

# TMDL - Total Maximum Daily Loads

No. 9a

Obed Watershed Community Association

July 2006

**Clean Water Act:** The Clean Water Act (CWA), passed in 1972, addressed both point and nonpoint sources of pollution and water quality in the US. Point sources are permitted discharges such as the Crossville wastewater treatment plant and industries. Nonpoint sources include runoff and polluted groundwater from urban, agricultural, and forestry activities. Initial CWA efforts were oriented toward implementing best available technology and practices. Municipal wastewater treatment plants, for example, were required to install secondary and tertiary treatment. For the first twenty years of the CWA, the nonpoint sources of pollution of American waterways were rarely addressed.

**TMDLs by Lawsuits:** Beginning in the early 1980s, lawsuits pushed the US EPA and state environmental agencies to shift their focus from cleaning up pipe discharges to addressing both point and nonpoint source pollution on a watershed basis. Water quality management expanded to encompass the actual quality of the waterbody itself, not just what came out of a pipe.

**TMDL Process:** When a lake or stream does not meet Water Quality Standards (WQS), a study must be completed to determine the amount of a pollutant that can be put in a waterbody from point and nonpoint sources and still meet WQS. TMDL is used as a short hand acronym for how this determination is made.

## Need for TMDLs

### TN Water Quality - National Ranking

- Ranks second in number of stream miles affected by toxic organics.
- Ranks third in the number of stream miles affected by sedimentation.
- Ranks fourth in the number of stream miles affected by pathogens.
- Ranks fourth in the number of stream miles affected by “other” pollutants.
- Ranks sixth in the number of stream miles affected by nutrients.

## Water Quality Standards

**Use Classification for Surface Waters:** While individual property owners own the land, states own the water flowing over it and through it. EPA identified seven water use classifications: navigation, domestic water supply, industrial water supply, fish and aquatic life, recreation, irrigation, and livestock watering and wildlife.

**Safe Levels to Protect Uses:** EPA has set water quality criteria to protect different water uses. For example, fish need to have minimum oxygen levels to survive. Drinking water cannot exceed very low levels of toxic pollutants.

**Antidegradation Requirements:** The Clean Water Act requires that states maintain existing uses of waterbodies and set an adequate level of water quality standards to protect their use. States must protect high quality water that exceeds levels necessary to support uses and provide special protection for Outstanding National Resource Water.

## 303(d) Lists

**Setting Beneficial Uses of Water Body:** States first set the use classification of the streams and lakes within their borders. The TMDL for each water body is set at a level that will allow the stream or lake to achieve the water quality standards set for its use.

**Identify Impaired Streams:** Section 303(d) of the CWA requires that states report streams and water bodies that do not meet ambient water quality standards - streams that fall below the water quality standard for their use. To identify the impaired waterbodies, the states must use reliable water quality data that is less than five years old. This assessment reflects the biological, habitat, sediment, and chemical quality of surface waters.

**Reporting:** The resulting inventory of impaired streams and water bodies, called the 303(d) list, is updated every two years by states and provides a basis for decisions related to restoring water quality. States have the responsibility to list the impaired streams within their borders and to report them to the US EPA. Listed waters are prioritized with respect to designated use classifications and the severity of their pollution.

**Developing TMDLs:** States must develop a TMDL plan of action for the prioritized 303(d) streams which take consider all the sources of pollution from nonpoint as well as point sources. The TMDL process establishes the maximum allowable loadings of pollutants for a waterbody that will allow the waterbody to maintain water quality standards.

TMDLs are generally developed one pollutant at a time, and a waterbody may have multiple TMDLs for different pollutants. The TMDL manager must first establish the amount (or load) of pollutant a water body can take in, or assimilate, without degradation in beneficial uses. These loads are called Total Maximum Daily Loads (TMDLs) and represent the sum of all waste load allocations from point sources, nonpoint sources, natural sources, and a margin of safety.

**Implementing TMDLs:** A draft TMDL is released for public comment. After making any appropriate modifications in response to the public comment, the TMDL is sent to EPA for approval. Once approved, the state is required to implement the TMDL so the water body will meet Water Quality Standards. The TMDL is implemented through existing programs, such as National Pollution Discharge Elimination System (NPDES) permits for point source discharges and nonpoint source control programs, to achieve the necessary pollutant reductions. TMDLs do not establish new regulations beyond those that currently exist. Currently, no nonpoint source pollution regulations affect farmers; thus, implementation requires voluntary cooperation of farmers.

**TMDL Monitoring:** Water quality monitoring is a critical component throughout the entire TMDL process. The overall objectives of TMDL monitoring are,

- Determining compliance with regulations. How much higher are the actual loads than the target loads? Do they vary with time?
- Identifying sources of major loading. Typically upstream / downstream monitoring approaches will indicate which reaches of a stream contribute the most pollutant. Changes in water quality between two points are used to determine where pollution originates.
- Evaluating how the plans are working to bring the water body back into compliance. Where TMDLs are not met, stakeholders must develop a watershed management plan that includes Best Management Practices (BMPs) designed to improve water quality. Monitoring is required to determine which BMPs are actually effective improving water quality and to assess their degree of effectiveness.

**Management of TMDLs:** Because TMDLs are based on the federal Clean Water Act, the US EPA has primary responsibility for their administration. However, EPA delegates this responsibility to the states. In our state, that is the TN Department of Environment and Conservation.

**Community Involvement:** Public Process: TMDL development is a public process that works best with the involvement of all affected parties. This is particularly important during the discussion on allocation and implementation issues. Participation by local communities and landowners leads to more representative TMDLs that can be readily implemented. This leads to quicker improvements in water quality.

Resources: EPA/watershed website; TDEC website;

The Obed Community Association has as its purpose community appreciation and volunteer involvement in ongoing research of the natural and cultural heritage of the Obed River watershed within Cumberland County. Louise Gorenflo, OWCA director, produced this fact sheet. Those wanting to join this membership organization or more information may contact OWCA at 484-2633 or at 185 Hood Drive, Crossville, TN 38555.

# TMDL for the Obed Watershed

**303(d) List: The following 303(d) streams of Cumberland County have TMDLs**

Waterbody ID	Waterbody	Stream Miles	Watershed /ID	Pollutant Source	Pollutant Cause
06010208013_0400	Drowning Creek	13.1	0102	Siltation - physical substrate alteration	Nonpoint animal feeding operations
060102088013_2000	Obed River	3.2	0101	Stream flow alteration / physical substrate alteration	Discharges from urban area / upstream impoundment
060102088015_0510	Long Branch	2.2	0201	Siltation	Abandoned mine lands
060102088015_0810	One Mile Creek	8.5	0202	Siltation	Land development

**Cumberland County 303(d) Streams with a TMDL**

**Applicable Water Quality Standards:** The streams of the Obed River and its tributaries are expected to meet the highest water quality standards, that for fish and aquatic life. The state requires that the water quality of our streams be sufficient to maintain or increase their diversity and productivity of aquatic biota. The biological integrity of the streams is measured using macroinvertebrates as indicator species.

**Siltation:** Siltation is the process by which sediments are transported by moving water and deposited on the bottom of streams, rivers, and lakebeds. It is the most frequently cited cause of waterbody impairment in TN, impacting over 5,743 TN stream miles. Excessive sediment loading is a major ecosystem stressor that can adversely impact biota directly or through changes to its physical habitat. In streams and rivers, fine organic sediments, especially silts and clays, affect the habitat for macroinvertebrates and fish spawning, as well as rearing and feeding behavior. Suspended sediment affects the light available for photosynthesis by plants and visual capacity of animals.

**Nonpoint Sources:** The vast majority of sediment loading to surface waters comes from nonpoint surfaces. Sources include natural erosion, soil erosion from farming and livestock operations, construction runoff, street runoff, unpaved roadways and road construction, runoff from abandoned mines, and runoff from timbered land. For impaired waterbodies within our watershed, most of the sediment comes from agriculture, roadways, and urban sources (construction and street dust.)

**Sediment TMDLs or the Impaired Watershed (pounds/acre/year)**

Waterbody	Existing sediment Load	Target Load	TMDL - % Required Load Reduction
Drowning Creek	340	135.5	60.1%
Obed River	496	135.5	72.7%
Long Branch	265	135.5	48.9%

One Mile Creek	732	135.5	81.5%
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**Point Source Implementation:**

- The ready mix concrete facilities and mining sites within the impaired watersheds are currently regulated under existing permit requirements for these sites.
- Construction storm water: all existing and new construction sites must get approval for their stormwater sedimentation prevention plan, implement plan. They are then monitored for compliance with state regulations affecting construction stormwater discharges.

**Non-Point Source Implementation:** TDEC has no direct regulatory authority over most nonpoint discharges. Sedimentation reduction depends upon:

- Voluntary, incentive-based programs.
- Cooperation and active participation by the general public through landuse planning, public education, and advocacy of agricultural best management practices.

Resources: “Proposed TMDL for Siltation and Habitat Alteration in the Emory Watershed,” TN Department of Environment and Conservation (April 17, 2006.)

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