Kansas State University Agricultural Experiment Station and Cooperative Extension Service

What's in YOUR Water?

What's in Your Water?

Have you ever fished off the shores of a pond, watching the sun set and relaxing to the sounds of a summer night? Have you ever gone swimming or water-skiing in one of our state lakes? Have you ever spent a day floating down a river or stream? Did you ever stop and wonder what could be in that water?

Most of us don't give it a second thought. Just like some of us don't give it a second thought when we fertilize our lawn or spray our fields, walk the dog or feed our livestock, or even wash our car in the driveway. Yet these seemingly harmless activities could be harming the quality of your water.

This booklet will explain what is in your water. It will tell you what you and your neighbors can do or are doing to ensure that the water you drink, swim or fish is safe.

Why should I care about water quality? My drinking water is just fine.

True, city and state agencies have done an excellent job of providing safe drinking water. They have developed a number of treatment and monitoring systems to guarantee the safety of your drinking water supply. But these systems aren't free. Since 1988, Kansas cities have spent about $550 million on water pollution control systems. When you help reduce water pollution, you're helping direct your tax dollars toward projects (like schools, parks and community projects) rather than allocating it to water treatment.

Although most people don't drink the water in Kansas lakes and streams, you can swim in the water or eat the fish you caught from it. And, even if you don't personally swim or fish in Kansas surface waters, your neighbors might or, in a few years, your children or grandchildren might. It's our responsibility to do our part now to keep Kansas waters clean. By making minor changes in how you do things, you can greatly help keep Kansas waters clean.

What difference can I make?

Whether you own 1,600 acres or one-sixteenth of an acre, what you do on your property can affect water quality for thousands of Kansans. Simple actions, such as properly disposing of car oil or animal wastes, can be helpful to Kansas waters, especially when repeated by homeowners all over the state.

To help you know how to manage, reduce, or dispose of wastes or pollutants, K-State Research and Extension watershed specialists can help you identify and use safe practices, known as Best Management Practices or BMPs. These BMPs help keep Kansas waters clean and are tailored to your specific situation.

Think of it this way: If one person dumped a bucket of sand in Milford Lake, no one would notice. But if everyone in Kansas dumped a bucket of sand in Milford Lake, the lake would eventually fill up and become unusable. The idea is to make sure everyone knows that putting "sand" — in other words, pollutants — in the water system is detrimental to the water quality.

What about the "big polluters," like factories or sewer pipes?

It might be helpful to understand that there are two categories of water pollution: point source and nonpoint source pollution.

Point source pollution comes from an obvious individual source, such as a factory or a sewer pipe. Point source can also come from large livestock feeding operations, stormwater runoff from cities and large construction sites. Kansas has been regulating and working on controlling this type of pollution for the past 30 years.

Point sources must have a National Pollutant Discharge Elimination System (NPDES) permit to discharge treated wastewater. The NPDES permit includes conditions that establish the quality of wastewater the point source is allowed to discharge. Permit holders who fail to comply with permit conditions can be penalized through fines and other enforcement actions.

Nonpoint source pollution comes from many different sources in small amounts, but taken in total, contributes a large portion of water pollution. Nonpoint source pollution is the water, fertilizer and soil that runs off your yard. It can be as small as dog wastes dumped in a ditch or as large as pesticide runoff from a field. Virtually everything we do for work or pleasure can release nonpoint pollutants. Water quality protection requires the combined actions of everyone — homeowner, farmer, business owner, etc. Protecting water quality begins at home in our own backyards. We all need to do our part now, voluntarily, to prevent nonpoint source pollution.

How did the water quality effort get started?

Kansans have a long history of protecting our water, with the first Kansas water pollution law passed in 1885. In 1972, in response to nationwide water pollution problems, Congress enacted the Clean Water Act to restore and maintain the nation's waters. The act includes several objectives designed to protect and improve water quality. As part of the Clean Water Act, states are required to establish water quality standards, which include designating uses for surface water, such as determining if a lake or river is for fishing, swimming, or drinking. Water quality criteria determine how clean the water needs to be for each designated use. The Clean Water Act also requires states to identify, prioritize and work to improve waters where the quality criteria are not met.

Who is monitoring our water and water quality efforts?

In Kansas, the water quality effort is being led by the Kansas Department of Health and the Environment (KDHE), which monitors and assesses the state's water resources relative to existing water quality standards.

While KDHE is leading the water quality effort, each of us as owners and managers of businesses, homes, and farms has a responsibility to do our part to improve water quality.

How is water quality measured?

The federal Clean Water Act requires states to establish water quality standards that protect aquatic life and support recreation such as fishing and swimming. Water quality standards are rules and regulations that define the quality of water required to assure its safety for various uses. Kansas water

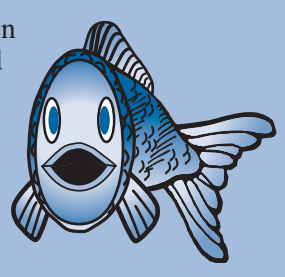
A TMDL, or Total Maximum Daily Load, is the maximum amount of pollution a surface water body can receive without violating water quality standards. A TMDL:

- outlines the amount of a pollutant that needs to be reduced to meet water quality standards;
- allocates control responsibilities among pollution sources in a watershed;
- provides a basis and priority for taking actions to restore water quality;
- monitors water quality programs; and
- outlines plans for public input and response.

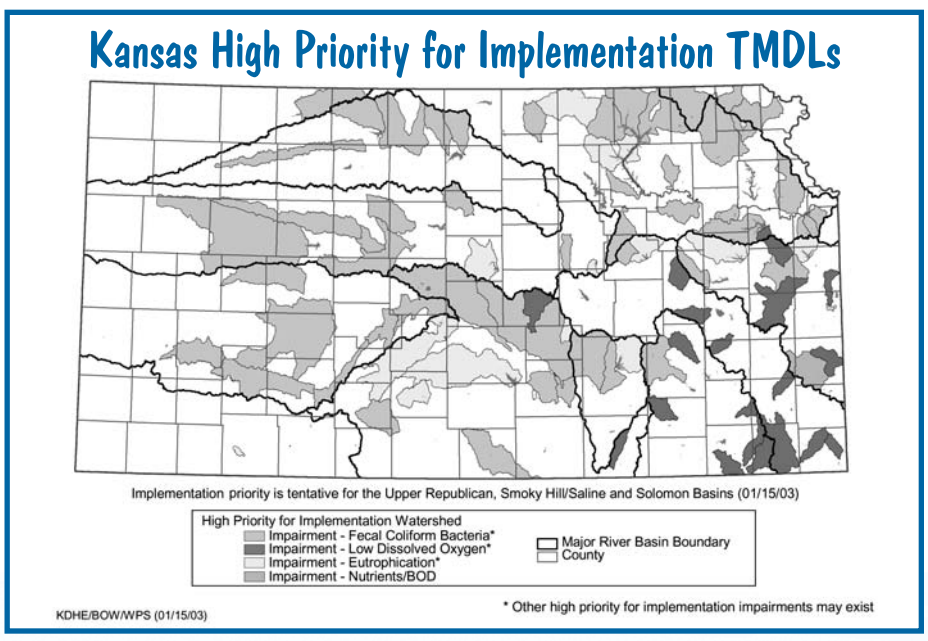
What are the different TMDLs?

The most common TMDL in Kansas streams is for fecal coliform bacteria. Surface water often contains a variety of pathogens including viruses, fungi, protozoa and bacteria. Human health risks generally occur when there is fecal contamination from human or animal sources. For that reason, fecal coliform bacteria levels in surface water are monitored and used as indicators of pathogen contamination and for risk of disease associated with drinking, swimming, or other uses of the water.

Other pollution concerns in Kansas relate to phosphorus, eutrophication, atrazine, and sedimentation.



quality standards address aquatic life support, recreation, domestic water supply, agricultural water use (livestock watering and irrigation), and groundwater recharge. For each identified water body, Kansas water quality standards identify uses for that body as well as criteria the water must meet to protect the identified use. Criteria for such things as bacteria, dissolved oxygen, nutrients, and other substances are used to determine if the water body supports its assigned uses. If the water of the lake or river does not meet the criteria, it is found to be impaired. When a lake or river is impaired, the Clean Water Act requires that a Total Maximum Daily Load (TMDL) be established.



What is a TMDL?

A TMDL is the amount of a pollutant that a stream or lake can receive and still meet water quality standards. But that's not all. It also is a detailed water quality assessment that provides the foundation for a water quality management plan, outlining the steps necessary to reduce a pollutant and meet water quality standards. A TMDL specifies what reductions are needed for each pollutant in order to meet a water quality designation, and then allocates those reductions among pollution sources in the watershed.

By July 2003, TMDLs for all 12 river basins in Kansas will have been submitted by KDHE for approval by the U.S. Environmental Protection Agency (EPA). The TMDLs will be prioritized as high (first five years), medium (second five years), or low (addressed sometime in the future).

Basically a TMDL identifies the problem, determines how much the problem needs to be reduced and then suggests steps to reduce pollution in a watershed.

Terms and Definitions

Atrazine – A herbicide widely used to control broadleaf and grass weeds in corn and grain sorghum. It is the most commonly used herbicide in the United States.

Best Management Practices (BMPs) – Management practices used to reduce the amount of a pollutant generated or delivered from human activities to water resources.

Bioremediation – The process by which living organisms act to decompose or transform hazardous contaminants into nonhazardous forms. Examples include filter strips and wetlands.

Buffer strip – A type of vegetative filter strip that can help prevent potential pollutants from getting into surface waters, such as streams and rivers. Types of buffers include grassed waterways, contour grass strips, field borders, field windbreaks, shelterbelts and riparian (streamside) buffers.

Clean Water Act – An act established by Congress in 1972 to restore and maintain the nation's waters. Under the act, states are required to develop and implement water quality standards, including TMDLs. For more information, see *http://www.epa.gov/compliance*.

Designated use – Refers to how a body of water is being used. Designated uses established by KDHE include aquatic life (fishable), recreation (swimmable), and domestic water supply.

Eutrophication – A condition in an aquatic ecosystem where high nutrient concentrations stimulate blooms of algae.

Fecal coliform – Bacteria living in the digestive tract of warm-blooded animals that are excreted in solid wastes. Fecal coliform is an indicator of fecal contamination in water and the most common reason for impaired waters in Kansas.

Impaired streams – Streams that do not fully meet the water quality standards for their designated use established by the Kansas Department of Health and Environment. In 2003, 1,692 stream segments are classified as impaired.

Maximum Contaminant Levels (MCLs) – Legally enforceable public drinking water standards. MCLs, as set by EPA, establish the maximum permissible concentration of contaminants in public water supplies.

Nonpoint source pollution – Pollution that originates from diffuse sources. It is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, depositing them into water bodies.

Point source pollution – Pollution that originates from a well-defined source. Examples include large feedlots, industry, or municipal waste water discharges.

Riparian – Vegetated areas next to water resources that protect them from nonpoint source pollution and provide bank stabilization and aquatic and wildlife habitat.

Total Maximum Daily Load (TMDL) – The maximum amount of pollution a surface water body can receive without violating water quality standards.

Vegetative filter strip – An area along a ditch, gully, stream, pond, lake, or sink hole that is covered by vegetation such as grass, hay, or timber. The vegetation reduces or removes sediments, chemicals, nutrients and organic materials carried in runoff.

Watershed – The land area that drains into a body of water by surface or subsurface flow. Kansas has 12 major river basins: Kansas-Lower Republican, Upper Arkansas, Lower Arkansas, Cimmaron, Upper Republican, Neosho, Missouri, Marais des Cygnes, Smoky Hill-Saline, Solomon, Walnut and Verdigris. These are divided into smaller watersheds and subwatersheds.

Find out what's in your water.

For additional information, visit your local K-State Research and Extension office for the watershed specialist near you. You can gather additional water quality information by visiting the following Web sites:

Kansas Water Office
www.kwo.org

K-State Research and Extension
www.oznet.ksu.edu

Kansas Center for Agriculture and Natural Resources
www.oznet.ksu.edu/kcare

Kansas Department of Agriculture
www.accesskansas.org/kda

Kansas Department of Health and Environment
www.kdhe.state.ks.us

State Conservation Commission
www.accesskansas.org/kscc

Kansas Department of Wildlife and Parks
www.kdwp.state.ks.us

USDA/Natural Resources Conservation Service
www.ks.nrcs.usda.gov

USDA/Environmental Quality Incentives Program
www.nrcs.usda.gov/programs/eqip

United States Environmental Protection Agency
www.epa.gov

Kansas Association for Conservation and Environmental Education
www.kacee.org

Kansas Cattlemen's Association
www.kansascattlemen.com

Kansas Alliance for Wetlands and Streams
www.kswetlands.org

Kansas Geological Survey
www.kgs.ukans.edu

Kansas Rural Water Association
www.krwa.net

Kansas Rural Center
www.kansasruralcenter.org

Kansas Biological Survey
www.kbs.ukans.edu

Kansas Farm Bureau
www.kfb.org

Kansas Forest Service
www.kansasforests.org

Kansas Association of Wheat Growers
www.wheatonline.com

Kansas Corn Growers Association
www.ksgrains.com/corn/index.html

Kansas Livestock Association
www.kla.org

Kansas Dairy Association
www.ksdairy.org

Kansas Grain and Feed Association
www.kansasag.org/kgfa

Kansas Grain Sorghum Producers Association
www.ksgrains.com/sorghum

Kansas Pork Association
www.kspork.org

Kansas Agribusiness Retailers Association
www.kansasag.org/kara

Kansas Seed Industry Association
www.ksseed.org/ksseed/index.html

Kansas Soybean Association
www.kansassoybeans.org

Kansas State University Agricultural Experiment Station and Cooperative Extension Service
Manhattan, Kansas

Financial assistance for the preparation of this document provided via a U.S. Environmental Protection Agency Section 319 Nonpoint Source Pollution Control Grant – Number C900740500 through a cooperative agreement with the Kansas Department of Health and Environment.

Funding provided in part by the Kansas State Water Plan Fund.

Edited and Designed by the Kansas State University Department of Communications

Spring 2003

www.oznet.ksu.edu