

## Regulatory Impact Analysis

<b>Rule Topic:</b>	2023-2025 Triennial Review – Surface Water Quality Standards										
<b>Rule Citations:</b>	15A NCAC 02B .0219 – Fresh Surface Water Quality Standards for Class B Waters 15A NCAC 02B .0226 – Exemptions from Surface Water Quality Standards										
<b>DEQ Division:</b>	Division of Water Resources (DWR)										
<b>Staff Contacts:</b>	Paul Wojoski, Water Quality Permitting Section Chief, DWR <a href="mailto:Paul.Wojoski@deq.nc.gov">Paul.Wojoski@deq.nc.gov</a> (919) 707-3676  Sapana Bastola, Economist, DWR <a href="mailto:Sapana.Bastola@deq.nc.gov">Sapana.Bastola@deq.nc.gov</a> (919) 707-9117										
<b>Impact Summary:</b>	<table><tr><td>State government:</td><td>Net cost savings to State due to switch from Fecal Coliform to <i>Escherichia coli</i> (<i>E. coli</i>) bacteria criterion (02B .0219).</td></tr><tr><td>Local government:</td><td>Cost savings to subject facilities covered under NPDES wastewater and stormwater permits.</td></tr><tr><td>Federal government:</td><td>No impact.</td></tr><tr><td>Private entities:</td><td>Cost savings to subject facilities covered under NPDES wastewater and stormwater permits.</td></tr><tr><td>Substantial Impact:</td><td>Total annual economic impact (costs + benefits) is <u>not</u> projected to exceed &gt; \$1,000,000.</td></tr></table>	State government:	Net cost savings to State due to switch from Fecal Coliform to <i>Escherichia coli</i> ( <i>E. coli</i> ) bacteria criterion (02B .0219).	Local government:	Cost savings to subject facilities covered under NPDES wastewater and stormwater permits.	Federal government:	No impact.	Private entities:	Cost savings to subject facilities covered under NPDES wastewater and stormwater permits.	Substantial Impact:	Total annual economic impact (costs + benefits) is <u>not</u> projected to exceed > \$1,000,000.
State government:	Net cost savings to State due to switch from Fecal Coliform to <i>Escherichia coli</i> ( <i>E. coli</i> ) bacteria criterion (02B .0219).										
Local government:	Cost savings to subject facilities covered under NPDES wastewater and stormwater permits.										
Federal government:	No impact.										
Private entities:	Cost savings to subject facilities covered under NPDES wastewater and stormwater permits.										
Substantial Impact:	Total annual economic impact (costs + benefits) is <u>not</u> projected to exceed > \$1,000,000.										
<b>Authority:</b>	G.S. 143-214.1 and 143-215.3(a)										
<b>Necessity:</b>	To comply with the Clean Water Act (CWA) which requires that states and tribes evaluate and revise, as necessary, water quality standards at least once every three years. This process is known as the “Triennial Review.”										

## ACRONYM LIST

Abbreviation	Term
\$	Dollars
AMS	Ambient Monitoring System
CFR	Code of Federal Regulations
COC	Certificate of Coverage
CWA	Clean Water Act
DEMLR	Division of Energy, Mineral and Land Resources
DEQ	Department of Environmental Quality
DWR	Division of Water Resources
EMC	Environmental Management Commission
EPA	United States Environmental Protection Agency
<i>E. coli</i>	<i>Escherichia coli</i>
G.S.	North Carolina General Statute
MF	Membrane Filtration (MF count)
MGD	Million Gallons per Day
NCAC	North Carolina Administrative Code
NCG	North Carolina General Permit
NPDES	National Pollutant Discharge Elimination System
POTW	Publicly Owned Treatment Works
QA/QC	Quality Assurance/Quality Control
RAMS	Random Ambient Monitoring System
RPA	Reasonable Potential Analysis
TBELS	Technology-based Effluent Limits
TMDL	Total Maximum Daily Load
WQBEL	Water Quality Based Effluent Limit

# 1. BACKGROUND

## 1.1 Water Quality Standards

Water quality standards are “provisions of state, territorial, authorized tribal or federal law approved by the [U.S. Environmental Protection Agency \(EPA\)](#) that describe the desired condition of a water body and the means by which that condition will be protected or achieved.” Standards consist of three required components:

- Designated uses of a water body;
- water quality criteria necessary to protect the designated uses; and
- antidegradation.

Water quality standards are added and revised through the Triennial Review process.

### 1.1.1 Designated Uses

Designated uses of a water body are communicated through the waterbody’s classification. In North Carolina, all freshwaters are classified to protect, at a minimum, the following uses: aquatic life propagation, survival and maintenance of biological integrity (including fishing and fish); wildlife; secondary contact recreation; and agriculture. These waterbodies are classified as Class “C”.

Waterbodies classified as sources of water supply for drinking, culinary or food processing purposes are designated as Water Supply (WS) Waters, with a classification of WS-I, WS-II, WS-III, WS-IV or WS-V. WS waters also protect for all Class C water uses.

Waterbodies classified for primary recreation, which includes swimming, diving, skiing, and similar uses involving human body contact with water where such activities take place in an organized or on a frequent basis [15A NCAC 02B .0202 (46)], are designated as Class “B” waters. The focus of Class B standards is to protect recreational users from gastrointestinal illnesses associated with exposure to pathogenic organisms in contaminated surface waters. Class B waters also protect for all Class C water uses.

Other freshwater classifications include high quality waters (HQW), nutrient sensitive waters (NSW), outstanding resource waters (ORW), swamp waters (Sw), and trout waters (Tr). Classes HQW, NSW, ORW, Sw and Tr also protect for all Class C water uses.

Saltwater classifications have a similar structure as freshwater classifications. SC waters protect for aquatic life propagation survival and maintenance of biological integrity (including fishing, fish and Primary Nursery Areas; wildlife; and secondary contact recreation), SB waters protect for primary recreation, and SA waters protect for shellfishing.

### 1.1.2 Water Quality Criteria

Water quality criteria are expressed as numeric concentrations or narrative statements. Numeric criteria are constituent concentrations or levels representing a quality of water that supports a

particular use (e.g., “Cyanide, available or total: 5.0 µg/l”). Narrative criteria are statements that describe the desired conditions of a waterbody (e.g., “oils, deleterious substances, or colored or other wastes: only such amounts as shall not . . . impair the waters for any designated uses.”) Federal regulations (40 CFR 131.11) require a narrative criterion when a numeric criterion is not, or cannot, be established.

### 1.1.3 Antidegradation

Antidegradation is the framework for maintaining and protecting the water quality that has been achieved. It also protects the assimilative capacity of waters. Each state must develop, adopt and retain statewide antidegradation requirements, which must be reviewed and approved by EPA. (40 CFR 131.12)

## 1.2 Triennial Review Process

Under Section 303(c)(1) of the Clean Water Act (CWA), states and authorized tribes are responsible for adopting water quality standards necessary to protect all designated uses. States and authorized tribes must conduct a review of its standards at least once every three years to comply with the CWA and EPA’s regulations in 40 CFR 131.20.

This proposed rulemaking package is the state’s Triennial Review for 2023-2025. We anticipate public hearings for this proposed rulemaking to be held in the first half of 2025, adoption later in 2025 and submittal to EPA for approval by the end of 2025.

## 1.3 Regulatory Programs that use Surface Water Quality Standards

Surface Water Quality standards are the foundation for various state water quality protection programs required by the Clean Water Act. They “[\*establish the environmental baselines used for measuring the success of Clean Water Act programs\*](#)” and serve different purposes depending on the program.

### 1.3.1 NPDES Wastewater Program

The National Pollutant Discharge Elimination System (NPDES) is a permit program that addresses water pollution by regulating point sources that discharge pollutants into waters of the U.S. EPA delegated permitting authority to North Carolina in 1975. North Carolina issues Individual NPDES wastewater permits, General NPDES wastewater permits and Certificates of Coverage for General NPDES wastewater permits.

#### General NPDES Wastewater Permits

North Carolina’s General NPDES wastewater permits are issued for a given activity. They are grouped by class of activity and can apply to projects anywhere in the state. General permits are not issued to a particular facility; instead, Certificates of Coverage (COCs) are issued to facilities or sites that meet the requirements for coverage under a General NPDES wastewater permit. As such, dischargers covered under general permits know their applicable requirements before obtaining coverage under that permit. Approximately 1,758 COCs have been issued for coverage under the following General NPDES wastewater permits:

- NCG500000 Non-contact cooling water discharges;
- NCG510000 Petroleum-based groundwater remediation;
- NCG520000 Sand dredging;
- NCG530000 Seafood packaging; and
- NCG550000 Domestic discharges from single-family residences.
- NCG560000 Pesticides
- NCG580000 Conjunctive Water Uses

Of these approximately 1,758 COCs, 82 are government entities: 63 local entities, 16 State entities, and 3 Federal entities.

### **Individual NPDES Wastewater Permits**

North Carolina’s Individual NPDES wastewater permits are developed and issued on a case-by-case basis for activities not covered by general permits. Individual permits are categorized as minor or major permits. Discharges from treatment systems treating domestic waste with a design flow greater than 1.0 million gallons per day (MGD), or with a Pretreatment Program, are classified as “major” discharges. Discharges from treatment systems treating domestic waste with a design flow less than 1.0 MGD, and without a Pretreatment Program, are classified as “minor” discharges. Industrial and commercial discharges are classified based on several factors including flow, waste characteristics, water quality impacts and health impacts.

An Individual NPDES permit is unique; written to reflect the site-specific conditions of the individual discharger based on the information submitted in the permit application. Individual Permits are issued directly to a particular facility. Currently, there are 1,094 active Individual NPDES permits. Of these, 114 local governments administer Pretreatment Programs for 137 Publicly Owned Treatment Works (POTWs). These local Pretreatment Programs regulate approximately 590 Significant Industrial Users (SIUs) and other non-domestic wastewater sources, commonly known as ‘indirect dischargers.’

### **Use of Water Quality Criteria in NPDES Wastewater Permits**

Water quality criteria provide the regulatory basis for calculating allowable discharge concentrations (effluent limits) for NPDES wastewater permitting. Water-quality based effluent limits “WQBELs” are permit limits that are based on surface water quality criteria and are specific to each discharge and its receiving stream. Technology-based effluent limits “TBELs” are permit limits based on treatment performance standards. If a discharge is subject to both TBELs and one or more WQBELs for the same parameter, the most stringent effluent limit is included in the facility’s NPDES permit.

To establish WQBELs for an Individual Permit, DWR performs a Reasonable Potential Analysis (RPA) for each parameter of concern using an EPA approved methodology. The RPA is conducted to determine if a discharge has a reasonable potential to cause or contribute to an exceedance of water quality criteria in the receiving stream. RPAs are conducted at issuance and at each permit renewal, using the most current characteristics of the discharger’s effluent and the receiving stream. The RPA methodology consists of calculating the *maximum predicted effluent concentration* for the parameter of concern, based on actual effluent data from the facility, and comparing that value to the *maximum allowable effluent concentration* based on the surface water

criteria and the dilution available in the stream under low-flow conditions. Each RPA results in one of three determinations:

- 1) A permit limit is warranted to protect water quality;
- 2) A limit is not warranted, but the substance is present in such concentrations that monitoring is advised; or
- 3) No limit or monitoring is necessary.

POTWs with approved Pretreatment Programs must evaluate whether, in addition to plant improvements, it is necessary to set limits on their significant industrial users (indirect dischargers) in order to comply with their limits. POTWs with approved Pretreatment Programs issue and administer local permits that are similar to the NPDES permits. Limits in local permits can be based on categorical pretreatment standards or calculated on a facility specific basis (a process known as a headworks analysis) to prevent interference, pass-through, or sludge contamination. If a parameter is subject to more than one limit based categorical pretreatment standards or headworks analyses, the more stringent of the limits applies.

### 1.3.2 NPDES Stormwater Program

The NPDES Stormwater Program is administered by the NC DEQ – Division of Energy, Mineral and Land Resources (DEMLR). Like the NPDES wastewater program, the NPDES Industrial Stormwater Program is federally mandated and covers a wide variety of industrial activities under one of the following types of permits:

- **Individual Industrial Permits** apply to industrial activities that are not eligible for any of the general permits. Each Individual Permit is unique, written to reflect the site-specific conditions of the individual dischargers based on the information submitted in the permit application.
- **General Industrial Permits** are issued for a given activity, grouped by category of industrial activities with potential stormwater discharges. There are currently 20 General Industrial Stormwater Permits for which facilities may apply for a COC.
- **No Exposure Certifications** apply to industrial activities that do not expose industrial materials or activities to precipitation and provide secondary containment on the site.

There are approximately 3,480 active stormwater permits, including both Certificates of Coverage for General Permits and Individual Permits. Of these active stormwater permits, 298 are General Permit COCs for government facilities and 73 are Individual permits for government facilities. NPDES Stormwater Industrial permits include a list of parameters for which an industrial facility is required to monitor and the associated stormwater benchmarks for each parameter. Stormwater benchmarks are numerical action levels for pollutants that may be present in industrial stormwater. They are not enforceable effluent limits, rather exceedances of stormwater benchmarks may trigger stormwater pollution prevention actions or more frequent monitoring.

Stormwater benchmarks are set based on the effects to aquatic life from acute (short-term) exposure to the pollutant rather than effects to human health from chronic (long-term) exposure. Acute exposure to pollutants is used because rainfall events occur sporadically, flushing out stormwater systems and resulting in short ‘pulses’ of toxicants to which aquatic organisms are then exposed.

### 1.3.3 Non-Discharge and Animal Feeding Operations Programs

The Non-Discharge Program is responsible for the permitting and compliance of residual and wastewater effluent land application facilities. The Branch is also responsible for permitting facilities for the beneficial use of reclaimed water for the purpose of conserving the state's potable water, surface water, and groundwater resources.

The Animal Feeding Operations Program is responsible for the permitting and compliance activities of animal feeding operations across the state. Some aspects of the Animal Feeding Operations Program are governed by the non-discharge rule requirements.

Permits for non-discharge systems do not utilize surface water quality standards in permitting because these systems are prohibited from discharging waste into surface waters by rule. Some facilities are required to monitor adjacent surface waters; however, monitoring requirements will be unaffected by this proposed rulemaking. During site closure, facilities with groundwater drainage networks or surface waters present onsite or within the compliance boundary require a demonstration that the surface waters do not exceed the surface water quality criteria before DEQ issues a certificate of closure [15A NCAC 02T .1507]. The proposed rulemaking will not impact the Non-Discharge Programs or any of their regulated entities.

### 1.3.4 Water Sciences – Lab Certification

The North Carolina Wastewater/Groundwater Laboratory Certification program ensures the quality of analytical data used for regulatory purposes by programs within DEQ. Various Divisions within DEQ rely on the services of the Laboratory Certification program to support a multitude of scientific, regulatory, and administrative decisions.

The Laboratory Certification Program operates pursuant to G.S. 143-215.3(a)(1), G.S. 143-215.3(a)(10) and 15A NCAC 02H .0800. The program issues certifications, renewals, recertifications, decertifications, and reciprocity certifications. It is a fee-supported program managed by the DWR Water Sciences Section. The program certifies approximately 700 environmental laboratories in NC and throughout the U.S. under the following categories: municipal, industrial, commercial, field, field commercial, and other. The proposed rulemaking is not anticipated to result in any impact to the Lab Certification Program.

### 1.3.5 Ambient Monitoring and Integrated Report

Chemical, physical, and biological parameters are assessed regularly to determine how well waterbodies are meeting their best intended use (e.g. recreation, water supply, biological integrity, etc.). The assessment of water quality is required under Sections 303(d) and 305(b) of the CWA. This assessment, also known as the Integrated Report, is required to be submitted to EPA every two years. The assessment is conducted in three parts:

- 1) **Monitoring.** The first part of the assessment is collecting water samples through the state's lakes, rivers and streams. Data is collected by DWR's Ambient Monitoring



System (AMS), which includes the Random Ambient Monitoring Systems (RAMS) and the NPDES Coalition Monitoring Program (Coalition).

- a. DWR's AMS is a network of sampling stations located throughout the state to provide site-specific, long-term water quality information. DWR's AMS has been active for over 40 years and currently has 317 static AMS stations.
  - b. DWR's RAMS provides monitoring at random locations throughout the state, usually for smaller streams that are not normally sampled as an AMS station. DWR's RAMS has been active for 14 years and has 30 RAMS stations that are monitored for two years after which they are retired, and new random stations are selected.
  - c. The Coalition Program is a voluntary, discharger-led, ambient monitoring program. Each Coalition is comprised of a group of NPDES dischargers that combine resources to collectively fund and perform an instream monitoring program in lieu of performing the instream monitoring required by their Individual NPDES permits. The collaboration frequently reduces monitoring costs for an individual discharger by sharing the burden across the coalition.
- 2) **Compare.** The second part of the assessment is comparing each water quality sample collected to NC's water quality criteria. Each parameter (e.g. pH, bacteria, metals, etc.) is assessed independently.
- 3) **Assessment.** The third part of the assessment is applying the Environmental Management Commission (EMC) approved Assessment Methodology to determine whether the waterbody is meeting criteria, exceeding criteria (i.e., impaired), or data inconclusive for each parameter.

After sampling, comparing collected samples to water quality criteria and applying the Assessment Methodology, all assessed waters are listed in the Integrated Report with their assigned categories based on whether they are meeting criteria (Category 1 or 2), exceeding criteria (Category 4 or 5), or data inconclusive (Category 3). The list of waters in Category 5 form the "303(d) list," which is the list of impaired waters where a Total Maximum Daily Load (TMDL) or alternative management action (TMDL Alternative) is needed.

The TMDL program is a federal program authorized under the CWA to address waters that are impaired. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality criteria. The TMDL is then used to establish limits on sources of the pollutant and the waterbody is moved from Category 5 to Category 4.

A TMDL Alternative is a watershed restoration plan or set of actions pursued in the near-term that is designed to attain water quality criteria. There are two options for TMDL alternatives:

- 9-Element Watershed Plans are watershed-based plans that identify sources and contributing causes of nonpoint source pollution, involve key stakeholders in the planning process and identify restoration and protection strategies that will address water quality concerns. Impaired waters with a 9-Element Watershed Plan are Category 5r, with deferred TMDL development while the plan is being implemented.
- 4b Demonstration Plans incorporate adaptive management and are tailored to specific circumstances where such approaches are better suited to achieve the water quality goals



of the state than a traditional TMDL. 4b Demonstration Plans include enforceable pollution control programs that are expected to solve pollution problems. While these are not TMDLs, they have many of the same features and must include legal and/or financial assurances that they will be implemented. An impaired water with a 4b Demonstration Plan is moved from Category 5 to Category 4b.

## 2. REGULATORY BASELINE

As part of the permanent rulemaking process, G.S. 150B-19.1 requires agencies to quantify to the “greatest extent possible” the costs and benefits to affected parties of a proposed rule. To understand what the costs and benefits of the proposed rule changes may be to regulated parties and the environment, it is necessary to establish a regulatory baseline for comparison. For the purposes of this fiscal note, the baseline is comprised of the General Statutes in Chapters 143 and 143B, the existing rules in 15A NCAC Chapter 02 (which also incorporate specific federal regulations by reference), and any existing permit requirements.

## 3. SUMMARY OF ANTICIPATED ECONOMIC IMPACT

Since water quality criteria are developed to define an appropriate condition, the water quality criteria regulations themselves do not result in costs to the public. Costs and benefits are incurred when regulatory programs use the water quality criteria to implement the rules within each program. Cost and benefit information are included in this analysis to the greatest extent possible. When cost and benefit information is not available, data on potentially affected permits and impacted entities is included. A summary of each proposed rule change and its anticipated economic and environmental impact is provided below (see Table 1).

**Table 1: Summary of Proposed Changes, Economic and Environmental/Health Impacts**

Rule(s)	Proposed Change	Economic Impacts	Environment/Health Impacts
15A NCAC 02B .0219 Fresh Surface Water Quality Standards for Class B Waters	Update recreational bacteria criterion for Class B waters by replacing fecal coliform with <i>E. coli</i> .	Cost savings of approximately \$0-\$25 per sample for facilities covered under NPDES wastewater and stormwater permits.  No costs are anticipated to the state’s Lab Certification program or to commercial laboratories.  Net cost savings of ~\$1,150 annually to the state’s Ambient Monitoring program.	Maintain surface water quality, recreational uses, and human health protections.
15A NCAC 02B .0226 Exemption from Surface Water Quality Standards	Update language for variances by adding a reference to EPA regulations at 40 CFR 131.14.	None	None

## 4. UPDATE RECREATIONAL BACTERIA CRITERION

### 4.1 Rule Citation

15A NCAC 02B .0219(3)(b) - Fresh Surface Water Quality Standards for Class B Waters

### 4.2 Baseline

A pathogenic indicator is defined by EPA in §502 (23) of the Clean Water Act as “*a substance that indicates the potential for human infectious disease.*” Pathogenic indicators do not necessarily cause illness themselves. However, they are associated with pathogenic contamination of surface waters and are employed as a means for estimating the concentration of the total pathogenic bacterial and viral organisms associated with such contamination that may not be measurable using standard laboratory methods.

North Carolina has a bacteria criterion to protect fresh water classified for primary contact recreation use (Class B waters). The baseline is the fecal coliform bacteria criterion currently in rule. The fecal coliform bacteria criterion is currently being applied in regulatory programs as part of the baseline condition.

### 4.3 Proposed Changes

North Carolina protects fresh waters classified for primary contact recreation use (Class B) by means of a bacteria criterion in 15A NCAC 02B .0219; it reads:

*(3)(b) Fecal coliforms shall not exceed a geometric mean of 200/100 ml (MF count) based on at least five samples taken over a 30-day period, nor exceed 400/100 ml in more than 20 percent of the samples examined during such period.*

We are proposing to replace the fecal coliform bacteria criterion in 15A NCAC 02B .0219 with an *Escherichia coli* (*E. coli*) bacteria criterion as follows:

*(3)(b) Escherichia coli shall not exceed a geometric mean of 126/100 ml (colony forming units or most probable number) based on at least five samples taken over a 30-day period, nor exceed 274/100 ml (colony forming units or most probable number) in more than 20 percent of the samples examined during such period.*

### 4.4 Rationale

We are proposing to update the bacteria criterion to align with [EPA’s 2012 Recreational Water Quality Criteria](#) (EPA 820-F-12-058), which recommended states set bacteria water quality criterion for primary recreation waters using either the *Escherichia coli* or *Enterococcus* indicators. *E. coli* is not considered to be more or less stringent or more or less protective than fecal coliform, but rather it is better representative of the pathogens in the water that are likely to cause human illness. Fecal coliforms are a subgroup of total coliforms and are found in the intestines and feces of people and animals. *E. coli* is a subgroup of fecal coliforms and the only coliform generally not found growing and reproducing in the environment. Consequently, *E. coli* is considered to be the species of coliform

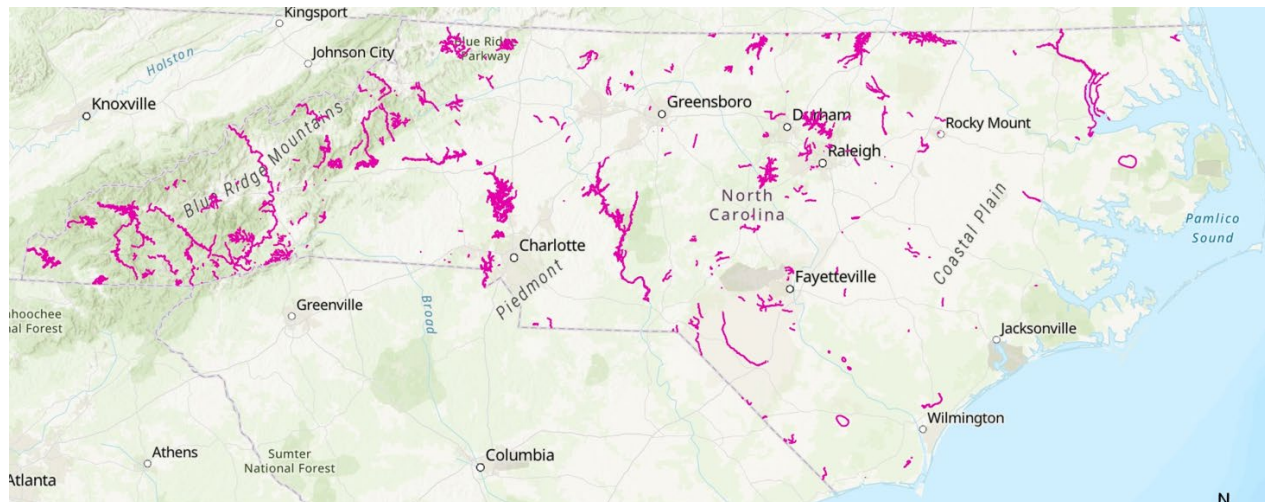
bacteria that is the best indicator of fecal pollution and the possible presence of pathogens that can cause human illness when ingested. Its presence in recreational water is a stronger indication of recent fecal contamination compared to just detecting general fecal coliform bacteria.

Updating the bacteria criterion to *E. coli* was requested by non-governmental organizations and the DWR Asheville Regional Office staff (see [Report of Proceedings](#) from last triennial review for more information). Furthermore, public interest in the use of *E. coli* has grown with recent EPA approval of an *E. coli* analytical method (Colilert®) that provides a quicker turn-around time for results and requires less staff time than the MF Count method currently in rule for fecal coliform.

#### 4.5 Impacted Waterbodies

The proposed *E. coli* bacteria criterion will apply to all Class B waters in North Carolina, which are approximately shown as the pink waters on the map below.

**Figure 1: Waters Classified for Primary Contact Recreation Use (Class B)**



#### 4.6 Anticipated Costs and Cost Savings

Summary: Cost savings of approximately \$0-\$25 per sample are anticipated for subject facilities covered under NPDES wastewater and stormwater permits. No costs or savings are anticipated to commercial laboratories. Cost savings of approximately \$1,150 annually are anticipated to the state's Ambient Monitoring program.

##### 4.6.1 NPDES Wastewater Permits

No costs are anticipated to facilities with NPDES wastewater permits because of the proposed replacement of the fecal coliform bacteria criterion with *E. coli*. There are 103 NPDES permits with fecal coliform effluent limits and/or monitoring requirements that discharge to Class B waters. Because pathogens are present at significant levels in all untreated municipal wastewater, it is presumed that all municipal wastewater treatment plants that discharge to recreational waters have a reasonable potential to cause or contribute to an excursion above the applicable recreational water quality standards. These excursions are expected regardless of the bacteria

indicator used. Thus, we do not expect that the shift from fecal coliform to *E. coli* as a bacteria indicator will result in a significant change to the number of excursions above the criterion or exceedances of permit limits. This finding is supported by a [2023-2024 statewide fecal coliform and \*E. coli\* study](#) conducted by DEQ.

Facilities are already conducting effluent monitoring for fecal coliform, so the change to *E. coli* will not result in additional costs associated with monitoring. DWR contacted commercial laboratories that perform fecal coliform and *E. coli* testing to determine the number of samples run and the cost difference between the two methods. DWR received one response, detailing the cost of fecal coliform testing is \$85/sample while the cost for *E. coli* (using Colilert®) was between \$60 and \$70/sample and that approximately 200 bacteria samples are analyzed per year. An online source showed no cost difference for the two test methods. Based on this limited information, we estimate facilities may realize a cost savings of \$0-\$25 per sample because of the proposed replacement of the fecal coliform bacteria criterion with *E. coli*.

The number of samples collected in a year varies by facility depending on the monitoring frequency required by their permit and the number of outfalls discharging to Class B waters. Typically, monitoring is required semi-annually, quarterly, or (least common) monthly. The number of outfalls is variable among facilities. Due to this variability among facilities, we could not reasonably estimate the total likely cost savings to NPDES wastewater permitted facilities.

#### **4.6.2 NPDES Stormwater Permits**

No costs are anticipated to facilities with NPDES stormwater permits because of the proposed replacement of the fecal coliform bacteria criterion with *E. coli*. There are five NPDES stormwater General Permits with fecal coliform requirements:

- NCG020000 Mining Activities
- NCG060000 Food and Kindred
- NCG110000 Treatment Works
- NCG120000 Landfills
- NCG240000 Composting Operations

There are four landfills with COCs under the NCG120000 General Permit and one composting operation with a COC under the NCG240000 General Permit that discharge to Class B waters. There are no Individual NPDES Stormwater Permits that discharge to Class B waters with fecal coliform requirements.

Facilities are already conducting effluent monitoring for fecal coliform, so the change to *E. coli* will not result in additional costs associated with monitoring. We do not expect any change (more or less exceedances) in stormwater benchmarks as a result of the change to an *E. coli* indicator. In addition, we do not expect any change to the exceedance rate from the indicator switch as *E. coli* is a subset of the Fecal coliforms on which the stormwater benchmarks are currently based.

As with NPDES wastewater permits, we estimate facilities with NPDES stormwater permits may realize a cost savings of \$0-\$25 per sample because of the proposed replacement of the fecal coliform bacteria criterion with *E. coli*. Each of the five affected permittees (4 landfills + 1 composting operation) are required by general permit to collect samples on at least a quarterly

basis (increases to monthly monitoring under a Tier Two Response). Collectively, these five permittees collect a minimum of 52 samples in a year (4 samples per year x 13 outfalls). Based on an estimated cost savings of \$0-\$25 per sample, total potential cost savings to NPDES Stormwater permitted facilities from switching to *E. coli* is estimated to be \$0 - \$1,300, with potentially greater savings for facilities that conduct sampling on a monthly basis.

### 4.6.3 Ambient Monitoring Programs

#### Ambient Monitoring Program – Summary

No costs are anticipated to collect *E. coli* samples in lieu of fecal coliform samples. Cost savings of approximately \$1,150 annually are expected to the state DWR Laboratory to run *E. coli* samples using the Colilert® test method as compared to the status quo (running fecal coliform using membrane filter count method).

#### Sampling

For ambient monitoring stations in Class B waters, fecal coliform will be removed, and *E. coli* will be added to the basic core suite of indicators that are routinely sampled. Because collection time is the same for both bacteria criteria, we concluded there is no anticipated cost to sampling because of the proposed replacement of the fecal coliform bacteria criterion with *E. coli*.

#### DWR State Laboratory

Ambient samples for bacteria are analyzed at the state DWR lab. Fecal coliform uses the membrane filtration (MF) count method while *E. coli* can use the MF count method or the Colilert® test method. The MF count method for fecal coliform uses a two-step verification process using two different medias with incubation at 44.5 degrees for 24 hours. The MF count method for *E. coli* uses a multistep verification process using four different media with incubation at 35 degrees for two hours than 44.5 for 22 hours. The Colilert® test method for *E. coli* does not require verification; incubation is at 35 degrees for 18 hours. The costs associated with the current fecal coliform test method and the two possible *E. coli* test methods are summarized in Table 2.

**Table 2: Cost Comparisons at State DWR Laboratory**

Description	Test Method		
	Fecal coliform By MF (current method)	<i>E. coli</i> by MF	<i>E. coli</i> by Colilert®
Cost per sample (testing materials)	\$3 <sup>.00</sup>	\$5 <sup>.50</sup>	\$10 <sup>.00</sup>
Average # samples/year	580	580	580
Total sample cost/year	\$1,740 <sup>.00</sup>	\$3,190 <sup>.00</sup>	\$5,800 <sup>.00</sup>
Staff time per sample (hours)	0.5	0.75	0.25
Average lab staff salary <sup>1</sup> /hour	\$35 <sup>.88</sup>	\$35 <sup>.88</sup>	\$35 <sup>.88</sup>
Staff cost/sample (opportunity cost)	\$17 <sup>.94</sup>	\$26 <sup>.91</sup>	\$8 <sup>.97</sup>
Average # samples/year	580	580	580
Total staff cost/year	\$10,405 <sup>.20</sup>	\$15,607 <sup>.80</sup>	\$5,202 <sup>.60</sup>

<b>Total cost/year</b>	<b>\$12,145</b>	<b>\$18,798</b>	<b>\$11,003</b>
------------------------	-----------------	-----------------	-----------------

<sup>1</sup> Staff salary derived from the average annual salary range of Water Sciences Section staff and includes the benefits for insurance, social security, etc. as stipulated in the NC Office of State Personnel [Compensation Calculator](#).

The DWR lab will be able to handle the workload associated with the *E. coli* testing without additional personnel. There is a sizeable difference in opportunity cost savings (staff time) associated with the different methods, with *E. coli* by MF count method requiring the most staff time and *E. coli* by Colilert® requiring the least staff time (Table 2). In total, the proposed replacement of the fecal coliform bacteria criterion with *E. coli* and use of the Colilert® test method could result in a net savings in the form of opportunity cost savings to the state of over \$1,100 per year as compared to the baseline (fecal coliform by MF Count method).

#### 4.6.4 Lab Certification

No costs are anticipated to the Lab Certification program because of the proposed replacement of the fecal coliform bacteria criterion with *E. coli*. Labs can currently be certified for both fecal coliform and *E. coli*.

#### 4.6.5 Commercial Laboratories

The proposed replacement of the fecal coliform bacteria criterion with *E. coli* will not require any commercial, municipal or industrial laboratory to request certification; therefore, the proposed replacement will not necessarily result in any costs to the laboratories. However, there will be an incentive for additional laboratories to get certified for *E. coli* in order to actualize the opportunity cost saving (reduced staff time).

Currently, there are 17 commercial laboratories certified for *E. coli* (see Table 3).

**Table 3: Commercial Laboratories with Certification for E. Coli Testing**

<b>Laboratory Name</b>	<b>Laboratory City</b>	<b>Method<sup>1</sup></b>
Waypoint Analytical, - Greenville	Greenville, NC	IDEXX Colilert-18® (MPN) (Aqueous)
Microbac Laboratories, Inc.	Fayetteville, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
Rogers & Callcott Engineers Inc.	Greenville, SC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
TBL Environmental Laboratory Inc.	Lumberton, NC	IDEXX Colilert-18® (MPN) (Aqueous)
Pace Analytical Services LLC – Asheville NC	Asheville, NC	IDEXX Colilert-18® (MPN) (Aqueous)
Water Tech Labs Inc.	Granite Falls, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)



Environmental Chemists, Inc. (EnviroChem)	Wilmington, NC,	IDEXX Colilert-18® (MPN) (Aqueous)
Charlotte Water-Environmental Laboratory Services	Charlotte, NC	IDEXX Colilert-18® (MPN) (Aqueous)
Charlotte Water-Environmental Laboratory Services	Charlotte, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
Cherokee WWTP Laboratory	Cherokee, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
Pace Analytical Services LLC – West Columbia	West Columbia, SC	IDEXX Colilert-18® (MPN) (Aqueous)
Waypoint Analytical – Charlotte	Charlotte, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
Waypoint Analytical – Charlotte	Charlotte, NC	IDEXX Colilert-18® (MPN) (Aqueous)
K & W Laboratories	Midland, NC	IDEXX Colilert-18® (MPN) (Aqueous)
Environmental Testing Solutions Inc.	Asheville, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
Environmental Chemists Inc./Outer Banks Div.	Manteo, NC,	IDEXX Colilert® (24 hr) (MPN) (Aqueous)
Pace Analytical Services LLC – Eden NC	Eden, NC	IDEXX Colilert® (24 hr) (MPN) (Aqueous)

<sup>1</sup> IDEXX Colilert-18 produces test results within 18 hours whereas IDEXX Colilert (24 hr) produces test results within 24 hours.

To become certified, the cost to a laboratory would be \$85.00 for each Parameter Method that the laboratory elects to add, assuming they are already a certified laboratory. Fees for becoming certified and/or adding Parameter Methods once already certified are detailed in 15A NCAC 02H .0806 and SL 2023-134 (12.14). Additionally, the costs associated with initial purchases of equipment for *E. coli* using Colilert-18® are estimated<sup>1</sup> as follows:

- IDEXX® Sealer: \$3,750.00
- Certified Incubator: \$1,895.00
- UV Viewing Cabinet and Lamp: \$300.00
- QA/QC Comparator Tray: \$22.00
- Refrigerator (if samples will not be processed immediately): Varies

## 5. UPDATE LANGUAGE FOR VARIANCES

### 5.1 Rule citation

15A NCAC 02B .0226 – Exemptions from Surface Water Quality Standards

<sup>1</sup> Based on input from a regional environmental advocacy group that has been testing for *E. coli* using the Colilert® method.



## 5.2 Baseline

The baseline is the current language in both state [15A NCAC 02B .0226] and federal [40 CFR 131.14] regulations.

## 5.3 Proposed Change

We are proposing to update the current language in 15A NCAC 02B .0226 for water quality standards variances by adding a reference to EPA regulations at 40 CFR 131.14.

## 5.4 Rationale

States are currently obligated to comply with 40 CFR 131.14, which specifies the requirements for water quality standards variances. For increased clarity, EPA requested states update their rule language to either add a reference to 40 CFR 131.14 or copy the language from 40 CFR 131.14 into the state rule. We propose adding the reference to 40 CFR 131.14 into 15A NCAC 02B .0226.

## 5.5 Anticipated Costs

No costs are anticipated from the proposed rule change to the water quality standards variance rule because states are currently obligated to comply with 40 CFR 131.14.

## 6. ENVIRONMENTAL AND HUMAN HEALTH BENEFITS

Regulations aimed at environmental protection provide a wide range of benefits to the public. Environmental protections can provide several benefits such as economic benefits, human health benefits, and direct or indirect benefits to aquatic organisms. The proposed change to the water quality standards will replace fecal coliform with *E. coli* as a more accurate pathogen indicator for assuring the continued protection of human health during primary contact recreation.

Compared to fecal coliform, *E. coli* is more representative of pathogenic indicator organisms in recreational water and has a stronger correlation to rates of swimming-associated gastroenteritis. Nevertheless, we don't expect the switch to *E. coli* to result in a change in the rate of gastrointestinal illnesses. This is because, based on our ambient monitoring study, we don't expect a change in the number of permit exceedances that would require facilities to take corrective actions.

The proposed changes will better align with current science on pathogenic indicators, maintain surface water protections in the short term, and continue to protect against potential future water quality degradation.

## REFERENCES

1. For background information about water quality standards: <https://www.epa.gov/standards-water-body-health/what-are-water-quality-standards>
2. For more in-depth information about water quality standards: EPA Water Quality Standards Handbook <https://www.epa.gov/wqs-tech/water-quality-standards-handbook>
3. For information about setting limits in NPDES wastewater permits and RPAs: Technical Support Document for Water Quality-Based Toxics Control, EPA Document Number 505/2-90-001, March 1991. <https://www3.epa.gov/npdes/pubs/owm0264.pdf>
4. For information about NC DEQ Ambient Monitoring Program: <https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/ecosystems-branch/monitoring-coalition-program>
5. For information about NC DEQ TMDL assessment: <https://deq.nc.gov/about/divisions/water-resources/planning/modeling-assessment/tmdls>
6. For information on effluent limitations and anti-backsliding. NPDES Permit Writers Manual- Chapter 7. [https://www3.epa.gov/npdes/pubs/pwm\\_chapt\\_07.pdf](https://www3.epa.gov/npdes/pubs/pwm_chapt_07.pdf)
7. For information about NC DEQ 303(d) Listing Methodology: <https://edocs.deq.nc.gov/WaterResources/DocView.aspx?dbid=0&id=3075212>
8. For information about [2012 Recreational Water Quality Criteria](#) (EPA 820-F-12-058)

1 **15A NCAC 02B .0219 is proposed for amendment as follows:**

2  
3 **15A NCAC 02B .0219 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS B WATERS**

4 The following water quality standards shall apply to surface waters that are for primary contact recreation as defined  
5 in Rule .0202 of this Section, and are classified as Class B waters. Water quality standards applicable to Class C waters  
6 as described in Rule .0211 of this Section also apply to Class B waters.

- 7 (1) The best usage of Class B waters shall be primary contact recreation and any other best usage  
8 specified for Class C waters.
- 9 (2) Class B waters shall meet the standards of water quality for outdoor bathing places as specified in  
10 Item (3) of this Rule and shall be of sufficient size and depth for primary contact recreation. In  
11 assigning the B classification to waters intended for primary contact recreation, the Commission  
12 shall consider the relative proximity of sources of water pollution and the potential hazards involved  
13 in locating swimming areas close to sources of water pollution and shall not assign this classification  
14 to waters in which such water pollution could result in a hazard to public health. Sources of water  
15 pollution that preclude any of these uses on either a short-term or long-term basis shall be deemed  
16 to violate a water quality standard.
- 17 (3) Quality standards applicable to Class B waters:
- 18 (a) Sewage, industrial wastes, or other wastes: none shall be allowed that are not treated to the  
19 satisfaction of the Commission. In determining the degree of treatment required for such  
20 waste when discharged into waters to be used for bathing, the Commission shall consider  
21 the quality and quantity of the sewage and wastes involved and the proximity of such  
22 discharges to waters in this class. Discharges in the immediate vicinity of bathing areas  
23 shall not be allowed if the Director determines that the waste cannot be treated to ensure  
24 the protection of primary contact recreation;
- 25 (b) ~~Fecal coliforms~~ Escherichia coli shall not exceed a geometric mean of 200126/100 ml (~~MF~~  
26 ~~count~~ colony forming units or most probable number) based on at least five samples taken  
27 over a 30 day period, nor exceed 400274/100 ml (colony forming units or most probable  
28 number) in more than 20 percent of the samples examined during such period.
- 29 (4) Wastewater discharges to waters classified as B shall meet the reliability requirements specified in  
30 15A NCAC 02H .0124. Discharges to waters where a primary contact recreational use is determined  
31 by the Director to be attainable shall be required to meet water quality standards and reliability  
32 requirements to protect this use concurrently with reclassification efforts.

33  
34 *History Note:* Authority G.S. 143-214.1; 143-215.3(a)(1);  
35 Eff. January 1, 1990;  
36 Amended Eff. October 1, 1995;  
37 Readopted Eff. November 1, 2019;  
38 Amended Eff. xx; June 1, 2022.  
39  
40  
41

1 **15A NCAC 02B .0226 is proposed for amendment as follows:**

2  
3 **15A NCAC 02B .0226 EXEMPTIONS FROM SURFACE WATER QUALITY STANDARDS**

4 Variances from applicable standards, revisions to water quality standards or site specific water quality standards may  
5 be granted by the Commission on a case by case basis pursuant to G.S. 143215.3(e), 143214.3 or 143214.1. [Variances](#)  
6 [from applicable standards must also meet the requirements set forth in 40 CFR §131.14.](#) A listing of existing variances  
7 shall be maintained and made available to the public by the Division. Exemptions established pursuant to this Rule  
8 shall be reviewed as part of the Triennial Review of Water Quality Standards conducted pursuant to 40 CFR 131.10(g).

9  
10  
11 *History Note:* Authority G.S. 143-214.1; 143-214.3; 143-215.3(e);  
12 Eff. October 1, 1995;  
13 Readopted Eff. November 1, ~~2019-2019~~;  
14 [Amended Eff. xx.](#)  
15  
16