

Water quality on the Qualla Boundary is maintained by adherence to federally approved Tribal water quality standards written in the Cherokee Code. These water quality standards comply with the Clean Water Act. Water quality criteria are listed in the Eastern Band of Cherokee Indians' Water Quality Standards: Administrative Rules, Section 4: General Water Quality Criteria, and Section 5: Water Quality Criteria for Specific Uses. Water quality regulations are also found in Chapter 113E - WATER QUALITY CODE FOR TRIBAL WATERS.

The NRD monitors the health of our rivers and streams by evaluating the following parameters:

Dissolved oxygen – Oxygen is critical for aquatic life. The value for dissolved oxygen should be above 5 mg/L.

pH - pH measures the acidity or alkalinity of water with expected values ranging from 6-9. Anything below 6 is too acidic and anything above 9 is too basic which can be troublesome for aquatic organisms.

Nutrients - We monitor for total phosphorus and total nitrogen in our waters but do not have regulatory parameters for these two nutrients. Nutrient pollution can come from agricultural runoff and lawn fertilizer. High total phosphorus amounts can cause toxic algal blooms, which can kill off any organisms living in the stream or river and can make humans and their pets sick. The limit for TP is 0.1 mg/L. For total nitrogen, higher amounts can be troublesome for aquatic organisms. The limit for TN is 0.46 mg/L.

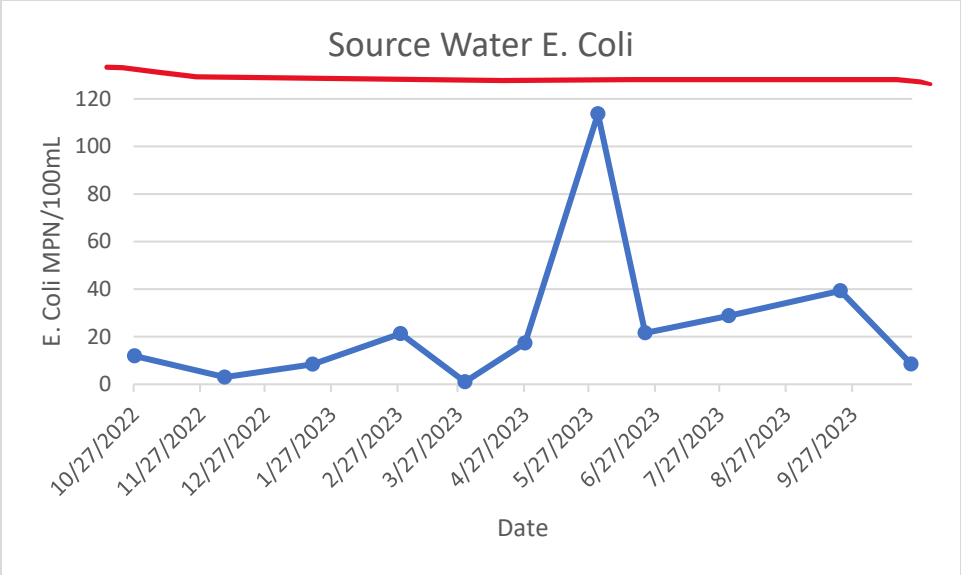
Turbidity – This parameter measures the amount of suspended particulate matter in our water and should be less than 10 NTU. Turbid waters caused by sediment from stormwater runoff can harm fish gills and smother reproductive habitat. For instance, after a rainstorm, the water could be brown with suspended sediment in the river.

Escherichia coli (E. coli): These bacteria are naturally occurring in the digestive tracts of people and animals. E coli can be found in moving waters such as rivers and streams from waste pollution. Values should be less than 126 MPN/100mL. Anything higher increases the possibility of making a human being sick.

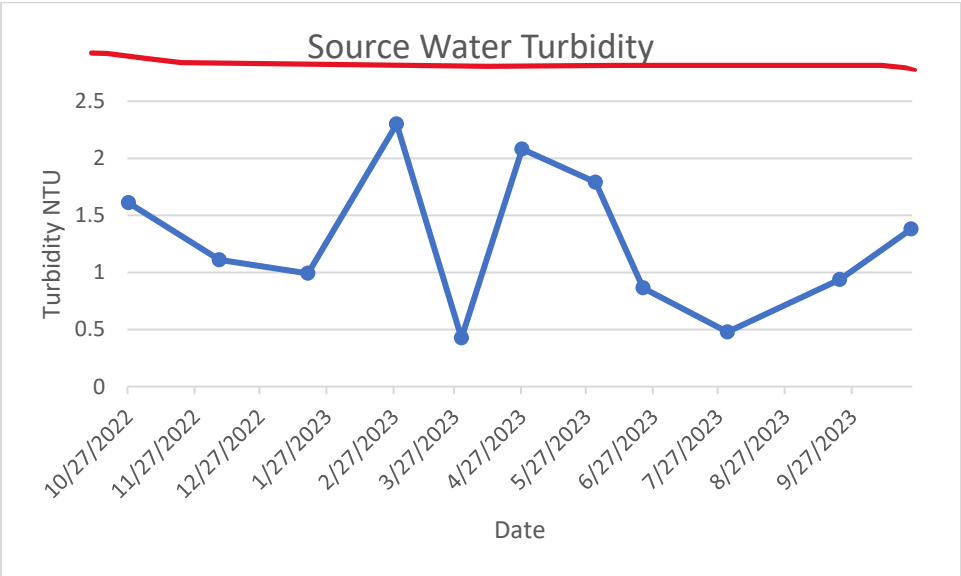
Temperature - For coldwater streams that contain trout, the temperature should be less than 29 degrees Celsius. Anything higher can create conditions where trout are stressed, less healthy and unable to live year-round.

The sample station for our “Source Water” data collection is upstream of the drinking water plant intake. Our sample station for the lower Oconaluftee River is a USGS Gauging Station supported by the EBCI located downstream of the Cherokee Wastewater Treatment Plant. This station takes continuous readings which are accessible via the USGS webpage (<https://waterdata.usgs.gov/monitoring-location/03512000/#parameterCode=00065&period=P7D&showMedian=true>).

Data from the “Source Water” site indicates good water quality. This is based on its low E. Coli and low turbidity measures taken from 10/31/2022 to 10/24/2023. The E. Coli levels at the Source Water site are all well below the threshold of 126 MPN/100mL as you can see on the graph. Anything above the threshold is a hazard to both animals and people.



The Source Water turbidity is well below the threshold of 10 NTU, which is excellent, that means there is very little suspended in the water column. That means the water is clearer. Section 4.1.5 of the Tribal WQS Rules contains two turbidity criteria, one for warm water and one for trout streams. For cold water trout streams, turbidity needs to be between 0 to 10 NTU, because anything over that makes the water too murky and little to no sunlight gets through, and these aquatic organisms need sunlight to survive.

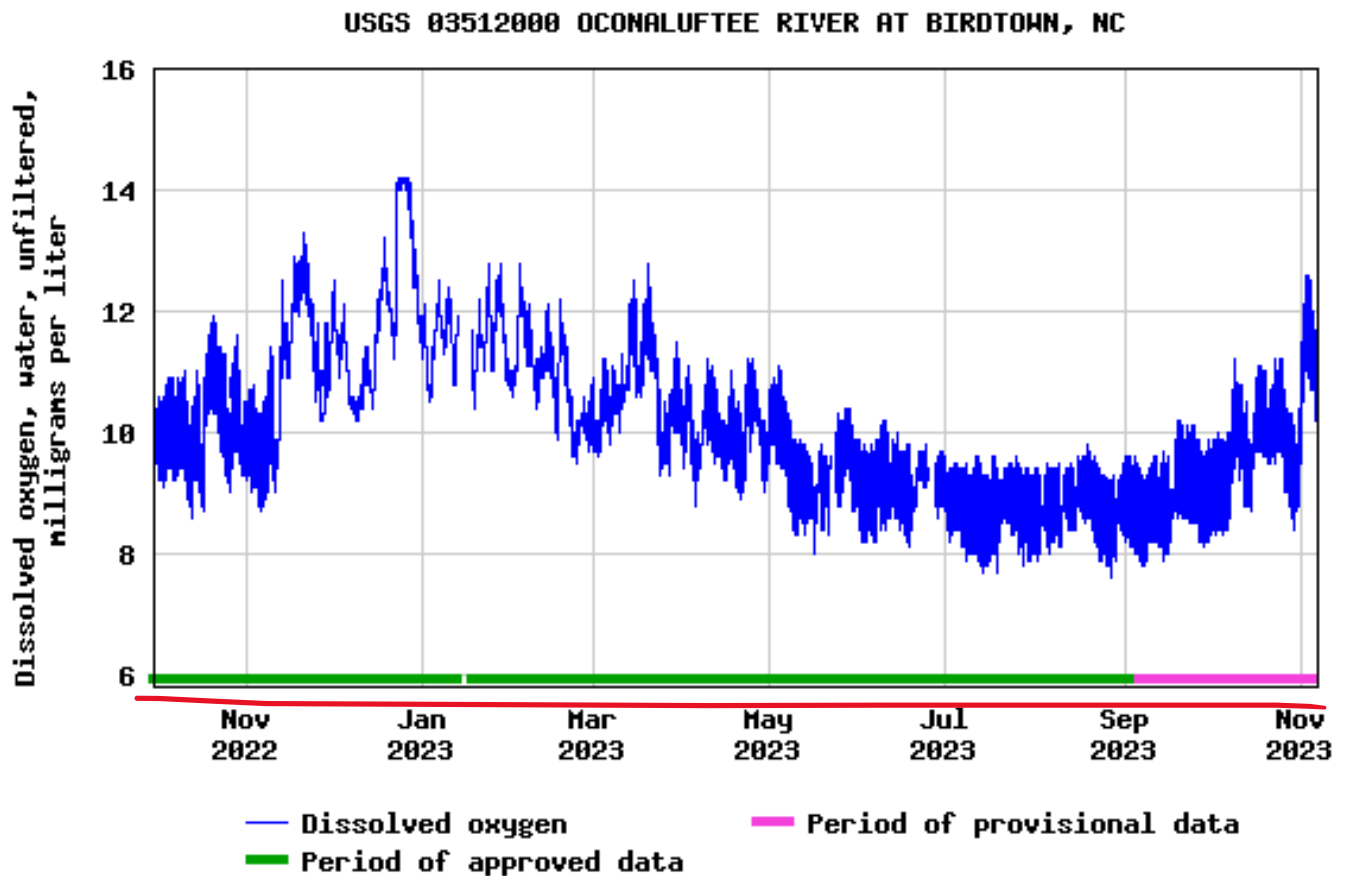


The data from the USGS Gauging Station also indicates overall healthy river conditions. This is based on low phosphorus, low nitrate, and generally low turbidity readings. Spikes in total phosphorus and turbidity are likely due to rain events and stormwater runoff. Also important was the river's pH, which was in the right range of 6 – 9, its dissolved oxygen was good, and its temperature was below the threshold.

In the following graphs, the red lines represent the acceptable thresholds.

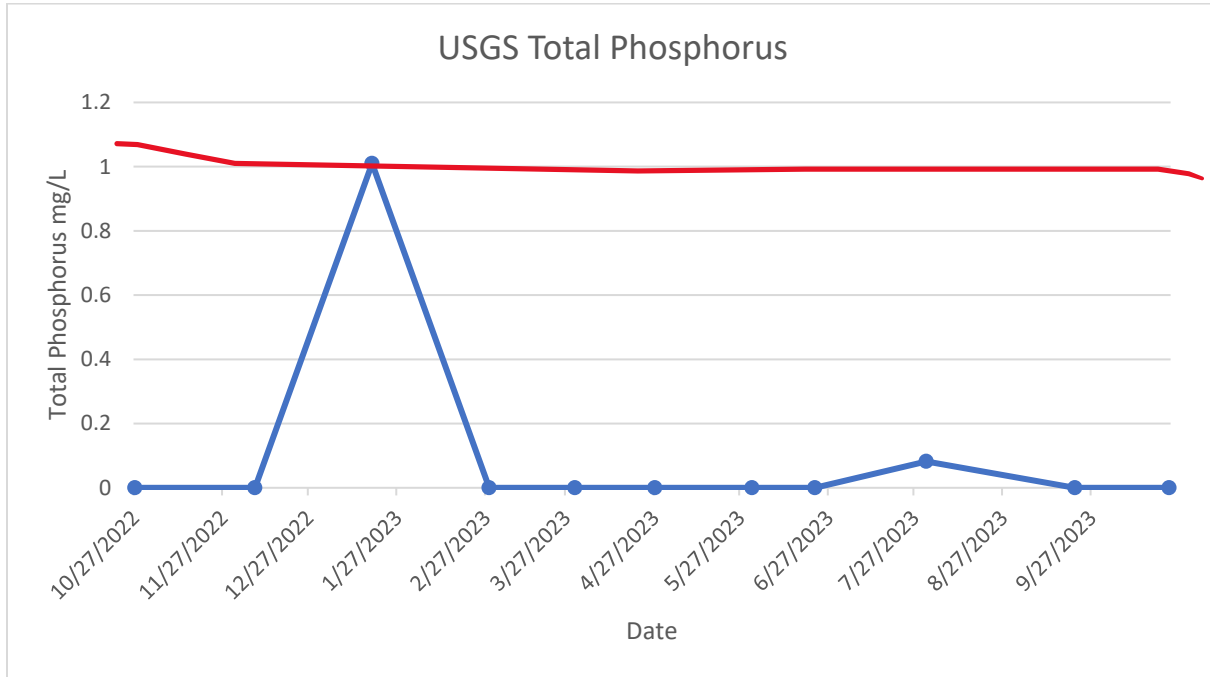
USGS Dissolved oxygen, water, unfiltered, milligrams per liter

The dissolved oxygen is well above the minimum threshold of 5mg/L, meaning there is enough oxygen in the water. This is good for the organisms that live in the water, such as trout. Oxygen values appear above the red line.



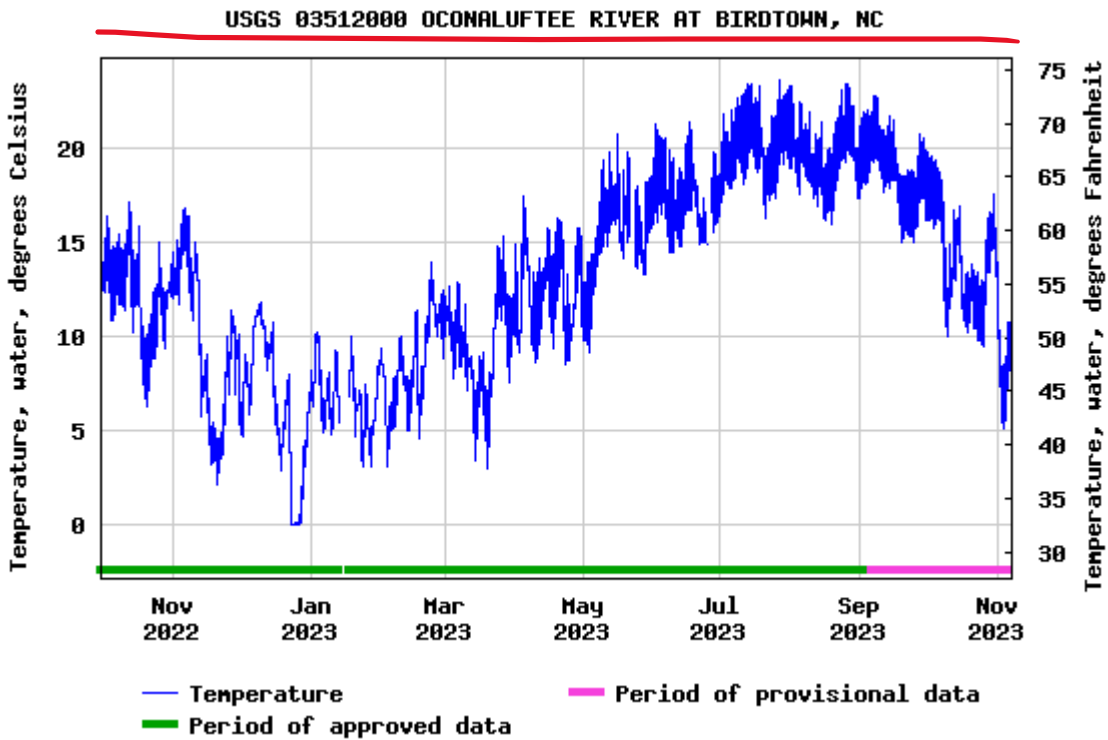
USGS Total Phosphorus, water, unfiltered, milligrams per liter

Total phosphorus can come from a number of different sources, such as effluent from the CWWTP upstream, it can come from a rain event, but the USGS gauging station has very little phosphorus hits through the years, it is usually no phosphorus at all. So this one hit is not a cause for concern.



USGS Temperature, water, degrees Celsius

The temperature is well below the threshold of 29 degrees Celsius, which is good for the organisms living in the river, such as trout, which need temperatures less than 29 degrees Celsius to spawn.



USGS pH, water, unfiltered, field, standard units

The pH is within the minimum and maximum threshold of 6-9, meaning that it is an acceptable level for the life within the stream. In Section 4.1.3 of the Tribal WQS Rules the pH needs to be between 6 – 9, anything lower than a 6 is too acidic and will kill most organisms in the water, and anything above 9 is too basic and is also toxic for the organisms.

