

2023 Water Testing

What We Do:

FBSR samples local lakes, rivers, and streams to help determine the water quality of the Big Sioux River Watershed. Each year FBSR collects roughly 500 samples, spanning over 100 miles from Dell Rapids to Akron, IA. Following processing from the South Dakota Health Lab, the results are included in the South Dakota DNR water quality portal and posted to our website to allow public access to our data. Testing parameters included *E. coli*, total suspended solids, and nitrates.



Why it Matters:

Recent water crises across the US have elevated awareness regarding the importance of water and rivers for communities. By being proactive, we can avoid the struggles and costs associated with the maltreatment of an important resource. This is why monitoring water quality and providing data to decision-makers is important for economic growth & development, recreation & tourism, safe local water, and the health of the community & wildlife.

Results

In 2022, Sioux Falls received 17.47 inches of rain between May and September. In 2023, the watershed experienced a significant decrease in rainfall, with only 9.03 inches of rain falling in the city in the same time period. As a result, we saw an improvement in water quality. >>>

Our rivers and streams are regularly exceeding safe levels for *E. coli*. >>>

Water quality decreases in the Big Sioux River as it flows south. Overall, the southern monitoring sites at Newton Hills and Akron, IA have higher levels of sediment and nitrates. >>>

Nitrate levels continue to gradually rise in the Big Sioux River watershed. However, on average, nitrate levels continue to remain within safe levels. >>>

Implications

A decrease in rainfall leads to less runoff and erosion and thus improved water quality. However, less rainfall also leads to lower water levels in lakes, rivers, and streams, bringing water quantity issues to the forefront for cities, landowners, and recreationists.

More riparian buffers are needed to reduce contaminant runoff.

The actions taken by communities upstream affect those downstream. Eventually, the water flowing through the Big Sioux River watershed will reach and contribute to the Dead Zone in the Gulf of Mexico.

High nitrate levels can lead to Blue Baby Syndrome. Fertilizer application should be limited based on accurate soil testing. Pet owners should pick up and properly dispose of pet wastes.

| 2023 Summary | | TSS Safe Level: 158 mg/L | | | E. coli Safe Level: 235 CFU/100 mL | | | Nitrate Safe Level: 10 mg/L | | | | |
|----------------------------------|--------------|-----------------------------|-----|------|---------------------------------------|---------|-----|--------------------------------|--------------|---------|-----|------|
| Site Locations | # of Samples | Average | Low | High | # of Samples | Average | Low | High | # of Samples | Average | Low | High |
| BIG SIOUX RIVER SITES | | | | | | | | | | | | |
| Dell Rapids BSR Canoe Access | 10 | 39 | 20 | 78 | 9 | 34 | 7 | 488 | 10 | 0.4 | 0.2 | 1.4 |
| I-90 BSR | 9 | 28 | 21 | 50 | 9 | 100 | 15 | 687 | 9 | 0.3 | 0.2 | 1.3 |
| Falls Park BSR | 10 | 22 | 14 | 33 | 10 | 116 | 21 | 1120 | 10 | 0.2 | 0.2 | 0.4 |
| Lien Park BSR | 10 | 24 | 11 | 52 | 10 | 38 | 10 | 124 | 10 | 0.3 | 0.2 | 1.6 |
| Newton Hills BSR Canoe Access | 10 | 60 | 24 | 136 | 10 | 43 | 12 | 127 | 10 | 2 | 0.8 | 7.8 |
| Akron BSR Canoe Access | 10 | 85 | 28 | 192 | 10 | 43 | 4 | 629 | 10 | 1.2 | 0.2 | 3.9 |
| SPLIT ROCK CREEK SITES | | | | | | | | | | | | |
| Garretson City Park SRC | 8 | 17 | 10 | 38 | 7 | 21 | 1 | 231 | 8 | 0.3 | 0.2 | 1.3 |
| Palisades Park Campground Stream | 6 | 5 | 3 | 10 | 5 | 976 | 291 | 2420 | 6 | 4.9 | 0.2 | 12.7 |
| Palisades Picnic Area | 9 | 10 | 3 | 39 | 8 | 58 | 16 | 411 | 9 | 0.5 | 0.2 | 2.3 |
| 484th Ave on SRC | 10 | 16 | 3 | 26 | 9 | 64 | 26 | 172 | 10 | 0.7 | 0.2 | 2.2 |
| Hwy 11 Bridge on SRC | 9 | 30 | 3 | 69 | 8 | 236 | 37 | 1050 | 9 | 1.1 | 0.4 | 2.9 |
| SKUNK CREEK SITES | | | | | | | | | | | | |
| Skunk Creek 250th St. Bridge | 8 | 10 | 3 | 82 | 7 | 138 | 48 | 488 | 8 | 0.2 | 0.2 | 0.2 |
| Skunk Creek 258th St. Bridge | 10 | 33 | 16 | 75 | 9 | 40 | 9 | 199 | 10 | 0.3 | 0.2 | 1.7 |
| NINE MILE CREEK SITE | | | | | | | | | | | | |
| Hwy 11 and Nine Mile Creek | 10 | 9 | 3 | 30 | 10 | 185 | 6 | 1410 | 10 | 0.3 | 0.2 | 2.4 |
| WETLANDS AND LAKES | | | | | | | | | | | | |
| Dewey Gevik Observation Dock | 8 | 14 | 3 | 4400 | 8 | 60 | 1 | 1730 | 8 | 0.2 | 0.2 | 0.3 |
| Wall Lake Boat Ramp | 10 | 8 | 3 | 110 | 9 | 7 | 1 | 99 | 10 | 0.2 | 0.2 | 0.2 |
| Lake Alvin Boat Access | 10 | 44 | 28 | 70 | 10 | 8 | 1 | 63 | 10 | 0.2 | 0.2 | 0.2 |
| Lake Lakota Boat Access | 0 | - | - | - | 0 | - | - | - | 0 | - | - | - |

*Red numbers dictate results over safe levels. All safe levels reflect the daily maximum criteria as defined by the South Dakota Department of Agriculture and Natural Resources.

**Geometric mean was used instead of arithmetic mean to calculate average values.

***Lake Lakota was inaccessible in 2023.

Learn more at fbsr.org/water-quality-monitoring.

The best way you can support our work for a cleaner Big Sioux River for everyone is to donate.

Visit fbsr.org/donate to contribute.



2023 Contaminant Levels and Beneficial Use Criteria



The State of South Dakota has established beneficial use criteria for waterbodies in the Big Sioux River. Beneficial use establishes what the water can safely be used for, such as domestic water supply, immersion recreation, or fish and wildlife propagation. The following graphs plot the daily maximum beneficial use criteria for total suspended solids (158 mg/L, fish life propagation), *E. coli* (235 CFU/100 mL, immersion recreation), and nitrates (10 mg/L, domestic water supply) against the average contaminant levels in 2023 at the 17 sites sampled by FBSR. A geometric mean was used to calculate the averages instead of arithmetic mean.

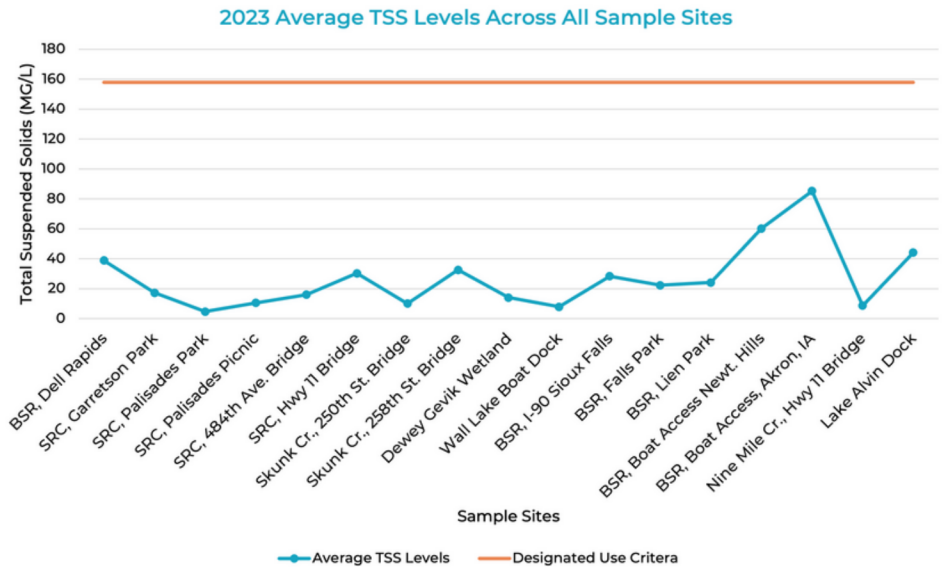
Total Suspended Solids

On average, in 2023, TSS levels did not exceed the designated use criteria of 158 mg/L at the 17 sampled sites.

Two sites exceeded the designated use criteria at least once during the 2023 testing season.

Total Suspended Solids (TSS) can include a wide variety of materials, such as silt, decaying plant and animal matter, industrial wastes, and sewage.

High TSS levels decrease water clarity and can interfere with water chemistry and photosynthesis processes.



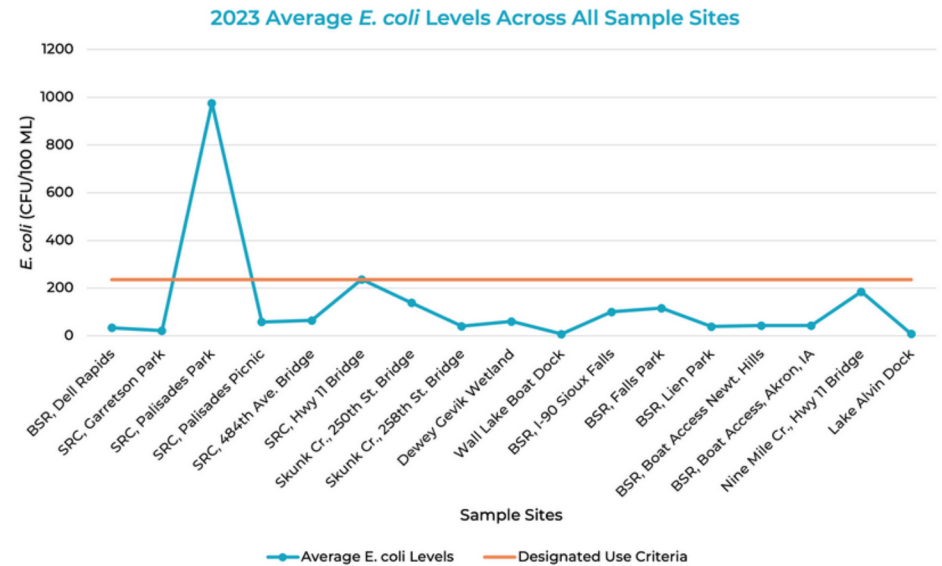
E. coli

On average, in 2023, *E. coli* levels exceeded the designated use criteria of 235 CFU/100 mL at two of the 17 sampled sites, including the popular recreation spot of Palisades State Park.

Ten sites exceeded the designated use criteria at least once during the 2023 testing season.

The presence of fecal coliform bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of people or other animals.

Common sources of *E. coli* include agriculture runoff, wastewater treatment plants, failing septic systems, domestic and wild animal waste, and stormwater runoff.



Nitrates

On average, in 2023, nitrate levels did not exceed the designated use criteria of 10 mg/L.

One of the sites exceeded the designated use criteria at least once during the 2023 testing season.

Nitrates are an essential source of nitrogen for plants and are commonly used in fertilizers.

When nitrogen fertilizers are used to enhance soil fertility, nitrates may be carried by rain over or through the soil and deposited in surface water.

High levels of nitrates in drinking water can lead to Blue Baby Syndrome and an increased risk of certain cancers and thyroid dysfunction.

