TMDL Implementation Under the Clean Water Act

Bruce Zander

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Strategies in Western Water Law and Policy:
Courts, Coercion and Collaboration
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NATURAL RESOURCES LAW CENTER
University of Colorado
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Introduction

In the 1972 Clean Water Act, Congress included a provision in Section 303 which called upon States to develop and implement water quality standards for surface waters. Included in this part of the Act is a provision found in §303(d) (see following page) which requires States to implement their standards through the development of total maximum daily loads (TMDLs). Although this requirement has been in existence for 27 years, most of the effort in implementing TMDLs until the 1990's has focused on supporting water quality-based decisions for point source dischargers. As water quality planning takes on a wider perspective, looking at all activities within a watershed, TMDLs have become a valuable tool in translating water quality standards to a combination of point and nonpoint source controls needed to achieve in-stream goals.

The purpose of this presentation is to familiarize the audience with the TMDL process, describe the regulatory requirements for TMDL development, present how TMDLs fit in with the watershed approach, and to provide a series of TMDL case examples that demonstrate the issues and opportunities surrounding the TMDL program.
FEDERAL WATER POLLUTION CONTROL ACT
Section 303(d)

(1)(A) Each State shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standard applicable to such waters. The State shall establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters.

(B) Each State shall identify those waters or parts thereof within its boundaries for which controls on thermal discharges under section 301 are not stringent enough to assure protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife.

(C) Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

(D) Each State shall estimate for the waters identified in paragraph (1)(B) of this subsection the total maximum daily thermal load required to assure protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife. Such estimates shall take into account the normal water temperatures, flow rates, seasonal variations, existing sources of heat input, and the dissipative capacity of the identified waters or parts thereof. Such estimates shall include a calculation of the maximum heat input that can be made into each such part and shall include a margin of safety which takes into account any lack of knowledge concerning the development of thermal water quality criteria for such protection and propagation in the identified waters or parts thereof.

(2) Each State shall submit to the Administrator from time to time, with the first such submission not later than one hundred and eighty days after the date of publication of the first identification of pollutants under section 304(a)(2)(D), for his approval the waters identified and the loads established under paragraphs (1)(A), (1)(B), (1)(C), and (1)(D) of this subsection. The Administrator shall either approve or disapprove such identification and load not later than thirty days after the date of submission. If the Administrator approves such identification and load, such State shall incorporate them into its current plan under subsection (e) of this section. If the Administrator disapproves such identification and load, he shall not later than thirty days after the date of such disapproval identify such waters in such State and establish such loads for such waters as he determines necessary to implement the water quality standards applicable to such waters and upon such identification and establishment the State shall incorporate them into its current plan under subsection (e) of this section.

(3) For the specific purpose of developing information, each State shall identify all waters within its boundaries which it has not identified under paragraph (1)(A) and (1)(B) of this subsection and estimate for such waters the total maximum daily load with seasonal variations and margins of safety, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculation and for thermal discharges, at a level that would assure protection and propagation of a balanced indigenous population of fish, shellfish and wildlife.

(4) LIMITATIONS ON REVISION OF CERTAIN EFFLUENT LIMITATIONS.--

(A) STANDARD NOT ATTAINED.--For waters identified under paragraph (1)(A) where the applicable water quality standard has not yet been attained, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section may be revised only if (i) the cumulative effect of all such revised effluent limitations based on such total maximum daily load or waste load allocation will assure the attainment of such water quality standard, or (ii) the designated use which is not being attained is removed in accordance with regulations established under this section.

(B) STANDARD ATTAINED.--For waters identified under paragraph (1)(A) where the quality of such waters equals or exceeds levels necessary to protect the designated use for such waters or otherwise required by applicable water quality standard, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section, or any water quality standard established under this section, or any other permitting standard may be revised only if such revision is subject to and consistent with the antidegradation policy established under this section.
TMDL Source Documents

- Clean Water Act
- EPA Federal Register Notice on TMDLs
- Water Quality Planning & Management Rule
  (40 C.F.R. Part 130)
- Guidance for Water Quality-based Decisions:
  The TMDL Process (US EPA; April, 1991)

Clean Water Act
TMDL Requirements in Section 303(d)

- identify impaired/threatened waterbodies
- develop TMDLs
South Dakota 303(d) Waterbody List

Cheyenne River Basin

<table>
<thead>
<tr>
<th>Waterbody</th>
<th>Pollutants</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battle Creek</td>
<td>pH, Temp, ammonia</td>
<td>low/high</td>
</tr>
<tr>
<td>Bismark Lake</td>
<td>nutrients, pH</td>
<td>low</td>
</tr>
<tr>
<td>Box Elder Creek</td>
<td>total suspended solids</td>
<td>low</td>
</tr>
<tr>
<td>Center Lake</td>
<td>nutrients</td>
<td>medium</td>
</tr>
<tr>
<td>Cheyenne River</td>
<td>total suspended solids, fecal coli, TDS</td>
<td>medium</td>
</tr>
<tr>
<td>Horsethief Lake</td>
<td>nutrients, pH</td>
<td>medium</td>
</tr>
<tr>
<td>Lakota Lake</td>
<td>nutrients, fecal coli, pH</td>
<td>medium</td>
</tr>
<tr>
<td>Legion Lake</td>
<td>nutrients</td>
<td>medium</td>
</tr>
<tr>
<td>New Wall Lake</td>
<td>nutrients</td>
<td>medium</td>
</tr>
<tr>
<td>Sylvan Lake</td>
<td>nutrients</td>
<td>low</td>
</tr>
<tr>
<td>Spring Creek</td>
<td>fecal coli</td>
<td>low</td>
</tr>
<tr>
<td>Black Hawk Creek</td>
<td>ammonia</td>
<td>high</td>
</tr>
<tr>
<td>Elk Creek</td>
<td>ammonia</td>
<td>high</td>
</tr>
<tr>
<td>Fall River</td>
<td>ammonia, chlorine</td>
<td>high</td>
</tr>
<tr>
<td>French Creek</td>
<td>ammonia</td>
<td>high</td>
</tr>
<tr>
<td>Rapid Creek</td>
<td>dissolved oxygen, ammonia, temperature</td>
<td>high/low</td>
</tr>
</tbody>
</table>

Prioritization of TMDL Waterbodies

(example criteria)

- severity of pollution/uses to be made of waters
- degree of public interest/support/resource importance
- adequacy of existing data
- presence of threatened/endangered species
- court order/decisions
- national priorities and policies
- basin planning cycles
- on-going activities in the watershed
- programmatic needs regarding NDPES permitting
Water Quality Standards

- States/Tribes establish
- EPA review & approval
- EPA authority to promulgate

TMDL*

Water Quality Controls

- States/Tribes establish
- EPA review & approval
- EPA authority to establish

* TMDL = total maximum daily loads

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Water Quality Standards

- use classifications
  (e.g., aquatic life, irrigation, drinking water, recreation)
- numeric standards
  (e.g., 5.0 mg/l dissolved oxygen, 100 ug/l zinc)
- narrative standards
  (e.g., "free from toxics")
- antidegradation provisions
Clean Water Act Section 303(d)
TMDL Development

- TMDLs are to be established at a level necessary to implement applicable to water quality standards \(303(\text{d})(1)(C)\)
- TMDLs are to be established for those pollutants identified by the Administrator under Section 304(a)(2) \(303(\text{d})(1)(C)\)
- TMDLs are to be established with seasonal variations and a margin of safety \(303(\text{d})(1)(C)\)
- TMDLs "shall" be calculated for waters identified in 303(d)(1)(A) \(303(\text{d})(1)\) and "shall" be estimated for all other waters \(303(\text{d})(3)\)

What is a TMDL?

- a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards
- currently defined as the sum of the allowable loads from point and nonpoint sources, a margin of safety, and considers seasonal variation
TMDLs can be described as:

- mass per time
- toxicity (e.g., toxic units)
- other measure (e.g., % reduction)

Ref: 40 C.F.R. Part 130.2(i)
Components of Phosphorus TMDL for the Clark Fork River

TMDL values are based on 30-day averages for summer months.

Clark Fork River TMDL (MT)

<table>
<thead>
<tr>
<th>Water Quality Criteria</th>
<th>TMDL*</th>
<th>Water Quality Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 µg/l total phosphorus</td>
<td>77 kg/day phosphorus</td>
<td>land application of effluent</td>
</tr>
<tr>
<td>300 µg/l total nitrogen</td>
<td>801 kg/day nitrogen</td>
<td>N &amp; P treatment of effluents</td>
</tr>
<tr>
<td>100 mg/m² chlorophyll a</td>
<td></td>
<td>future NPS controls</td>
</tr>
</tbody>
</table>

* below Stone Container effluent discharge
Deep Creek Sediment & Temperature TMDL

Deep Creek TMDL (MT)

**Water Quality Endpoints** ➔ **TMDL** ➔ **Water Quality Controls**

**SEDIMENT**
- 30% substrate fines (<0.5 mm)
- 0.26 slope of TSS v. Q plot

**TEMPERATURE**
- > 73°F in only 10 days annually

**BIOTIC**
- 3,000 returning female trout captured/year

- Sediment load same as ref reach
- 50% reduction in erodible banks
- 2275 ft increase in channel length
- 3 - 9 cfs min flow

- Riparian restoration BMPs
- Grazing BMPs
- Rosgen-type channel mods
- Tree revetments
- Re-activate abandoned channels
- Irrigation withdrawal BMPs

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TMDL Litigation

- about 45 legal action in 34 states, as of April 1999
- EPA under court order/consent decree to ensure TMDLs established in many states
- 3 cases dismissed since 1993

Major Litigation Issues

- 303(d) lists -- adequacy, basis, underlying data
- TMDLs -- adequacy, basis
- pace of TMDL development -- when will they all be done?
- Plaintiffs typically want --
  - schedules for completing all TMDLs
  - EPA guarantee to do TMDLs if a state does
  - settlement agreements/consent decrees to ensure continued court oversight
Recent TMDL Issues

- implementation of TMDLs
- length of time to do a TMDL
- application of TMDLs to nonpoint sources
- application of TMDLs to pollution vs. pollutant
- prohibition of new/increased loads into 303(d) impaired waterbodies

"Pollutant"
Dredged spoil, solid waste, incinerator residue, sewage, garbage sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.  {CWA Section 502(6)}

"Pollution"
The man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of water.  {CWA Section 502(19)}
TMDL Reading


The TMDL Program
The primary mission of the TMDL program is to protect public health and ensure healthy watersheds by assuring that waterbodies are meeting water quality standards.

Listing Impaired Waterbodies
States and Territories identify impaired waterbodies, those not meeting water quality standards. Lists of these waterbodies are provided to the public and EPA every two years. The lists are priority-ranked based upon severity of the pollution and the uses to be made of the waterbodies.

Developing TMDLs
States then develop TMDLs for waterbodies on the list. TMDLs specify the reductions needed to meet water quality standards and allocate those reductions among the sources in the watershed.

Review and Approval
EPA reviews and approves the lists and the TMDLs. If EPA disapproves, the Agency must act in lieu of the State.

Improving TMDLs:
Federal Advisory Committee Report
In 1996, EPA set up a Federal Advisory Committee, composed of members from a wide spectrum of interests ranging from the environmental and agricultural communities to state and local governments. The committee’s objective was to recommend ways to improve the effectiveness and efficiency of State, Territorial, Tribal, and EPA TMDL programs. The committee’s report was issued in July, 1998. It contains recommendations based on broad agreements reached by the members of the Federal Advisory Committee.

Key Federal Advisory Recommendations:
✓ Restoring impaired waters must be a high priority
✓ Implementing TMDLs is key to program success
✓ Communications with public is critical
✓ Stakeholder involvement is key to successful implementation
✓ Governments’ capacity to do TMDLs must be strengthened
✓ An iterative approach to TMDL development and implementation is the best way to make progress in uncertain situations.

What is a TMDL?
A TMDL or Total Maximum Daily Load 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 that amount to the pollutant’s sources.

Water quality standards are set by States, Territories, and Tribes. They identify the uses for each waterbody, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use.

A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation must include a margin of safety to ensure that the waterbody can be used for the purposes the State has designated.

The Clean Water Act, section 303, establishes the water quality standards and TMDL programs.

Why TMDLs are Important–
• Critical for achieving water quality standards
• Analytic underpinning for watershed decisions
• Promote integrated solutions -- for example, for drinking water source, wetlands, and endangered species protection
• Opportunity for innovations -- trading
• Lists track all impaired waters
Proposed Revisions to TMDL and Other Regulations

EPA is taking steps to improve the TMDL program by revising the TMDL program regulations. Section 303(d) of the Clean Water Act authorizes the TMDL program; the current regulations can be found at 40 CFR 130.7. The recommendations of the Federal Advisory Committee are guiding the development of proposed changes.

EPA is also revising the National Permit Discharge Elimination System (NPDES permits) and Water Quality Standards regulations. These changes will help achieve reasonable further progress in attaining water quality standards.

The proposed regulatory changes are scheduled for publication in the Federal Register in mid-1999. After public review and comment, final regulations will be published sometime in 2000.

Proposed Regulations: Some Issues under Consideration

- What types of data and information are needed to identify waters for listing?
- Should waters be listed based on "pollutants" or "pollution"?
  - "pollutants" are residue, chemical wastes, materials, etc.
  - "pollution" is human-induced alteration of the water's integrity
- What should be the basis for setting priorities for TMDL development?
- What should be the timeframe for completing TMDLs?
- Should an implementation plan be required? How?
- Should EPA's authority to issue NPDES permits to key sources in support of TMDLs be expanded?
- What additional requirements, if any, should be placed on new or expanding dischargers in impaired waterbodies without TMDLs?
- What actions should EPA take to ensure expeditious State permit issuance to key sources before and after a TMDL is established?

For More Information see EPA's TMDL homepage-
http://www.epa.gov/owow/tmdl