

Kansas Field Office Technical Guide- **Section II**

Special Environmental Concerns

2. Clean Water Act

Authority: The Federal Water Pollution Control Act of 1972

Kansas Surface Water Quality: What Is It, and How Is It Measured?

In order to protect water quality, we must define and measure it. The state of Kansas has established standards that protect the purposes for which the water bodies in the state will be used, and defined measurements that will assure the water quality is good enough to attain those uses. Based on the standards, the Kansas Department of Health and Environment (KDHE), in concert with other federal, regional, and local agencies, carries out a regular program of monitoring and assessment to determine which water bodies are meeting the standards set for their use, and which are not. The state produces a periodic report, the [Kansas Water Quality Inventory and 303\(d\) List](#), that compares water quality conditions to established standards, as required by federal Clean Water Act (CWA) Sections 305(b) and 303(d).

Kansas Surface Water Quality Standards

The *Kansas Surface Water Quality Standards* are rules that:

- designate the uses, or purposes, for which the state's water bodies should be suitable;
- establish numerical and narrative goals for water quality throughout the state; and
- provide a basis on which KDHE regulatory programs can establish reasonable methods to implement and attain the state's goals for water quality.

All standards are protective; that is, they signal a situation where there is some possibility that water quality may be inadequate to meet its designated uses. There are instances, for example, in which a water body fails to meet the dissolved oxygen criterion for attainment of the aquatic life use, yet the number and variety of species present are high, and no fish kills are observed.

Four general categories for water use are defined in the *Kansas Surface Water Quality Standards*:

- aquatic life use
- contact recreation
- public water supply
- food procurement

Aquatic Life Use

The standards associated with this use are designed to protect aquatic species. They establish optimal conditions for the support of aquatic life and define indicators used to measure whether these conditions are met. Some pollutants or conditions that may violate this standard include low levels of dissolved oxygen, or toxics such as metals or pesticides dissolved in water.

Contact Recreation

The standard associated with this use measures the level of certain bacteria in water to estimate the relative risk of swimming or other water sports involving direct contact with the

water. It is possible to swim in water that does not meet this standard without becoming ill; however, the probability of becoming ill is higher than it would be if bacteria levels were lower.

Public Water Supply

Standards associated with this use indicate whether water from a lake or river is suitable for use as a source for a public water supply system. Source water is treated before it is delivered to the tap. A separate set of standards governs treated drinking water. Indicators used to measure the safety or usability of surface water bodies as a source for drinking water include the presence or absence of substances such as metals or pesticides. Concentrations of salts, such as sulfate or chloride, are also measured, since treatment to remove high levels of salts from drinking water may be expensive.

Food Procurement

The standards associated with this use are designed to protect the public from consuming fish or shellfish that may be contaminated by pollutants in the water. The standards identify levels at which there is a significant risk that certain toxic substances dissolved in water may accumulate in the tissue of aquatic species. Indicators of water quality that are not tied to specific uses—such as dissolved solids, nutrients, and toxic substances in sediment—are also described in the standards.

[Kansas Water Quality Inventory and 303\(d\) List](#)

The *Kansas Water Quality Inventory and 303(d) List* is an overview of the status of surface waters of the state, including concerns for public health, fitness for use by aquatic species and other wildlife, and specific pollutants and their possible sources.

The 303(d) List, a subset of the Inventory, identifies:

- water bodies that do not attain one or more of the standards set for their use, or are expected not to meet one or more uses in the near future;
- which pollutants or conditions are responsible for the failure of a water body to attain standards;
- common limitations in water quality include:
- bacteria levels that exceed the criterion established to assure the safety of contact recreation
- dissolved oxygen levels that are lower than the criterion established to assure optimum conditions for aquatic life
- total dissolved solids, sulfate, and chloride that exceed the criteria established to safeguard
- general water quality uses
- contaminants in fish tissue that pose a risk to consumers

Some water bodies also have:

- toxic substances in water that exceed the criterion to protect aquatic life

- conditions of acidity (measured as pH) and high temperature that exceed the criteria to safeguard general water quality uses

The *Kansas Water Quality Inventory and 303(d) List* is available herewith and on the KDHE Web site at <http://www.kdheks.gov/tmdl/methodology.htm>

Indicators of Water Quality

Several different parameters are measured to determine whether a water body meets the standards for its use. Some of the most common are listed here, with an explanation of why they are important to the health of a water body.

Metals

High concentrations of metals such as cadmium, mercury, and lead pose a threat to drinking water supplies and human health. Eating fish contaminated with metals can cause these toxic substances to accumulate in human tissue, posing a significant health threat. Metals also pose a threat to livestock and aquatic life. Potentially dangerous levels of metals and other toxic substances are identified through chemical analysis of water, sediment, and fish tissue.

Organics

Toxic substances from pesticides and industrial chemicals, called organics, pose the same concerns as metals. Polychlorinated biphenyls (PCBs), for example, are industrial chemicals that are toxic and probably carcinogenic. Although banned in the United States in 1977, PCBs remain in the environment, and they accumulate in fish and human tissues when consumed.

Bacteria

E. coli and *Enterococci* bacteria are measured to determine the relative risk of swimming (contact recreation), depending on whether the water body is fresh or marine. These bacteria originate from the wastes of warm-blooded animals. The presence of these bacteria indicates that associated pathogens from these wastes may be reaching a body of water. Sources may include inadequately treated sewage, improperly managed animal waste from livestock, pets in urban areas, aquatic birds and mammals, or failing septic systems.

Dissolved Oxygen

The concentration of dissolved oxygen is a single, easy-to-measure characteristic of water that correlates with the occurrence and diversity of aquatic life in a water body. A water body that can support diverse, abundant aquatic life is a good indication of high water quality. A problem frequently related to dissolved oxygen concentrations is an excess of nutrients in water. Large quantities of nutrients in water can cause excessive growth of vegetation. This excessive vegetation, in turn, can cause low dissolved oxygen.

Dissolved Solids

High levels of dissolved solids such as chloride and sulfate can cause water to be unusable, or simply too costly to treat for drinking water uses. Changes in dissolved solids concentrations also affect the quality of habitat for aquatic life.

Fish Consumption Advisories and Closures

KDHE conducts chemical testing of fish tissue to determine whether there is a risk to human health from consuming fish caught in Kansas streams and lakes. Fish seldom contain levels of contaminants high enough to cause an imminent threat to human health, even to someone who eats fish regularly. However, risk increases for people who regularly consume larger fish and predatory fish from the same area of contaminated water over a long period of time. To reduce health risks in areas of contamination, people should eat smaller fish from a variety of water bodies. When a fish consumption advisory is issued, a person may legally take fish from the water body under advisory, but it is not recommended. When a fish consumption closure is issued for a water body, the taking of fish is legally prohibited.

Fish Consumption Advisories

Fish advisories may warn against the consumption of particular fish or shellfish species from the affected water body, or may recommend the amount of fish that may be consumed over certain periods of time by specific segments of the population. For example, an advisory may read:

“Consumption Advice:

The advisory includes all species of fish and recommends limiting consumption to the following:

1. Adults should consume no more than one meal, not to exceed 8 ounces of fish per serving, each week.
2. Children seven years of age and older should consume no more than one meal, not to exceed 4 ounces of fish per serving, each week.
3. Children 6 and under, pregnant women, or women who may soon become pregnant should not consume fish from this reservoir.
4. Persons consuming fish from this reservoir should not consume mineral dietary supplements with selenium exceeding 50 micrograms per day.”

Fish Consumption Closures

Fish consumption closures identify a specific water body, or portion of a water body, where the taking of fish is prohibited because the human health risk from fish consumption is very high. The closure notice will also identify the contaminant of concern, such as mercury or fecal coliform bacteria, and will list any (or all) species of fish which people are prohibited from taking from the area of closure.