixed and nonpoint source waters. Later the pathways again become similar as, over time, the waters exhibit incremental improvements (i.e., improved water quality or reduced causes of impairment) and eventually full recovery;
- The program process for impairments following the 4b alternative differs from 4a mainly in the absence of a TMDL and Implementation Plan, both of whose primary functions are served by the 4b plan. After this alternative planning stage, the implementation of controls, monitoring of incremental improvements and full recovery under 4b are all generally as under 4a;
- For some impairments on the 4a and 4b pathways in which WQS apparently will not be met by the current course of action, adaptive management feedback loops (upper and lower center of diagram) return the impaired water to the planning stage for adjustments;
- When impairment restoration efforts proceed along any of the above pathways and reach the far right box, 'Meet Water Quality Standards,' the primary goal of recovery has been achieved and the formerly impaired water leaves the pipeline, so to speak. Waters that were formerly in Categories 4a, 4b, 4c, or 5 in the pipeline are listed in Category 1 or 2 when states produce their next biennial Integrated Report on the condition of all their waters. Category 1 contains waters that fully meet all designated uses, and Category 2 is used when waters that now meet some designated uses have insufficient data to determine if all uses are supported.

***About the TMDL Program Results Analysis Project**. The EPA Office of Water's National TMDL Program initiated the TMDL Program Results Analysis Project to assess the environmental outcomes and programmatic progress of the TMDL program, analyze probable causes for these findings, and interpret the implications for potential program improvements. The general approach involves identifying and measuring indicators of environmental change or programmatic efficiency that provide insights about specific elements of the TMDL program's performance. Analysis products include project reports, published papers, a website, and this fact sheet series. For more information please contact the TMDL Results Analysis Project Leader, Doug Norton, at norton.douglas@epa.gov.*