



NORTH CAROLINA  
Environmental Quality

ROY COOPER  
Governor

ELIZABETH S. BISER  
Secretary

RICHARD E. ROGERS, JR.  
Director

**The following frequently asked questions (FAQs) are being provided to address concerns about the presence of Escherichia coli (*E. coli*) in the French Broad River near Asheville. The Division of Water Resources believes this information will provide useful facts to citizens, river outfitters, and others about bacteria and recreating in natural waters.**

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### **What is *E. coli*?**

*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.

### **Who regulates *E. coli* bacteria levels in surface water in North Carolina?**

North Carolina does not currently have a regulatory standard for *E. coli*. Instead, North Carolina regulations for water quality stream standards, discharge limits, determining impairments, etc. are based on fecal coliform bacteria, a broad group of organisms that are generally fecal in origin. The N.C. Department of Environmental Quality (DEQ), like other state environmental agencies around the country, has begun to evaluate a transition to the more specific *E. Coli* stream standard.

### **Who determines if a stream is safe to swim or not?**

The N.C. Department of Human Health Services (DHHS) is the agency charged with issuing health and (or) recreational advisories in North Carolina. DHHS works in collaboration with local health departments and the DEQ's Division of Water Resources (DWR) to obtain information that is the basis for these advisories. Advisories may be based on recreational standards which may differ from state stream standards. While specific health advisories are issued periodically, citizens should always follow [these simple precautions to help prevent recreational water illnesses](#).



North Carolina Department of Environmental Quality | Division of Water Resources  
Asheville Regional Office | 2090 U.S. Highway 70 | Swannanoa, North Carolina 28778  
828.296.4500

**What is the North Carolina standard for *E. coli*? 235 Most Probable Number (MPN)/100ml has been used, is this the state or EPA standard?**

North Carolina does not currently have a regulatory standard, stream standard nor health advisory standard, for *E. coli*. Instead, a fecal coliform stream standard is used. Because bacteria levels naturally fluctuate, results from multiple fecal coliform sampling events are used to determine a waterbody's water quality over an extended (e.g., month) period of time; there is no state health advisory standard for bacteria that provides an instantaneous health risk advisory determination for freshwater.

In 1986, the EPA recommended a single-sample health criterion of 235 colony-forming units (CFU)/100 ml for heavy use waterbodies (EPA, 1986). While this is no longer an EPA recommended water quality criterion, it is a value that can be used as an additional precautionary tool for a notification and advisory program. The 235 MPN/100 ml is the level some entities have elected to use when assessing recreational water usability based on single event grab samples. In addition, for purposes of a recreational advisory, the use of a single value measured once per week poses limitations because bacteria levels tend to spike during rain events and a single weekly measurement does not account for this effect.

**Are there alternatives to sampling once a week for recreational advisory purposes?**

DWR is working in collaboration with local partners to finalize use of an estimator *E. coli* model for the French Broad River flowing through Asheville. While the model is in its early phase and based on limited data, its use will provide a more accurate estimate of *E. coli* concentrations compared to single week sampling. DWR will have more information once the model is available for use.

**What does the current DWR data indicate?**

DWR data collected during the recreational seasons beginning in May 2019 indicate periods of elevated levels of fecal coliform bacteria present in the monitored portion of the French Broad River near Asheville. Exceeding the state bacteria stream standard means the water body is not meeting its intended use as a primary recreational water. Therefore, this segment of the French Broad River is on the [draft State listing](#) of impaired waters also known as the 303(d) list in reference to the federal Clean Water Act.

**Why list a stream on the impaired 303(d) list?**

The Clean Water Act (CWA) requires states to submit reports to the EPA indicating the health of stream segments including a list of waterbodies that do not meet their intended use (e.g., primary recreation). Once a waterbody is listed, a process is initiated to limit further pollutants from entering the stream and restore water quality. Funding for some restoration activities becomes available when a stream segment is listed as impaired. [See EPA's webpage on 303\(d\) for more information.](#)

### **What is the source of the *E. coli* present in the French Broad River (FBR)?**

While some of the *E. coli* contribution in the FBR may episodically be associated with unpermitted discharges (e.g., sanitary sewer overflows, spills, etc.), the primary sources of *E. coli* in the FBR are nonpoint source pollutants such as urban runoff, agricultural runoff, livestock accessing streams, pet wastes, wildlife wastes, failing septic systems, etc. Additionally, bacteria are harbored, reproduce and thrive in bed sediment and in surface waters with elevated sediment and nutrient loads. Elevated sediment and nutrient loads are, at times, present in the FBR. While there exist analytical methods to fingerprint the source (i.e., humans, cows, birds, etc.) of the *E. coli*, the test methods are expensive and the sample collection process resource-intensive. The continued monitoring and listing of the waterbody as impaired will initiate a process to plan restoration, a component of which will be pollutant source identification.

### **Why do the *E. coli* levels fluctuate?**

Bacteria concentrations are expected to fluctuate with changes in river conditions such as flow, sediment load, and temperature. These conditions change daily and sometimes hourly, but become more pronounced following rainfall events, which result in increased runoff and turbidity (i.e., muddy water). DWR data demonstrate a strong positive correlation between elevated *E. coli* levels and turbidity (i.e., higher turbidity is associated with higher *E. coli* levels). The data and preliminary modeling indicate that bacteria levels can remain elevated for an extended period (e.g., days or much longer) after some rain events.

### **What is DWR doing in response to the *E. coli* present in the French Broad River?**

The DWR Asheville Regional Office initiated *E. coli* monitoring at locations in the high-use recreational segments of the FBR near Asheville in May of 2019. A primary goal of the DWR *E. coli* monitoring is to evaluate different approaches to data collection, evaluation, and risk communication in which health professionals can base recreational advisories upon. DWR will continue to evaluate bacteria monitoring in other highly recreated stream segments in western North Carolina. The data collected so far has been used to better understand and determine relationships between variables most often associated with elevated bacteria (*E. coli*) such as rainfall, flow, turbidity, temperature, etc. While DWR continues to address point source bacteria through its regulatory permitting programs, it is now strengthening its efforts to identify and address non-point bacteria sources through several collaborative projects with local stakeholders. Nonpoint source pollution, unlike the rigid regulatory framework for point source pollution, is addressed through federal grant programs referenced in the Clean Water Act under section 319(h). The programs fund local entities in developing and implementing non-point source management programs such as watershed restoration plans. For more information on North Carolina's 319 program, please visit:

<https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/319-grant-program#overview>

**What can be done to reduce *E. coli* levels?**

To address nonpoint *E. coli* sources in watersheds, robust and well-funded partnerships are needed that engage state, county, municipal, commercial, environmental, and citizen stakeholders. Remedies to reduce or eliminate these sources exist (e.g., enhanced infrastructure, implement best management practices on agricultural operations, increased use of permeable surfaces in urban areas, improved stream buffer strategies, more effective nutrient management, improved storm water capture, etc.) but all require support and action at the citizen level. There are many ways to become involved. For example, ensure your property is not contributing sediment or chemical (i.e., fertilizer) runoff; support a watershed coalition to develop a [watershed action plan](#); let your government representatives know you value the state's rivers, lakes, and streams; supporting funding for restoration efforts and protective approaches at the local, state and federal level; and others.

**Have there been any new developments in the DWR monitoring program for this year?**

In the 2022 state budget, North Carolina legislators appropriated funding to DWR to initiate a recreational water quality monitoring program for Western North Carolina. While early in development, we have begun to identify program goals that will help inform local and state health authorities about water quality in frequently recreated areas while evaluating future testing methods to further expedite testing results and refine health risk advisories. While we develop this program, we are continuing to collaborate with local partners, health officials, and an array of stakeholders.

**Where can I find additional information or report a water quality issue?**

For information on current recreational advisories, please contact your local health department. If you observe excessive foam, sheen, discoloration, or other changes in water quality, please contact DEQ at 1-800-858-0368, or the Asheville Regional Office during business hours at 828-296-4500.