

Summary of Data

Water quality sampling occurred at six sites within the Lake Glenville watershed on 06/02/26. All sites were located as close as possible to sites sampled in previous monitoring years; the location for the Glenville Creek sample was again sampled downstream at its standard location. A very light rain had occurred in the early morning prior to sampling on 06/02/25, the area received 0.55 inches of rain on 05/27/25 but none in the preceding days from 05/28/26 – 06/01/26 (Figure 1). Stream flows were normal base flow. The suite of parameters sampled included water temperature, dissolved oxygen (DO), pH, specific conductivity, turbidity, fecal coliform, E.coli, ammonia, nitrite/nitrate, phosphate, and alkalinity.

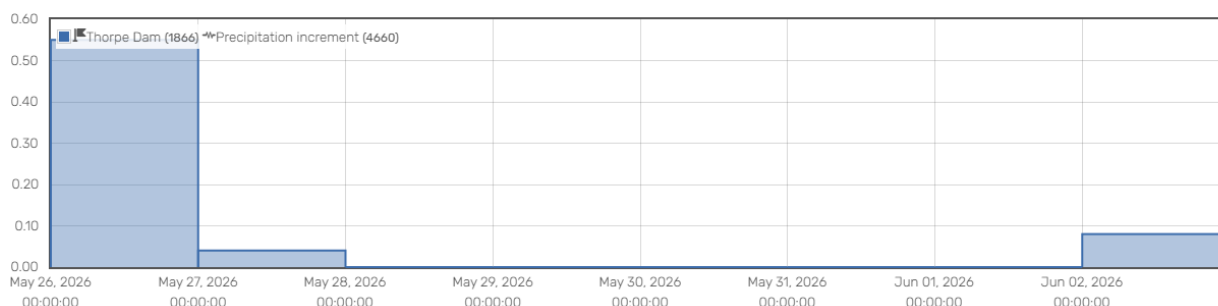


Figure 1. Precipitation for the week of sampling.

Turbidity was less than 5 NTU for all sites. The state standard for North Carolina streams that carry the Trout Waters (Tr) designation is that turbidity shall not exceed 10 NTU. Pine Creek, Mill Creek, Norton Creek, Hurricane Creek, and Cedar Creek all carry the Tr classification. Glenville Creek is too small to be classified under this system. The regional Volunteer Water Information Network (VWIN) mean is 6.2 NTU.

Dissolved oxygen is the amount of oxygen dissolved in water. The concentration of dissolved oxygen in surface water is affected by temperature and has both a seasonal and a daily cycle. Cold water can hold more dissolved oxygen than warm water. In winter and early spring, when the water temperature is low, the dissolved oxygen concentration is high. In summer and fall, when the water temperature is high, the dissolved oxygen concentration is often lower. Dissolved oxygen is important for ecological health as most aquatic organisms need oxygen to survive and grow. Some species, such as trout and stoneflies, require high DO levels (>6 mg/L) for survival, and trout show improved reproductive health when DO levels are above 10 mg/L. **Dissolved oxygen concentrations for the sampling event ranged between 7.8 mg/L in Glenville Creek and 8.9 mg/L in Cedar Creek. Glenville Creek was in a slight backwater condition during sampling.** “Backwater” is used to describe the conditions when the lake pool elevations acts as a base level, causing lake water to push back or slow down the incoming water from a tributary stream.

From 2020 to 2022, an increase in observed acidity was a concern over the course of several samplings in both the tributaries to Lake Glenville and the lake itself. However, during the most recent tributary samplings pH values have trended toward the regional VWIN mean (7.1). As has been stated previously, acidic waters are not uncommon for high elevation streams in the area. Depths to bedrock are shallow with thin soils and rock types do not have a mineralogy that buffers groundwater as it moves through the ground and reemerges in the streams. However, there are anthropogenic sources which can increase the acidity in streams to levels which are unhealthy for trout (below 5.0). High elevation areas of eastern Tennessee and Western North Carolina receive elevated rates of atmospheric acid deposition in comparison with other areas on the east coast, resulting in increased episodic stream acidification events, adding to the acidification of soil and surface waters. Episodic stream acidification occurs when heavy rain downpours bring increased acidic deposition to soils and water bodies, resulting in periods of increased stream flow and decreased water pH.

The issue of acidity is complicated by the fact that rain is, on average, much more acidic in the summer than in the winter. Continued monitoring of acidity will help increase awareness of any potential problems. It is important to note that although the effects of the issue are felt locally, it originates at a regional, continental scale and is not a “stand-alone” problem. It relates intimately to energy, land use, urban, transport, and other socioeconomic issues.

On 06/02/26 pH values ranged from 6.9 to 7.5, values that are more in line with what we would want to see when compared to some of the numbers from 2021 and 2022.

Ammonia concentrations were in line with those previously observed at all the sampled locations. **Ammonia values ranged from 0.08 mg/L to 0.16 mg/L.** The Regional VWIN mean is 0.09 mg/L. A concentration of <0.1 mg/L is the standard for pristine waters, while <0.2mg/L is still considered healthy. Ammonia is produced by bacterial decomposition of organic matter that accumulates in stream sediment; therefore, we would expect to see higher ammonia values following rainfall events where those sediments are being mobilized and transported.

Nitrite/Nitrate-Nitrogen concentrations were very low, with all values at 0.2 mg/L, well below the regional VWIN average of 0.5 mg/L. **Phosphorus concentrations ranged from undetectable to 0.03 mg/L.** The regional VWIN average for phosphorus is 0.02 mg/L. Grass fertilizers and livestock are a frequent source of phosphorus. Once in the stream and lake system, rainfall can disturb the sediments, resulting in internal loading of previously deposited phosphorus.

Under state rules, fecal coliform in fresh waters “shall not exceed a geometric mean of 200 colony forming units (CFU)/100 mL based upon at least five consecutive samples examined during any 30-day period, nor exceed 400 CFU/100 mL in more than 20 percent of the samples examined during such period.”. As such, any single sample is difficult to compare to the state standard, but as a rule of thumb low numbers are good and numbers exceeding 200 CFU/100 mL are undesirable. However, violations of the state standard are expected during heavy rainfall events and may be caused by uncontrollable nonpoint source pollution. Nonpoint source pollution comes from contaminants that end up on the ground naturally or from human activity.

Rainwater and snowmelt pick up these contaminants as it washes over yards, sidewalks, driveways, parking lots, and fields and deposits them into lakes and streams as nonpoint source pollution. Common sources of nonpoint source pollution in the Lake Glenville watershed could include:

- animal production operations and feedlots;
- agricultural activities;
- stream bank and shoreline erosion;
- timber harvesting;
- land development;
- on-site sewage disposal units;
- atmospheric deposition.

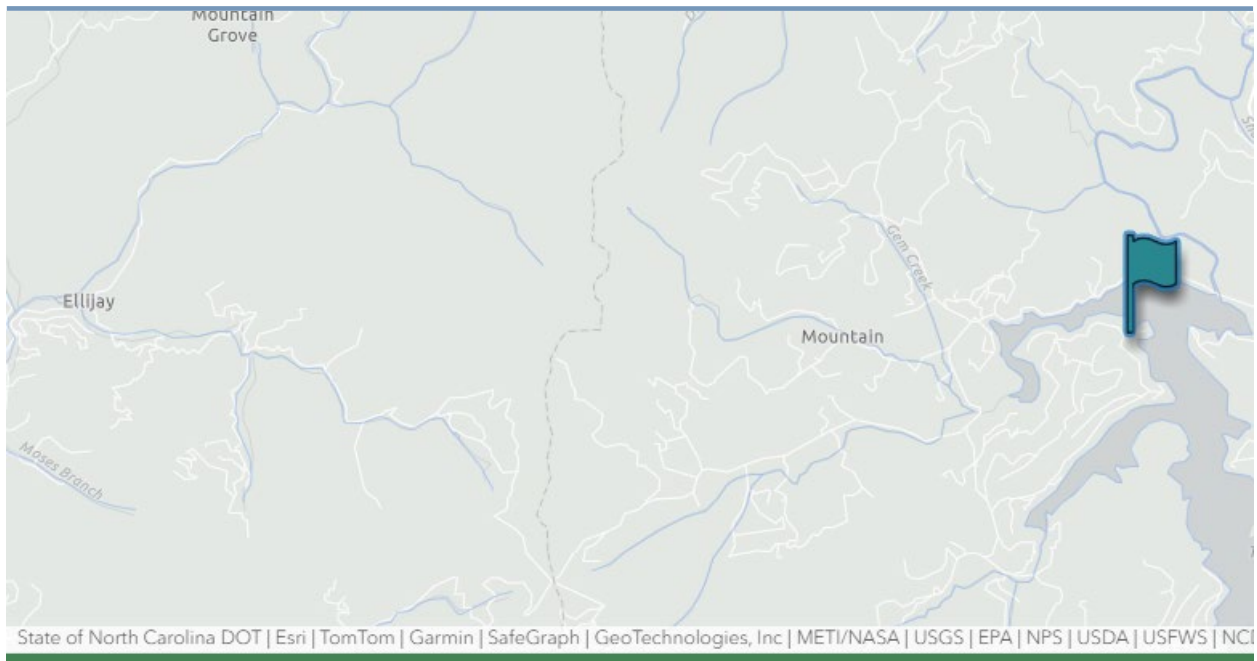
Fecal coliform concentrations ranged from 16 CFU/100 mL in Hurricane Creek to >3580 CFU/100 mL in Pine Creek. Even as a “one-off” concentration, the high concentration of Fecal Coliform in Pine Creek is alarming.

E. coli, a type of fecal coliform, is a diverse species of bacteria found in the environment, food, and intestines of animals and humans. The presence of *E. coli* at elevated levels in streams, lakes, and rivers is an indication of potential point and nonpoint source pollution. See EPA’s website for more information on nonpoint sources. While most strains of *E. coli* do not cause disease, their presence at elevated levels can indicate potential fecal contamination, which has been shown to co-occur with gastrointestinal illnesses. The U.S. Environmental Protection Agency (EPA) has determined that *E. coli* is the preferred fecal indicator bacterium to use when evaluating for health advisories in freshwater.

For the WNC Recreational Monitoring Program, NCDHHS provided [guidance](#) for freshwater recreational values for *E. coli* collected as part of the program. Based on NCDHHS' guidance, the *E. coli* recreational advisory level is 126 colony forming units of *E. coli* per 100 milliliters for primary contact with the water, such as swimming. In addition, NCDHHS calculated a recreational guidance value of 886 Colony Forming Units (CFU)/100 mL of *E. coli* for activities such as tubing, rowing, kayaking, etc. that do not necessarily involve full contact with the waterbody. Most probable number (MPN) is equivalent to CFU.

The E. Coli bacteria concentration in Pine Creek was >2420 MPN. Again, this value is worthy of alarm and FLG are actively working with NCDEQ water quality staff and utilizing Equinox Environmental to determine the source of the bacteria and what can be done to reduce the loading to Pine Creek.

We have included the following data to help put the problem in perspective relative to safety in Lake Glenville and particularly at the Pine Creek recreation area. Results of sampling at the Pine Creek recreation area on 6/3/26 indicated E. Coli concentration of approximately 10 MPN, a very safe number for swimming.



E. Coli

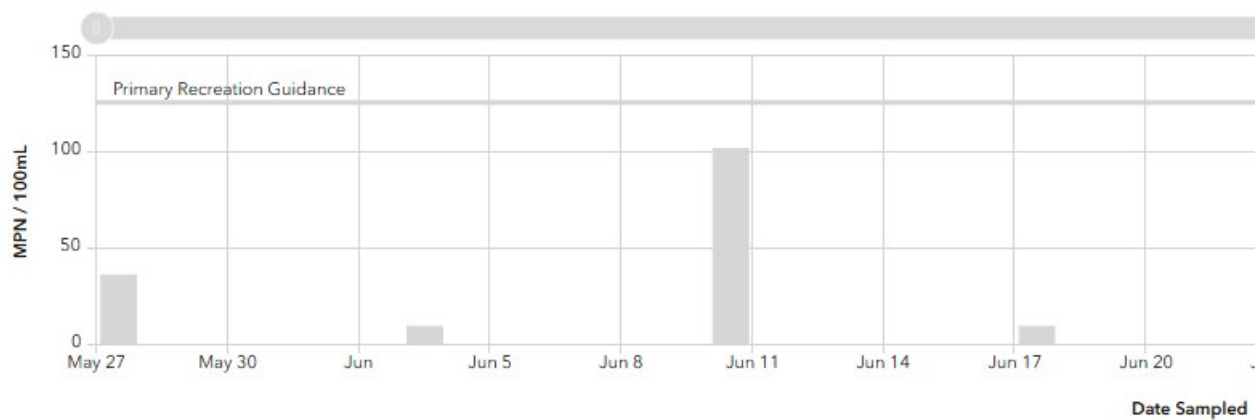


Figure 2. This map and graph show that the concentration of *E.coli* at the Pine Creek Recreation area was 10 MPN on 6/3/2026 despite the high concentration at Pine Creek on the previous day.

	**Regional VWIN mean - used to compare results against typical regional values											
	*Reporting limit											
		NH3	NO2/NO3	Phosphorous	Dissolved Oxygen	Specific Conductivity	pH	Turbidity	Fecal coliform	E.Coli	Temperature	Alkalinity
		mg/L	mg/L	mg/L	mg/L	µS/cm		NTU	CFU	MPN	°F	mg/L
		0.09**	0.5**	n/a	NC Trout Water	60**	7.1**	6.2**				CaCO ₃
		0.02*	0.1*	0.02*	designation standard ≥6 mg/L							
Pine Creek	6/2/2026	0.08	0.2	0.03	8.5	26	7.5	5	>3580	>2420	60	10
Mill Creek	6/2/2026	0.06	0.2	0.01	8.8	19	7.3	4	56	96	58	6
Norton Creek	6/2/2026	0.09	0.2	0.01	8.8	21	6.9	1	45	50	60	7
Hurricane Creek	6/2/2026	0.12	0.2	0.01	8.8	27	7.2	<1	16	25	61	5
Cedar Creek	6/2/2026	0.15	0.2	0.03	8.9	13	7.2	<1	44	66	61	5
Glenville Creek	6/2/2026	0.16	0.2	0.01	7.8	24	6.9	<1	74	131	65	8