



Water Quality Standards in South Dakota

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Overview

Water Quality Standard US

To protect aquatic ecosystems, the environment, and public health, the United States has Water Quality Standards (WQS) established under the [Clean Water Act](#) (CWA) that specify the acceptable condition of surface waters, such as rivers, lakes, and streams. Under the direction of the US Environmental Protection Agency (EPA), state and tribal authorities establish designated uses and water quality criteria to protect those uses, which are intended to maintain the quality of water for particular purposes, such as drinking, recreational activities, and the maintenance of aquatic life. These criteria are components of State water quality standards, described in constituent concentrations, levels, or narrative statements, indicating the water quality necessary to sustain a specific purpose.

Clean Water Act

The Clean Water Act (CWA) and [40 Code of Federal Register \(CFR\) Part 131](#) require states and authorized Tribes to maintain water quality standards (WQS) that consist of three main key components: designated uses, water quality criteria, and an antidegradation policy. The Federal Water Pollution Control Act, which was first enacted in 1948, had significant additions and amendments in 1972, leading to a name change to the Clean Water Act. Its primary goal is to maintain the chemical, physical, and biological integrity of surface

waters by limiting the number of contaminants released into surface water bodies, including lakes, rivers, and streams.

Water Quality Standards in SD

South Dakota's water quality standards, established in accordance with the 1972 National Clean Water Act, are designed to safeguard both human health and aquatic ecosystems. These standards define designated uses for surface waters through a beneficial use classification system, ensuring that each water body is managed according to its intended purpose. The beneficial use classifications encompass domestic water supply, propagation of coldwater and warmwater fish species, recreational use, fish and wildlife habitat, stock watering, irrigation, and waters designated for commercial and industrial purposes. To uphold these designated uses, South Dakota enforces an [Antidegradation Policy \(74:51:01:34\)](#) to maintain and protect water quality across all state water bodies.

Domestic Water Supply

Surface waters designated for Domestic Water Supply in South Dakota are monitored by the broadest range of water quality parameters compared to other classifications. These parameters include total dissolved solids (TDS), which measure the concentration of minerals like calcium, magnesium, and salts in water, and total petroleum hydrocarbons (TPH), which indicate

contamination from oil, gasoline, or other petroleum-based pollutants. To ensure safe drinking water, some pollutants are regulated using daily maximum allowable limits, meaning the concentration must not exceed a set threshold in a single day's sample. For example, if a river supplying drinking water has a TDS limit of 1750 mg/L, any sample exceeding that amount on a given day would indicate a potential water quality concern. Some pollutants, like nitrates, are reported using a 30-day average, which calculates the mean concentration over a month to detect long-term trends. This method ensures that short-term spikes do not unfairly impact water quality evaluations while still preventing prolonged exposure to harmful substances.

The criteria of parameters for domestic water supply waters and their allowable variations are included in [administrative rules 74:51:01:44](#). For total dissolved solids (TDS), the water should have a 30-day average concentration of less than or equal to 1,000 mg/L, with a daily maximum limit of 1,750 mg/L. Nitrate levels, measured as nitrogen (N), should not exceed 10 mg/L on any given day. The pH level, which measures the acidity or alkalinity of the water, should remain between 6.5 and 9.0 units.

For total coliform bacteria, the acceptable concentration is 5,000 per 100 mL, calculated as a geometric mean (the nth root of the product of all sample values) of at least five samples taken during separate 24-hour periods over 30 days. Additionally, no more than 20% of the samples collected in the same 30-day period should exceed this value. The table listed in [administrative rules 74:51:01:44](#) also specifies that in any single sample, the total coliform count should not exceed 20,000 per 100 mL.

Barium concentrations should remain below 1.0 mg/L on a daily basis. Chloride levels should have a 30-day average of less than or equal to 250 mg/L, with a daily maximum of 438 mg/L. Fluoride concentrations should not exceed 4.0 mg/L on any given day.

Sulfate concentrations are subject to a 30-day average limit of 500 mg/L, with a daily maximum of 875 mg/L. Lastly, total petroleum hydrocarbons, which indicate oil-based contamination, should have a daily maximum concentration of less than or equal to 1.0 mg/L.

Fish and Wildlife Propagation, Recreation & Stock Watering

Per the administrative rules of South Dakota § [74:51:01:52](#), South Dakota's WQS has established criteria for safeguarding livestock water supplies and wildlife propagation. These criteria include overall alkalinity (measured as calcium carbonate), dissolved solids, conductivity, nitrogen content (as nitrates), pH levels, total hydrocarbons from petroleum, and oil and grease content. These regulations expand on national guidelines for harmful substance levels to ensure water is safe and beneficial for the environment and livestock propagation.

Total alkalinity, measured as calcium carbonate, should have a 30-day average of less than or equal to 750 mg/L and a daily maximum of 1,313 mg/L. Total dissolved solids should not exceed 2,500 mg/L on a 30-day average or 4,375 mg/L as a daily maximum. The conductivity of the water at 25°C, which measures its ability to conduct electricity (and indicates the presence of dissolved salts), should remain below 4,000 micromhos per centimeter as a 30-day average, with a daily maximum of 7,000 micromhos per centimeter.

Nitrate levels, measured as nitrogen (N), should have a 30-day average of less than or equal to 50 mg/L and a daily maximum of 88 mg/L. The pH, which indicates the acidity or alkalinity of the water, should range between 6.0 and 9.5 units. The concentration of total petroleum hydrocarbons, which signal contamination by oil-based substances, should remain below 10 mg/L. Oil-based substances include oil-based paints, petroleum products (gasoline and diesel), lubricants, solvents, cooking oils, and industrial oils. Similarly, the oil and grease concentration should also not exceed 10 mg/L.

Irrigation Water

South Dakota regulates water quality for irrigation to protect crops and soil health. From April through October, irrigation water should have electrical conductivity below 2,500 micromhos/cm (30-day average) and under 4,375 micromhos/cm (daily maximum) to prevent salt buildup in soils. The sodium adsorption ratio (SAR) should be below 10, ensuring a balanced soil structure. A site-specific rule for the Belle Fourche River limits SAR to 6 to protect local agriculture. These guidelines help maintain sustainable irrigation practices and safeguard crop productivity.

Click here for more information: [74:51:01:53](#)

Commerce and Industry Water

South Dakota sets water quality criteria for commerce and industry to ensure safe and sustainable water use. Total dissolved solids (TDS) should be below 2,000 mg/L (30-day average) and under 3,500 mg/L (daily maximum) to prevent scaling and equipment damage. pH levels must remain between 6.0 and 9.5 to protect industrial processes and the environment. These regulations help maintain water quality while supporting industrial activities ([74:51:01:54](#)).

Recreation Water

South Dakota has specific water quality criteria to protect public health during recreational activities in lakes and rivers. These standards apply from May 1 to September 30, when recreational use is highest. Immersion recreation refers to activities where people are fully submerged in water, such as swimming, diving, and water skiing. To ensure safety, the water must maintain a minimum dissolved oxygen level of 5.0 mg/L to support aquatic life. The presence of *Escherichia coli* (*E. coli*), a bacteria indicating fecal contamination, should remain below 126 colony-forming units (CFU) per 100 mL as a 30-day geometric mean, with a single-sample limit of 235 CFU/100 mL. Additionally, harmful algal toxins like microcystin and cylindrospermopsin should not exceed 8 µg/L and 15 µg/L, respectively, to prevent health risks such as skin irritation and gastrointestinal illness. Limited contact recreation includes activities with a lower risk of water ingestion, such as wading, fishing, and boating. Since the likelihood of swallowing water is reduced, the *E. coli* limits are higher, with a geometric mean limit of 630 CFU/100 mL and a single-sample limit of 1,178 CFU/100 mL. However, the same oxygen, microcystin, and cylindrospermopsin limits apply to protect the ecosystem and public health. For more details, refer to [74:51:01:50](#) and [74:51:01:51](#).

Fish Life Propagation Water

Specific water quality standards to support the propagation of various fish species are summarized below, ensuring suitable habitats for different fish species. Coldwater permanent fish life, such as trout and salmon, thrive in cool, oxygen-rich water. To protect these species, dissolved oxygen must be maintained above 6.0 mg/L (7.0 mg/L during spawning), with chlorides below 100 mg/L (as a 30-day average),

and water temperatures not exceeding 65°F. Total suspended solids (TSS) must remain below 30 mg/L to prevent habitat degradation. Coldwater marginal fish life propagation waters can tolerate slightly warmer conditions. Their dissolved oxygen requirement is 5.0 mg/L, and TSS limits are higher (90 mg/L, 30-day average) due to naturally more turbid water bodies. Warmwater permanent fish life, such as bass and catfish, are adapted to higher temperatures, with a maximum of 80°F and dissolved oxygen levels above 5.0 mg/L. TSS levels can reach 90 mg/L (30-day average). Warmwater semipermanent and marginal fish life propagation waters can tolerate higher suspended solids (up to 150 mg/L, 30-day average) and temperatures up to 90°F. For more details, refer to [74:51:01:48](#) and [74:51:01:49](#).

Conclusion

Water quality standards protect human health, aquatic life, and the environment by setting protective limits for various pollutants in water bodies. These standards, established under the Clean Water Act and adopted into state law, ensure that water remains safe for domestic water supply, recreation, agriculture, industrial use, and wildlife. In South Dakota, water quality guidelines specify limits on contaminants such as total dissolved solids (TDS), *E. coli* bacteria, dissolved oxygen, and toxic chemicals based on the water's intended use. For domestic water supply, strict limits on nitrates, coliform bacteria, and petroleum hydrocarbons help safeguard public health. Irrigation water standards protect soil and crops from salt buildup and structural damage, while livestock and wildlife water set criteria to protect wildlife and livestock. Recreational waters are monitored to determine if the water body is meeting the recreational use criteria, and these criteria are used for NPDES permitting discharge levels to inform the safety of swimmers and boaters. Industrial and commercial water quality guidelines prevent damage to equipment and protect aquatic ecosystems from chemical pollutants. Fish propagation standards maintain healthy habitats for different species by setting protective criteria for dissolved oxygen levels, temperature, and suspended solids. Understanding and monitoring water quality is a shared responsibility. Farmers should test their irrigation water to prevent soil damage, homeowners relying on well water should regularly check for contaminants, and recreational users should stay informed about local water advisories. Citizens can report pollution, reduce

chemical runoff, and conserve water to help maintain safe water resources.

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