

# Total Maximum Daily Loads

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

The Clean Water Act of 1972 required states to set water quality standards. The standards for any given body of water depend on the designated uses (public drinking water, fish and wildlife, recreation, agricultural, industrial, etc.) that apply to that water.

The act required states to identify and set priorities on waters not meeting those standards. These waters include streams, rivers, reservoirs, lakes, ponds (except private ponds), and wetlands.

If one or more pollutants are found to exceed the water quality standards for a given body of water, the state is required to establish a Total Maximum Daily Load (TMDL) for that body of water.

A TMDL is the maximum amount of pollution a water body can receive without violating water quality standards. Despite the seemingly simple term, Total Maximum Daily Load, a TMDL is not just a simple number that sets a maximum limit on the amount of, a given pollutant in a water body on any given day.

Rather, a TMDL establishes a range of acceptable values that vary with flow conditions. For example, a TMDL for atrazine for a lake may state that the Water Quality Standard (WQS) of 3 parts per billion (ppb) can only be exceeded in the April through September period 1 day every 3 years at seasonal flood pool levels, and in less than 10 percent of samples during spring flood conditions.

Kansas will be establishing about 900 TMDLs between 2000 and 2006. Many of the TMDLs will be in rural settings and

will rely on participation of agricultural producers to be successfully implemented. For streams in Kansas, the major issue will be reduction of bacteria levels. For lakes, the major issue will be reduction of pesticide and phosphorus levels. TMDL implementation will be done on a watershed basis.

## The TMDL Plan

A TMDL plan is a written document specific to a given pollutant and a given stream segment or lake in a watershed. The TMDL document takes into account:

1. Recent water quality monitoring data over a period of 2 or more years
2. Which pollutants are occurring at levels above the WQS levels in the stream segment or lake
3. The frequency of WQS violations
4. The flow conditions existing when the high levels of pollutants were recorded
5. The sources of the pollutant within the watershed and how much each source may be contributing to the problem

## Implementing a TMDL

Once the desired endpoints of pollution levels are established, the TMDL document sets into motion several important processes. First, KDHE is able to quantify how much reduction in the pollutant load is needed in the watershed area to meet the desired water quality endpoints. Second, KDHE is then able to divide responsibility for reducing pollution among possible point and nonpoint sources of the pollutant within the watershed during a specified number of years.

For nonpoint pollution sources, voluntary actions will be set in place to achieve compliance. This will consist of efforts to demonstrate, promote, design, and implement Best Management Practices for water quality improvement. These voluntary efforts will be a partnership between the private sector; K-State Research and Extension; and various state, local, and federal agencies and organizations.

If future water quality monitoring shows that the body of water is no longer impaired, no additional action is needed to reduce pollution. But if pollution levels are still too high at the end of the time period for voluntary action, KDHE will determine what measures must be taken and by whom to reduce the pollution to acceptable levels. These measures may be mandatory at that time.

## The Goal of TMDLs

Monitoring data indicate the historic number of violations of WQS levels. The goal of TMDLs will be to reduce the number of those violations. It is the hope of the state that violations will occur in less than 10 percent of the samples. Violations during high flow are indicative of nonpoint source pollution, the state's primary type of pollution. The key to successful implementation of TMDLs will be setting reasonable goals for pollution reduction, focusing on specific watersheds with highest priority, concentrating on activities that occur near streams, getting voluntary participation among those who

contribute to nonpoint source pollution, providing those sources with enough time and money to implement BMPs, and making state programs available for assistance.

### Water Quality Monitoring in Kansas

The Kansas Department of Health and Environment (KDHE) monitors the quality of surface waters of Kansas. KDHE prepared lists of impaired surface waters in 1994, 1996, and 1998. The 1998 list includes more than 770 impaired stream segments and 130 impaired lakes within the 12 major river basins, requiring the establishment of TMDLs.

The 1998 list of impaired waters was based on monitoring data from 1996 and 1997. This data is taken from 291 monitoring sites throughout Kansas. Sites are monitored on a bimonthly basis.

### The TMDL Process

TMDLs will be established for bodies of water not meeting their designated uses due to violations in water quality standards. The TMDL assessment outlines the

amount of a pollutant that needs to be reduced to meet WQS levels, allocates control responsibilities among pollution sources in a watershed, and provides a basis for taking actions to restore water quality. The process of developing and implementing TMDLs involves:

1. Identifying the impaired water body, the pollutant(s) causing the impairment, and defining the goal for improved water quality.
2. Determining to what extent the impaired water body can assimilate the pollutants.
3. Estimating the type, location, and magnitude of the sources contributing pollutants to the water body.
4. Estimating the relationship between each source and the pollutant load in the impaired water body.
5. Allocating permissible loads of each pollutant among point, nonpoint, and background sources. Assigning responsibility for reducing pollutants among the various sources. Establishing a margin of safety for each pollutant.
6. Follow-up monitoring of water quality.

7. Establishing a mechanism to ensure that the TMDL process is working effectively so that the water body will meet established water quality standards for all designated uses.

### The TMDL Schedule for Kansas

Kansas was required to submit TMDLs to the Environmental Protection Agency for impaired stream segments and lakes in each of the 12 major river basins in Kansas over an 8-year period, ending June 30, 1996. Kansas plans to accelerate this schedule. The first TMDLs were submitted on June 30, 1999 for the Kansas-Lower Republican Basin. The accelerated schedule for TMDLs in Kansas is:

**1999:** Kansas-Lower Republican River Basin (completed June 30, 1999)

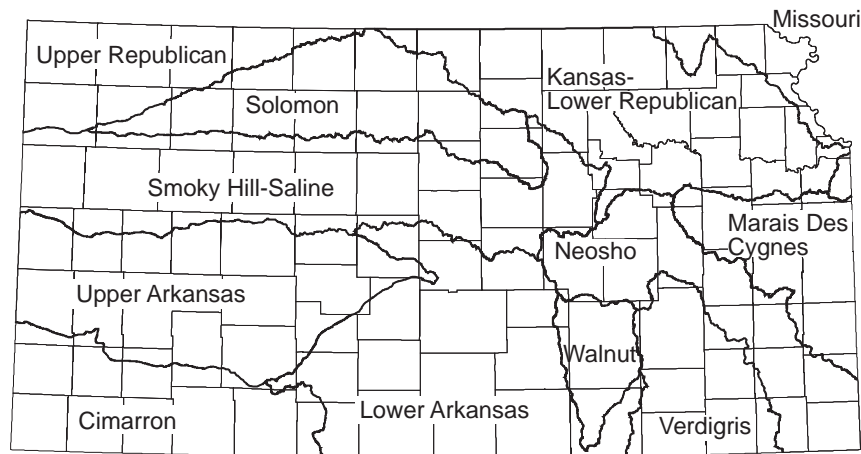
**2000:** Lower Arkansas, Upper Arkansas, and Cimarron River Basins

**2001:** Marais des Cygnes and Missouri River Basins

**2002:** Neosho, Verdigris, and Walnut River Basins

**2003:** Smoky Hill-Saline, Solomon, and Upper Republican River Basins

### Twelve River Basins in Kansas



**Daniel L. Devlin**

Extension Specialist and Coordinator  
Environmental Quality

Publications from Kansas State University are available on the World Wide Web at: <http://www.oznet.ksu.edu>

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Daniel L. Devlin, *Total Maximum Daily Loads*, Kansas State University, August 2000.

**Kansas State University Agricultural Experiment Station and Cooperative Extension Service**

MF-2459

August 2000

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, services, activities, and materials without regard to race, color, religion, national origin, sex, age or disability. Kansas State University is an equal opportunity organization. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Marc A. Johnson, Director.