

# Water Quality in the Northern Colorado Plateau Network: Water Years 2019-2022

[Arches National Park](#), [Bryce Canyon National Park](#), [Canyonlands National Park](#), [Capitol Reef National Park](#), [Dinosaur National Monument](#), [more »](#)



Green River, Dinosaur National Monument.

*NPS/A. Washuta*

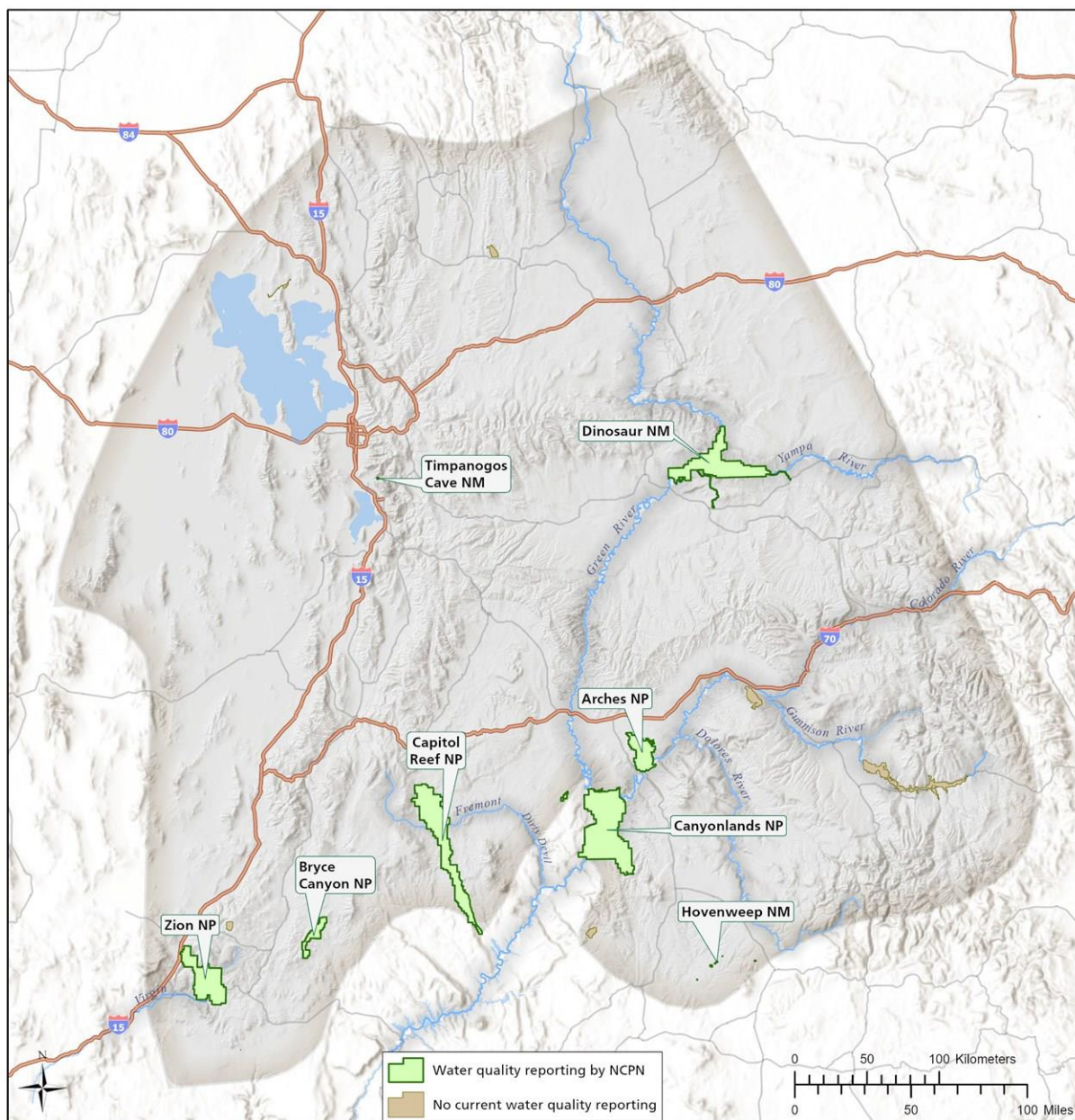
## Overview

Good, clean water is essential for healthy ecosystems—for people, vegetation, and animals—making it one of the most important resources in the semi-arid west. Rivers, streams, and lakes play a key role in natural systems and are also valued for their scenic beauty and the recreational opportunities they provide. Like everything in nature, river systems and their watersheds (the area of land draining into a river or lake) need to be used wisely to prevent negative impacts from impairing water quality. This means that the amount and characteristics of water (such as clarity, purity, and temperature) remain at levels that won't damage or sicken ecosystems, people, or make the water unusable. To help define water quality, states identified acceptable levels of specific water characteristics and developed water quality standards based on those levels.

The [Northern Colorado Plateau Network](#) (NCPN) and its partners monitor specific water quality parameters in and near National Park Service lands in Utah and Colorado. If the levels do not meet state standards, scientists can communicate water quality problems and potential sources to park managers. Managers can then take action to make changes to activities that may be contributing to water quality issues. In this way, water quality monitoring is like having regular health check-ups. It allows managers to make adjustments before a river's health deteriorates. It can also serve as a report card, providing feedback on the success of management policies to conserve and preserve natural resources.

#### At a Glance:

- **The National Park Service and partners monitor water quality in national parks** to understand current conditions and detect any problems in rivers, streams, and lakes. Monitoring is necessary to preserve waterbodies unimpaired for future generations and restore those that have been impaired.
- **Overall, water quality in the network remains excellent.** 96.8% of results met water quality standards. These results were consistent with previous findings from 2016 to 2018.
- ***Escherichia coli* (E. coli) concentrations continued to be high at some sites.** Potential sources of this bacteria include high-density livestock operations outside the park and trespass livestock within the park.
- **Water temperatures continued to exceed standards at multiple sites,** threatening the livelihood of aquatic organisms such as insects and fish that are adapted to certain temperatures and cannot survive in warmer waters. Water temperatures on the Colorado Plateau are correlated to air temperature and are expected to continue to rise.



Map of parks monitored for water quality in the Northern Colorado Plateau Network, October 2018 – September 2022.

*NPS*

## Methods

Monitoring sites that are directly supported by NCPN are visited monthly ten months of the year. Some measurements (including dissolved oxygen, pH, temperature, specific conductance, and flow) are made directly in the field. Other measurements (including trace elements, nutrients, major ions, total dissolved solids, and fecal indicator bacteria) are measured in a laboratory from

samples collected in the field. These provide information about levels of pollutants, nutrients, and purity of the water. One site visit can provide data for up to 30 water quality parameters.



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Verkin Creek, Zion National Park

*A. Washuta*

## Findings

The NCPN water quality monitoring program evaluated data collected from October 2018 through September 2022, and compared the results to state water quality standards. Of 22,356 total evaluations, 96.8% met state water quality standards. That's mostly good! The most common parameters that did not meet state standards included fecal indicator bacteria (*Escherichia coli*), water temperature, and total dissolved solids.

### E. coli

High concentrations of fecal indicator bacteria were measured in sites monitored in Arches, Bryce Canyon, Capitol Reef, and Zion national parks, as well as Dinosaur and Hovenweep national monuments. These bacteria, called *Escherichia coli* (*E. coli*), are found in the waste of mammals, including wildlife, livestock, and humans. At some sites, scientists were able to identify potential sources of contamination, including upstream flood irrigation that flowed over livestock-grazed pastures, high-density livestock operations outside park boundaries, and the presence of trespass livestock within park boundaries.

### Water Temperature

Just like humans, aquatic organisms, such as fish and insects, have a limit to how much heat they can handle. Water temperatures that exceeded state standards were observed in the Colorado River (Canyonlands National Park), the Fremont River and three of its tributary streams (Capitol Reef National Park), and the North Fork Virgin River and one of its tributary streams (Zion National Park). Water temperature is strongly correlated with air temperature in surface waters across the Colorado Plateau and is expected to rise as air temperatures increase.

### Total Dissolved Solids

While total dissolved solids can be an indicator of pollution, most occurrences at the monitoring sites are natural, resulting from weathering of rock outcrops with high salt content in the surrounding watershed. Some sites may have upstream land uses, such as agricultural irrigation, that can also increase levels of total dissolved solids in surface waters.

### Other Concerns

**Phosphorus** concentrations were often higher than acceptable limits but were rarely associated with other signs of water quality concerns, such as harmful algal blooms (HABs). Although there is increasing concern about HABs, they are not currently part of the NCPN water quality monitoring program. Toxins produced by HABs, known as cyanotoxins, exceeded public health limits in three water bodies at Zion National Park in 2020–2022. Park staff and the State of Utah are working with researchers to better understand the causes of these blooms.

**Low dissolved oxygen** at one site in Arches National Park and one site at Hovenweep National Monument, as well as **selenium** in the Colorado River (Arches and Canyonlands National Parks) are also water quality concerns. Utah and Colorado state agencies are working to reduce selenium concentrations in the Upper Colorado River basin.

## Conclusion

Waterbodies in national parks on the Northern Colorado Plateau meet water quality standards for most evaluations. They continue to support healthy aquatic ecosystems and provide scenic

landscapes and safe recreational opportunities. Northern Colorado Plateau Network's long-term monitoring efforts and water quality analyses enable science-based management, ensuring enjoyment and conservation of these important waterways of the semi-arid west.

*Results in this article are summarized from:* [Weissinger R and Hackbarth C. 2024. Water quality in the Northern Colorado Plateau Network: Water years 2019–2022. Science Report. NPS/SR—2024/154. National Park Service. Fort Collins, Colorado. https://doi.org/10.36967/2304433](https://doi.org/10.36967/2304433)