ARCADIS Design & Consultancy for natural and built assets

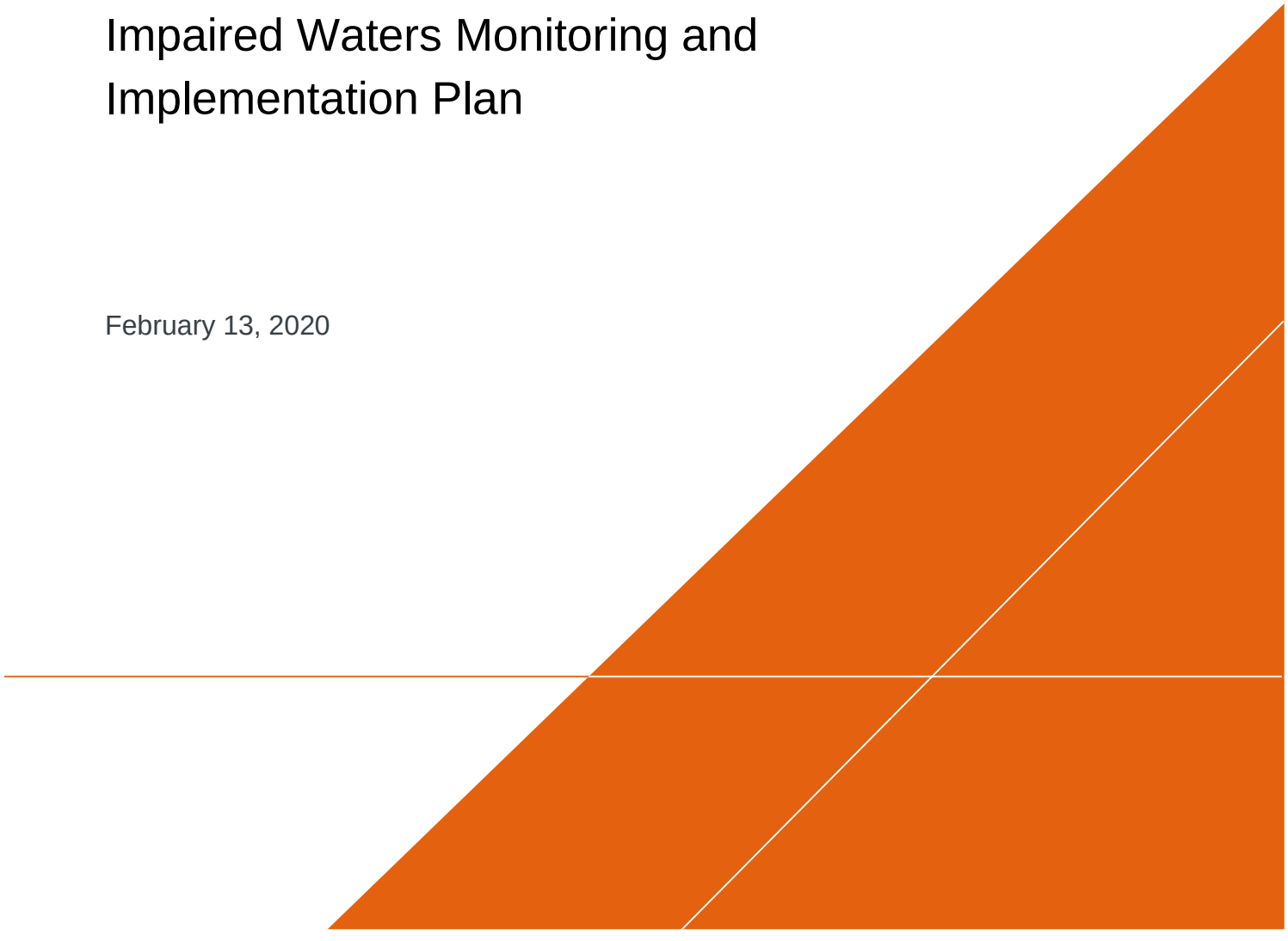
TETRA TECH

Athens-Clarke County, Georgia

FINAL 2019 ANNUAL REPORT

Impaired Waters Monitoring and Implementation Plan

February 13, 2020



FINAL 2019 ANNUAL REPORT

Impaired Waters Monitoring and Implementation Plan

Jody Hughey, PE
Principal Water Resources Engineer / Project Manager, Arcadis

Eric Byrne, PE
Project Engineer, Tetra Tech

Prepared for:

Athens-Clarke County, Georgia

Department of Transportation and Public Works

120 West Dougherty Street

Athens

Georgia 30601

Prepared by:

Arcadis U.S., Inc.

2839 Paces Ferry Rd

#900

Atlanta

Georgia 30339

Tel 770 431 8666

Fax 770 435 2666

Our Ref.:

30014885

Date:

February 13, 2020

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

EXECUTIVE SUMMARY

Athens-Clarke County, Georgia developed and implemented an Impaired Waters Monitoring and Implementation Plan and Sampling Quality Assurance Plan in October 2015 as part of its Municipal Separate Storm Sewer System National Pollutant Discharge Elimination System permit requirements. As part of the Plan, fecal coliform bacteria, total suspended solids, and pH are regularly measured at sampling stations representative of impaired reaches within the permit area.

Data collected from initiation of monitoring efforts in October 2015 through fourth quarter 2016 were presented in the 2016 Annual Report. Data collected in 2017 were presented in the 2017 Annual Report, and data collected in 2018 was presented in the 2018 Annual Report. This annual report includes sampling results from three quarters of 2019: two from November to April, and one from May to October. This report also includes analysis of pollutant of concern (POC) trends since initiation of monitoring.

Results collected from January 2019 through June 2019 indicated that 13 of the 24 pH levels measured for Kingswood Branch sampling stations attained state water quality standards. Most pH measurements for Kingswood Branch attained state standards until mid-2018; therefore, the pH impairment on Kingswood Branch was removed in EPD's 2018 303(d) List which was approved on June 14, 2019. However, pH levels were consistently below the state standard in late 2018 and throughout 2019. Therefore, Athens-Clarke County will continue to monitor pH on Kingswood Branch in 2020.

Results for total suspended solids measured at sampling stations on Carr Creek were high in January, then low for the rest of the year. Results for Noketchee Creek were consistently low throughout the year.

Fecal coliform results were consistently low in January and April compared with the state standard. Almost all fecal coliform results exceeded the state standard in June (except for station WTR-1). A definitive reason for the frequent exceedances of state standards for fecal coliform for the May to October season and fewer exceedances during the November to April season cannot be determined. In some cases, the exceedances from May to October were due to lower geometric mean criteria. During the May – October season, the state standard for geometric mean is 200 CFU/100 mL. During the November – April season, the state standard for geometric mean is 1,000 CFU/100 mL. Rainfall may have been a factor in the high fecal coliform results in June.

Athens-Clarke County Government (ACCGOV) has implemented best management practices, including initiatives in pet waste management, sewer evaluations, septic system management, and bacteria source tracking, to help reduce fecal coliform and sediment loads to receiving waters, as well as to maintain acceptable levels of pH. Best management practices are considered effective given that substantial progress has been made by ACCGOV over the reporting period. Examples of this progress include: millions of feet of sewer lines have been cleaned, sewer inflow and infiltration studies have been completed to detect areas of potential leaks, approximately 824 miles of roadways were swept as part of street sweeping programs (resulting in removal of 6,800 cubic feet of debris), construction sites were inspected for proper erosion and sediment controls, pet waste education materials were distributed, and septic system education and outreach programs continued to gain momentum. A bacterial source tracking study was also conducted from 2015 through 2017, and results are being used to target appropriate fecal coliform reduction strategies. Results from this study suggest that human sources of fecal coliform are a consistent contributor in Tanyard Creek, Brooklyn Creek, and Trail Creek, and are either not a contributor

or are a negligible contributor of fecal coliform in Carr Creek, Cedar Creek, Hunnicut Creek, Kingswood Branch, and unnamed tributary to Middle Oconee River. In 2018, nine Watershed Management Plans (WMPs) were completed for Bear Creek, East Fork Trail Creek, Malcolm Branch, Middle Oconee River, North Oconee River, Sandy Creek, Sulphur Spring Branch, Turkey Creek, and Walton Creek.

CONTENTS

TABLES

FIGURES

APPENDICES

Water Quality Sample Results (January 2019 – June 2019)

Water Quality Trends (October 2015 – June 2019)

ACRONYMS AND ABBREVIATIONS

ACC	Athens-Clarke County, Georgia
ACCGOV	Athens-Clarke County Government
BioF	biota - fish communities
BioM	biota - macroinvertebrates
BMP	best management practice
BST	bacteria source tracking
CFU	colony forming units
EPA	U.S. Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FC	fecal coliform bacteria
GIS	geographic information system
IWMIP	Impaired Waters Monitoring and Implementation Plan
mg	milligrams
mL	milliliter
MPN	most probable number
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
POC	pollutant of concern
PUD	Public Utilities Department
QA/QC	quality assurance/quality control
RDII	rainfall-dependent inflow and infiltration
SQAP	Sampling Quality Assurance Plan
SSES	sanitary sewer field evaluations and survey
TSS	total suspended solids
WMP	Watershed Management Plan

1 INTRODUCTION

Athens-Clarke County (ACC) is classified as a small Municipal Separate Storm Sewer System (MS4) community with a population greater than 10,000 and is permitted under the General National Pollutant Discharge Elimination System (NPDES) Stormwater Permit No. GAG610000 (Georgia Department of Natural Resources 2017). The General NPDES Stormwater Permit for small MS4s (Permit) requires MS4 communities such as ACC to develop and implement an Impaired Waters Monitoring and Implementation Plan (IWMIP) for impaired waters within the permitted area. Permittees must identify impaired waters located within its permitted area using the latest approved 305(b)/303(d) List of Waters, which contains MS4 outfalls or waters within 1 linear mile downstream of MS4 outfalls. Permittees are also required to identify POCs, which are the water quality parameter(s) for which the identified impaired waters are listed as not meeting its designated uses, such as fishing or drinking water.

Athens-Clarke County Government (ACCGOV) identified a total of 18 impaired reaches in the ACC Permit area (i.e., ACC jurisdictional area). Seventeen of the 18 reaches are listed as impaired for fecal coliform bacteria (FC), two reaches are listed as impaired for sediment impacts to fish biota (BioF), one reach is listed and impaired for sediment impacts to macroinvertebrate biota, and two reaches are listed as impaired for pH (Table 1; Georgia Department of Natural Resources 2016). Thus, the POCs identified for the ACC MS4 Permit area are FC, pH, and sediment (BioF and BioM). The reach names, locations, designated uses, impairment parameters (or POCs), extent (length of impaired reach), and potential causes are listed in Table 1.

Table 1. Impaired Stream Reaches with MS4 Outfalls within 1 Linear Mile in Athens-Clarke County, Georgia

Reach Name	Location	Designated Use	Impairment Parameter(s)	Extent (miles)	Potential Causes
Brooklyn Creek	Headwaters to Middle Oconee River, Athens	Fishing	FC	2	Urban runoff
Carr Creek	Headwaters to North Oconee River, Athens	Fishing	BioF, Bio M, FC, pH*	2	Industrial facility, urban runoff
Cedar Creek	Headwaters to Oconee River, Athens	Fishing	FC	4	Urban runoff
Cloverhurst Branch	Headwaters to Tanyard Branch (Athens)	Fishing	FC	2	Urban runoff
East Fork Trail Creek	Headwaters to West Fork Trail Creek, Athens	Fishing	FC	3	Urban runoff
Hunnicutt Creek	Headwaters to Middle Oconee River, Athens	Fishing	FC	1	Urban runoff
Kingswood Branch	Tributary to McNutt Creek, Athens	Fishing	FC**	1	Urban runoff
McNutt Creek	Headwaters at GA 316 and Dials Mill Road to Middle Oconee River	Fishing	FC	12	Non-point sources, urban runoff

Reach Name	Location	Designated Use	Impairment Parameter(s)	Extent (miles)	Potential Causes
Middle Oconee River	Big Bear Creek to McNutt Creek	Fishing	FC	12	Non-point sources
Middle Oconee River	McNutt Creek to North Oconee River	Fishing	FC	4	Urban runoff
Noketchee Creek	Headwaters to Sandy Creek	Fishing	pH***, BioF	5	Non-point sources, urban runoff
North Oconee River	Sandy Creek to Trail Creek	Drinking Water	FC	2	Non-point sources
North Oconee River	Trail Creek to Oconee River	Fishing	FC	8	Municipal facility, urban runoff
Oconee River	Confluence of North and Middle Oconee Rivers, Athens to Barnett Shoals Dam	Fishing	FC	4	Urban runoff
Tanyard Creek	Upstream North Oconee River, Athens	Fishing	FC	1	Urban runoff
Trail Creek	East Fork Trail Creek to North Oconee River, Athens	Fishing	FC	2	Urban runoff
Tributary to Middle Oconee River	Downstream closed UGA Botanical Gardens Landfill (Milledgeville Ave. Site), Athens	Fishing	FC	1	Non-point sources, urban runoff
West Fork Trail Creek	Athens	Fishing	FC	3	Urban runoff

*A pH impairment for Carr Creek were added to the approved 2016 305(b)/303(d) List of Impaired Waters; pH sampling has been added to the contract for 2020.
**The pH impairment for Kingswood Branch was removed from the 2018 305(b)/303(d) List of Impaired Waters.
***A pH impairment for Noketchee Creek was added to the 2018 305(b)/303(d) List of Impaired Waters; pH sampling has been added to the contract for 2020.

Source: Georgia Department of Natural Resources 2018

In 2015, ACCGOV developed and implemented an IWMIP and Sampling and Quality Assurance Plan (SQAP), referred to collectively as the Plan, to monitor and track POCs and to select initial best management practices (BMPs) to help reduce concentrations of the identified POCs. The Georgia Environmental Protection Division (EPD) approved the final IWMIP and SQAP in January 2016. ACCGOV began implementation of the Plan in October 2015, and implementation is ongoing. Combined with ACCGOV's ongoing Watershed Improvement Program, the Plan ultimately helps improve water quality and monitors progress toward removing the impaired waters from the 303(d) List.

In addition to satisfying MS4 Permit requirements, impaired water monitoring data are being collected in accordance with the SQAP component of the Plan (January 2016) to be submitted to EPD for consideration in 305(b)/303(d) listing decisions. Impaired waters monitoring data will be evaluated annually to help identify potential concentration trends and sources of POCs. Furthermore, the monitoring data are being used to help assess current watershed conditions and develop Watershed Management Plans (WMPs), as well as to help guide appropriate stormwater public education and

outreach efforts. Results will be evaluated regularly to monitor progress toward delisting the streams from the Georgia 303(d) list.

2 METHODS

Impaired waters were sampled and tested for identified POCs according to the detailed methods described in the ACC IWMIP and SQAP (Arcadis-Tetra Tech January 2016). Data collection began in October 2015 and is ongoing. As mentioned in the Executive Summary, the 2019 Annual Report includes detailed results from the first three quarters of 2019 but also includes an analysis of POC trends since initiation of data collection.

The data collected and evaluated as part of this annual report extends from January 2019 to June 2019. Sampling results were compared to applicable Georgia numeric criteria to determine compliance with water quality standards. In addition to sampling data collection and evaluation, ACCGOV implemented BMPs designed to improve water quality for the identified POCs and impaired reaches.

2.1 Impaired Waters Sampling

2.1.1 Study Area

The study area includes the following 18 impaired reaches within the ACC permitted area (Figure 1):

1. Brooklyn Creek
2. Carr Creek
3. Cedar Creek
4. East Fork Trail Creek
5. Hunnicutt Creek
6. Kingswood Branch
7. McNutt Creek
8. Middle Oconee River (section one)
9. Middle Oconee River (section two)
10. Noketchee Creek
11. North Oconee River (section one)
12. North Oconee River (section two)
13. Oconee River
14. Tanyard Creek
15. Cloverhurst Branch
16. Trail Creek
17. West Fork Trail Creek
18. Unnamed tributary to Middle Oconee River.

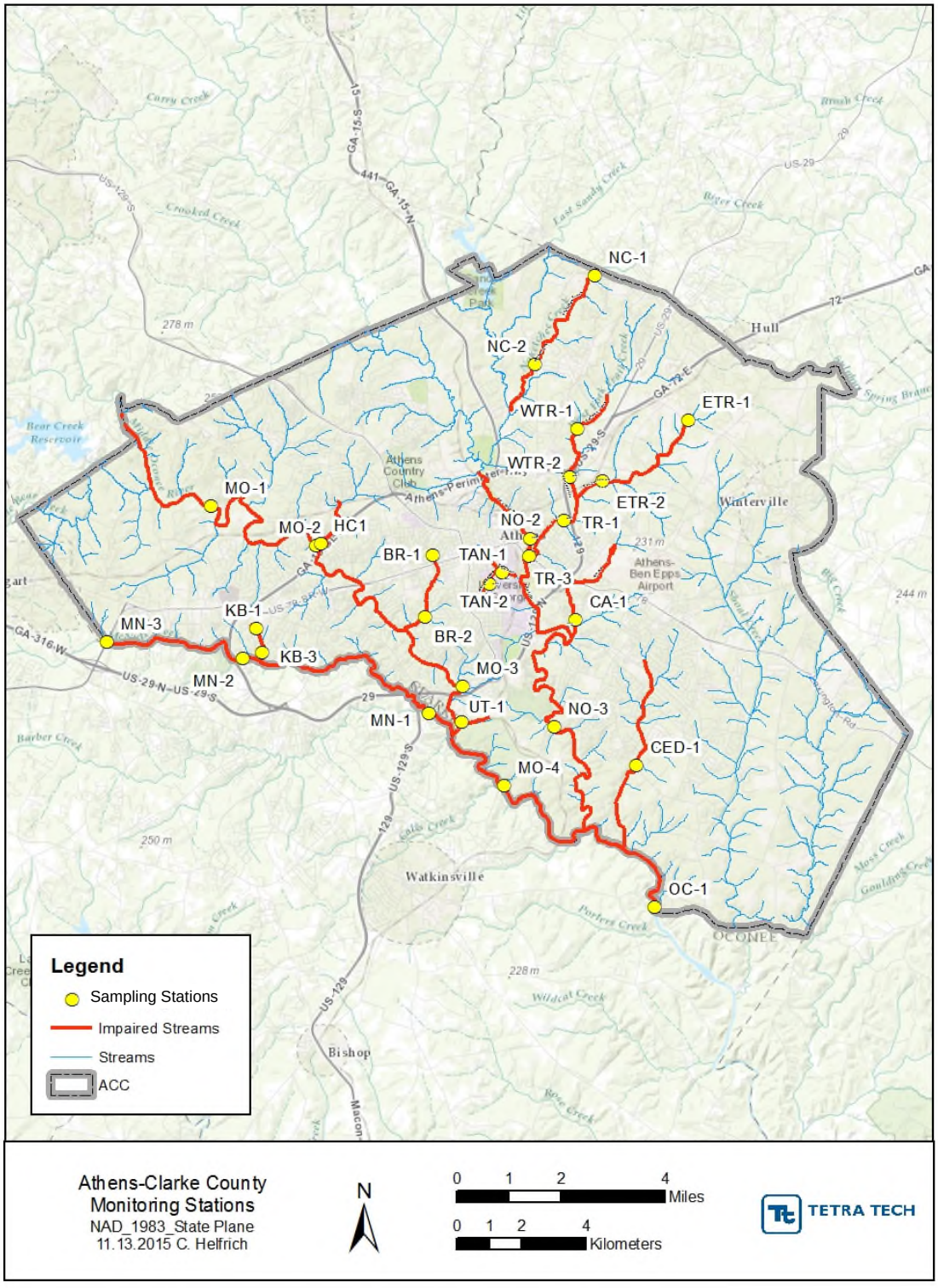


Figure 1. Impaired Stream Reaches within 1 Linear Mile of MS4 Outfalls and Sampling Stations in Athens-Clarke County, Georgia

2.1.2 Sampling Stations

The sampling station locations were selected to represent the 18 impaired reaches within 1 linear mile of MS4 outfalls and where water quality data were collected historically. The impaired streams are sampled at 28 stations. The sampling stations, along with their geographic coordinates, are listed in Table 2.

Table 2. Sampling Stations in Impaired Stream Reaches in Athens-Clarke County, Georgia

Station ID	Impaired Reach	Criterion Exceeded	Latitude	Longitude
BR-1	Brooklyn Creek	FC	33.9547	-83.3993
BR-2	Brooklyn Creek	FC	33.9376	-83.4021
CA-1	Carr Creek	BioF, FC	33.9364	-83.3518
CED-1	Cedar Creek	FC	33.8958	-83.3321
ETR-1	East Fork Trail Creek	FC	33.9918	-83.3136
ETR-2	East Fork Trail Creek	FC	33.975	-83.3426
HC-1	Hunnicutt Creek	FC	33.9581	-83.4367
KB-1	Kingswood Branch	FC, pH	33.9347	-83.4584
KB-3	Kingswood Branch	FC, pH	33.9279	-83.4565
MN-1	McNutt Creek	FC	33.9107	-83.401
MN-2	McNutt Creek	FC	33.9263	-83.463
MN-3	McNutt Creek	FC	33.9314	-83.5098
MO-1	Middle Oconee	FC	33.969	-83.4733
MO-2	Middle Oconee	FC	33.9576	-83.4383
MO-3	Middle Oconee	FC	33.9183	-83.3898
MO-4	Middle Oconee	FC	33.8904	-83.3763
NC-1	Noketchee Creek	BioF	34.0322	-83.3444
NC-2	Noketchee Creek	BioF	34.0077	-83.3649
NO-2	North Oconee River	FC	33.959	-83.3669
NO-3	North Oconee River	FC	33.9068	-83.3593
OC-1	Oconee River	FC	33.8563	-83.3263
TAN-1	Tanyard Creek	FC	33.9497	-83.3761
TAN-2	Cloverhurst Branch	FC	33.9466	-83.3804
TR-1	Trail Creek	FC	33.9642	-83.3553
TR-3	Trail Creek	FC	33.9542	-83.3671
WTR-1	West Fork Trail Creek	FC	33.9896	-83.3509
WTR-2	West Fork Trail Creek	FC	33.9761	-83.3534
UT-1	Unnamed tributary to Middle Oconee River	FC	33.908	-83.386

2.1.3 Sampling Parameters and Schedule

Sampling methods include in-situ pH measurements for stations KB-1 and KB-3; grab sampling for FC analytical testing at all stations except NC-1 and NC-2; and sampling for total suspended solids (TSS) at

stations CA-1, NC-1, and NC-2. Sample parameters, sample types, sampling stations, total number of stations sampled, and sampling schedule are listed in Table 3.

Table 3. Sampling Parameters and Schedule

Parameter	Sample Type	Stations Sampled	Total Number of Stations Sampled	Sampling Schedule
FC	Grab	BR-1, BR-2, CA-1, CED-1, ETR-1, ETR-2, HC-1, KB-1, KB-3, MN-1, MN-2, MN-3, MO-1, MO-2, MO-3, MO-4, NO-2, NO-3, OC-1, TAN-1, TAN-2, TR-1, TR-3, WTR-1, WTR-2, UT-1	26	4 geometric means/year = 16 grab samples = (4 grab samples/1 geometric mean) x (4 samples/year)
pH	In-situ	KB-1, KB-3	2	20 samples per year
TSS	Grab	CA-1, NC-1, NC-2	3	4 samples per year (1 sample collected each calendar quarter)

Georgia water quality standards for the sampled parameters and impaired reaches designated uses are provided in Table 4. Sampling results are compared to the state standards to evaluate attainment of these criteria.

Table 4. Georgia Water Quality Standards for Sampled Parameters

Parameter	Standard	Source
Fecal Coliform Bacteria	May–Oct <200 colonies/100 mL as geometric mean and 4,000 colonies/100 mL as a single sample maximum	GA Water Quality Standards
	Nov–Apr <1,000 colonies/100 mL and 4,000 as a single sample maximum	
pH	Between 6.0 and 8.5	GA Water Quality Standards
TSS	No quantitative standard in Georgia	NA

2.1.4 Sampling Methods

Sampling methods included in-situ water quality measurements for pH and grab samples for laboratory analyses of FC and TSS. Sampling protocols are described in detail in Section 3.1, Sampling Methods, of the ACC Plan (Arcadis-Tetra Tech January 2016) and adhere to the requirements of the Water Protection Branch Quality Assurance Manual (Georgia Department of Natural Resources 1999) and Title 40 of the Code of Federal Regulations, Part 136. Sampling included quality assurance/quality control (QA/QC) procedures such as the collection of blank and duplicate samples and the completion of chain-of-custody forms for grab samples submitted to the laboratory for analysis. These QA/QC protocols are described in the SQAP (Section 3 of the IWMIP and SQAP).

Sampling personnel maintained field records during sampling events. Field records include completed field forms that provide information on sample location, date, time, weather conditions at the time of sampling, names of sampling personnel, observed field conditions, problems encountered, and any

corrective actions taken as a result. Refer to Section 3.3.2, Field Records, of the Plan for additional details on the field records collected for each sampling event.

2.2 Best Management Practices

BMPs have been implemented in ACC to control and reduce POC concentrations. ACCGOV has many ongoing programmatic BMPs in place to reduce FC levels and prevent other POCs from entering streams in ACC. These BMPs and associated efforts are documented in the Unified Government of Athens-Clarke County Watershed Protection Plan 2018-2019 Annual Report (Jacobs 2019), ACC's NPDES Phase II 2019 Annual Report, and in the ACC Plan. In addition to ongoing programmatic BMPs, ACCGOV has conducted bacteria source tracking (BST) to assist in identifying the primary sources of FC measured in streams. Results will be used to focus management efforts in a cost-effective manner. BST commenced in November 2015 and was completed in October 2017.

The summaries below describe BMP progress made by ACCGOV in 2019. Progress made before 2019 is described in the 2018 IWMIP Annual Report.

2.2.1 Pet Waste Management Initiatives

This section discusses the activities ACC has undertaken to document, understand, and address pet waste management in ACC.

- During the reporting period, ACCGOV staff distributed brochures on pet waste/bag dispensers to promote public education on proper pet waste management. ACCGOV staff continues to actively monitor for pet waste "hot spots" in downtown Athens and beyond and will install additional pet waste stations or move current stations based on needs.
- The Stormwater Department passes out pet waste bag dispensers with bags for dog owners to clip to their leashes. They give these out at any tabling events they attend, and they supply animal shelters and hospitals with boxes of pet waste bags for dog adoption goody bags.
- The Leisure Services Department installs pet waste stations in public parks and at public trailheads. They maintain approximately 20 stations weekly.
- The ACC Stormwater Department is currently working with the ACC Solid Waste Department to find a pedestrian trash can design for downtown Athens that incorporates a pet waste bag dispenser. New cans will be installed in 2020.

2.2.2 Sanitary Sewer Evaluation

Due to the high levels of FC in ACC, a key source control measure for 303(d)-listed streams identified in the ACCGOV Public Utilities' Department (PUD) Watershed Protection Plan was maintenance and evaluation of sanitary sewer lines. Consequently, the following activities were undertaken to maintain and evaluate sanitary sewer lines in ACC.

2.2.2.1 Sewer Maintenance

- In 2019, PUD used Rodder trucks to clean 1,123,906 feet of sewer line, flush/vacuum trucks to clean 1,484,993 feet of sewer line, and camera trucks to inspect 170,645 feet of sewer line. In addition, 346,600 feet of easements and right-of-way were cleared.

- ACC PUD made condition and capacity upgrades to approximately 7,700 linear feet of 8-, 12-, 18-, and 24-inch gravity sewer line and appurtenances within the Tanyard Creek watershed.
- ACC PUD is also finalizing construction plans for the Brooklyn Creek Interceptor Improvements. This project includes replacing the sewer interceptor from the trunk line at the Middle Oconee River up to Baxter Street, and increasing pipe size to provide greater capacity based on population projections for the future.

2.2.2.2 Sewer Evaluation Studies

- In 2015, PUD conducted a Flow Monitoring Study to identify rainfall-dependent inflow and infiltration (RDII) within the wastewater collection system.
- In 2015 and 2016, PUD performed detailed field as-built surveys of critical portions of the wastewater collection system. This information was used to update PUD's geographic information system (GIS) with accurate pipe locations, pipe materials, pipe diameters, and pipe slopes and depths.
- In 2015 and 2016, PUD updated and calibrated dynamic dry-weather and wet-weather models for most of the wastewater collection system. The entire wastewater collection system will be modeled in 2017. The results of the forecasting, flow monitoring, and modeling efforts have been used to identify both short- and long-term Service Delivery Plan Capital Improvement Projects to ensure that the wastewater collection system has adequate capacity.
- In 2016, PUD performed sanitary sewer field evaluations and surveys (SSESs) on that portion of the wastewater collection system that has the highest RDII for the purpose of identifying pipes that are in poor condition and need rehabilitation and/or replacement.
- In 2017, PUD continued to analyze results of SSES efforts to identify causes of inflow and infiltration and subsequent capital improvement projects to reduce inflow and infiltration. PUD continues to perform flow monitoring comparisons between pre-rehabilitation and post-construction activities to determine the effectiveness of the SSES program on the wastewater collection system.

2.2.3 Septic System Management

Another key source control measure for FC identified in the Watershed Protection Plan was septic system management. The following activities were undertaken to support proper management of septic systems in ACC.

- The ACC Planning Department is currently responsible for maintaining the GIS septic system inventory. This inventory is updated regularly with newly built septic systems.
- ACCGOV uses the Manual for On-Site Sewage Management Systems (Department of Human Resources, Public Health, Chapter 290-5-26, 2016) to regulate sewer management systems and septic tanks. This includes minimum design and construction standards and minimum volume requirements.
- ACCGOV continues to enforce Sections 8-6-6 and 8-6-7 of the Protected Environmental Areas Ordinance, which prohibit septic tanks in floodplains and riparian zones, respectively.
- ACC maintained a Septic System Education Program, which includes a website (http://www.accgov.com/5317/Septic-System-Education-Program) and a phone number for

questions. ACC continued targeted septic tank education efforts, including continued distribution of informational materials, social media posts, and an article in the September 2019 Stormwater Newsletter about the U.S. Environmental Protection Agency's (EPA's) Septic Smart Week.

- ACCGOV has adopted a General Sewer Use ordinance to regulate discharges to public sewers, septic tanks, and private wastewater systems. On October 5, 2018, ACC Mayor & Commission revised the Sewer Use Ordinance to include a recommendation from ACC PUD. Section 5-1-2 (b)(6) now reads "Athens-Clarke County recommends that septic tank disposal systems be inspected on intervals of not less than every five years, and maintenance performed as needed, at the owner's expense."
- ACCGOV is considering a credit to the Stormwater Utility Fee for regular septic tank pumping. This consideration is part of a larger utility fee and credit review that started in late 2018 and is still underway. The new credit program has not yet gone into effect.

2.2.4 Street Sweeping

ACCGOV conducted the following street sweeping activities in 2019.

- In 2019, approximately 824 miles of roadways were swept, resulting in removal of 6,800 cubic feet of debris from roadways. ACC contracts street sweeping services on major urban roadways (approximately 6.86 curb miles per month and 46.64 curb miles per quarter) and throughout the Central Business District (approximately 8.88 curb miles per week). Through this contract, approximately 825 miles of roadways are swept in ACC per year.

2.2.5 Bacterial Source Tracking

- ACCGOV implemented BST in 2015 to determine the primary source(s) of fecal bacteria in streams that are impaired due to FC. BST analysis is being undertaken as a phased approach. Phase two of the BST work was completed in October 2017.
- Results from this study suggest that human sources of FC are a consistent contributor of FC in Tanyard Creek, Brooklyn Creek, and Trail Creek, and are either not a contributor or are a negligible contributor of FC in Carr Creek, Cedar Creek, Hunnicutt Creek, Kingswood Branch, and an unnamed tributary to Middle Oconee River.
- Results from all FC samples collected from Tanyard Creek, Brooklyn Creek, and Trail Creek as a part of the BST study exceeded the May-October state standard of 200 colony forming units (CFU)/100 milliliters (mL) of drinking water supply and recreational designated uses with the highest reporting limit (16,000 most probable number [MPN]/100 mL) for all three stations from the wet weather samples. However, the wet weather samples detected the same human gene biomarker levels as the dry weather samples. These results suggest that species other than humans are also contributing to the FC levels in Tanyard Creek, Brooklyn Creek, and Trail Creek.
- Because samples from Carr Creek, Hunnicutt Creek, Kingswood Branch, and an unnamed tributary to Middle Oconee River did not detect the human gene biomarker, species other than humans are contributing to the FC levels in those Creeks.
- Potential animal sources of FC were noted during stream walks and upland evaluations conducted in 2016 and 2017 as part of the Watershed Management Planning efforts and include dog, goose, and deer throughout most parts of ACC, and livestock in rural/agricultural areas.

- Based on the results of this study, next steps for consideration include:
    - Use data and analysis from the 2016/2017 Watershed Management Planning efforts to identify the most likely species and locations contributing to FC pollution in the listed streams.
    - Conduct BST to identify non-human species contributing to FC pollution. These may include species such as dog, goose, deer, and others as needed.

2.2.6 TSS Reduction BMPs

- Construction sites were inspected for watersheds with impairments for BioF to reduce sediment loads to receiving waters.
- During the reporting period, ACCGOV continued to increase the number of inspections in the Noketchee Creek and Carr Creek watersheds (which are listed as impaired for impacts to BioF) as well as the Middle Oconee watershed (which is listed as having impaired macroinvertebrate biota [BioM] above the confluence with Big Bear Creek). Street sweeping in watersheds with impairments for BioM are being evaluated by ACCGOV. ACCGOV's current street sweeping contract includes up to 35 additional miles of street sweeping to be used as necessary. ACCGOV continues to evaluate the allocation of these miles during fiscal year planning. A typical street sweeping program involves the deployment of street sweeper fleets on targeted routes based on schedules defined by desired load reduction goals and/or effectiveness. In ACC, the main objective is to target streets based on effectiveness.

2.2.7 Watershed Management Plans

Before 2018, the Arcadis, Tetra Tech, and ACC partnership completed watershed management documents for Brooklyn Creek, Hunnicutt Creek, Trail Creek, Tanyard Creek, Cedar Creek, Shoal Creek, Big Creek, Carr Creek, and McNutt Creek in accordance with the overarching goals of the Watershed Improvement Program. In 2018, the partnership completed WMPs for nine more watersheds, including Bear Creek, East Fork Trail Creek, Malcolm Branch, Middle Oconee River, North Oconee River, Sandy Creek, Sulphur Spring Branch, Turkey Creek, and Walton Creek. These recently completed plans will likely lead to additional initiatives to improve water quality.

The WMPs discuss the impaired water monitoring and results as they relate to characterizing the existing watershed and discussing water quality. Some of the watershed management needs and recommended management measures are tied to known impairments and/or the water quality data collected under the impaired waters monitoring program. For instance, the Middle Oconee is impaired for FC. Sampling as of the timeframe during which the WMP was being prepared (2017, finalized early 2018) confirmed issues with this. A recommended management measure identified in the WMP was MO-Res-01, also known as the Ben Burton Park Pet Waste and Managed Access Project. The project involves the augmentation of pet waste collection measures through the installation of pet waste stations and additional signage to reduce FC pollution in conjunction with construction of managed access points to the Middle Oconee River that include steps and a vegetated buffer to mitigate bank erosion. It would potentially deter park users from using unofficial access points through fencing and strategic vegetation. Benefits include nutrient uptake, runoff sediment reduction, and beautification.

3 RESULTS

Water quality monitoring data results collected during the study period are summarized below and are included in Appendix A.

3.1 Fecal Coliform

3.1.1 All Data

During the January 2019 to June 2019 period of record, a total of 360 grab samples (including duplicates and blanks) were tested for FC. Individual grab sample results were compiled and used to calculate three geometric means for 26 stations following sampling protocols (Table 5, Figure 2). Due to the resignation of the previous Director of ACC Transportation and Public Works in 2019 and associated transition period with an interim Director assigned, contracting for additional monitoring and reporting that would include a fourth geometric mean was not finalized until after the May-October sampling period. Therefore, sampling to calculate a fourth geometric mean for 2019 was not completed. Each geometric mean was computed based on results from four grab samples collected within a 30-day period, with no one grab sample collected less than 24 hours from the time of the previously collected sample. Grab samples used to compute geometric means did not overlap between the months of April and May or October and November to ensure that the results could be compared to Georgia FC water quality standards, which are presented as geometric mean criteria (Table 4).

Geometric means calculated for each station were plotted by date (Figure 2). The 2019 data set does not support statistically sound trend analysis; however, analysis that incorporates all geomeans collected since 2015 will be discussed in Section 4.2.

In Table 5, the Exceedances of Standard column indicates whether a geometric mean exceeded the standard. Each tick mark corresponds to a geometric mean in chronological order from left to right. A red tick mark indicates an exceedance, and a green tick mark indicates no exceedance of the applicable standard. In Table 5, the red and green colors of the cells containing geometric mean results indicate whether sample results exceeded the water quality standard; red values indicate an exceedance, and green values indicate no exceedance.

Table 5. Fecal Coliform Bacteria Geometric Means (January 2019 - June 2019) and Comparison to State Standards

Date	Jan-19	Apr-19	Jun-19	
Station	FC Geometric Mean (#14) cfu/100 mL (Nov-Apr)	FC Geometric Mean (#15) cfu/100 mL (Nov-Apr)	FC Geometric Mean (#16) cfu/100 mL (May-Oct)*	Exceedences of Standard
BR-1	784	1262	1411	
BR-2	855	558	1880	
CA-1	92	126	398	
CED-1	710	832	1987	
ETR-1	65	187	243	
ETR-2	351	430	660	
HC-1	202	358	897	
KB-1	179	598	799	
KB-3	559	765	2466	
MN-1	390	598	245	
MN-2	81	735	219	
MN-3	145	1254	470	
MO-1	332	1782	278	
MO-2	269	2070	424	
MO-3	257	1963	341	
MO-4	250	1703	313	
NO-2	455	1019	3224	
NO-3	363	738	1924	
OC-1	170	1072	880	
TAN-1	617	803	1773	
TAN-2	693	313	1987	
TR-1	156	201	296	
TR-3	399	1586	3240	
UT-1	182	437	256	
WTR-1	107	147	133	
WTR-2	141	139	379	
State Standard	**1,000**	**1,000**	**200**	

*Only one geometric means was completed for the May-October timeframe in 2019, as contracting for additional monitoring and reporting that would include a second geometric mean was not finalized until after the May-October sampling period.

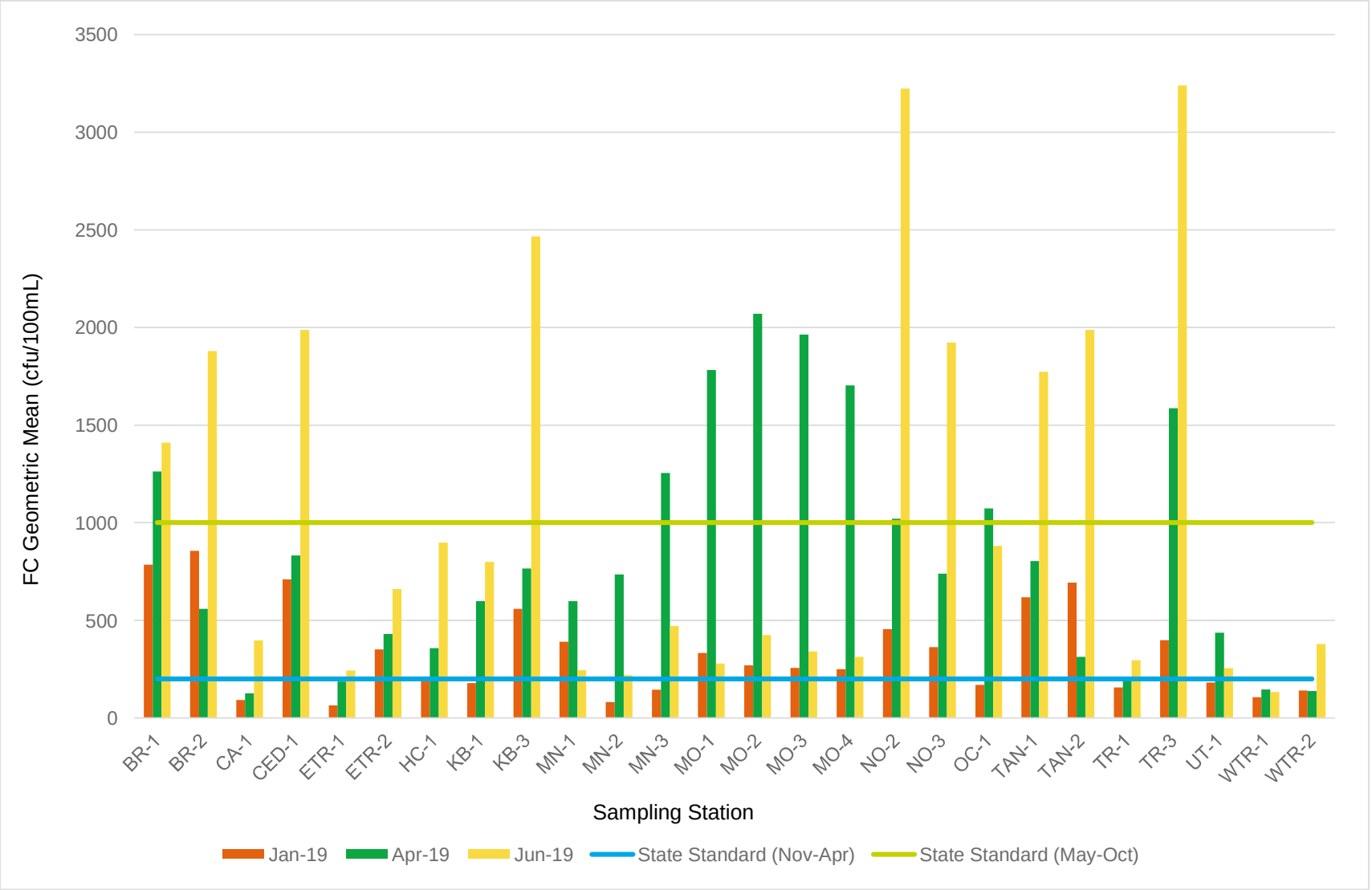


Figure 2. Fecal Coliform Geometric Means (January 2019 – June 2019)

During the January sampling event, results from all stations met the FC geometric mean standard of no greater than 1,000 CFU/100 mL. During the April event, results from nine stations exceeded the standard. In June 2019, results from all stations except WTR-1 exceeded the FC geometric mean standard of no greater than 200 CFU/100 mL. WTR-1 was the only station where results met state standards during all sampling events.

FC results measured for individual grab samples were compared to the state water quality standard for FC single samples: <4,000 CFU/100 mL. The stations that exhibited exceedances, as well as the percentage of station samples that exceeded the standard, are listed below:

- 25% of samples for stations NO-2, NO-3, OC-1 and TR-3 exceeded the standard.
- 17% of samples for stations BR-2, KB-3, and MO-3 exceeded the standard.
- 8% of samples for stations BR-1, CA-1, CED-1, HC-1, MN-1, MN-3, MO-1, MO-2, MO-4, and TAN-2 exceeded the standard.
- 0% of samples for all other stations exceeded the standard.

Individual grab sample FC data for the January 2019-June 2019 study period are provided in Appendix A. Results exceeding the standard are highlighted in red in the appendix.

3.1.2 November–April Data

Geometric means computed for FC grab samples were differentiated by either November–April or May-October timeframes to evaluate POC trends in these seasons and to compare them to applicable Georgia water quality standards. Results for the November – April period, which include data collected in January 2019 and April 2019, are presented in Table 6 and on Figure 3. In Table 6, the red and green colors of the cells containing geometric mean results indicate whether a sample exceeded the water quality standard; green values indicate no exceedance. Most of the geometric means were well below the state standard of 1,000 CFU/100 mL for data collected in November – April. All geometric means met the standard in January, and all but nine geometric means met the standard in April.

Table 6. Fecal Coliform Bacteria Geometric Means (January 2019 and April 2019) and Exceedance of State Standards

Date	Jan-19	Apr-19	
Station	FC Geometric Mean (#14) cfu/100 mL (Nov-Apr)	FC Geometric Mean (#15) cfu/100 mL (Nov-Apr)	Exceedences of Standard
BR-1	784	1262	
BR-2	855	558	
CA-1	92	126	
CED-1	710	832	
ETR-1	65	187	
ETR-2	351	430	
HC-1	202	358	
KB-1	179	598	
KB-3	559	765	
MN-1	390	598	
MN-2	81	735	
MN-3	145	1254	
MO-1	332	1782	
MO-2	269	2070	
MO-3	257	1963	
MO-4	250	1703	
NO-2	455	1019	
NO-3	363	738	
OC-1	170	1072	
TAN-1	617	803	
TAN-2	693	313	
TR-1	156	201	
TR-3	399	1586	
UT-1	182	437	
WTR-1	107	147	
WTR-2	141	139	
State Standard	**1,000**	**1,000**	

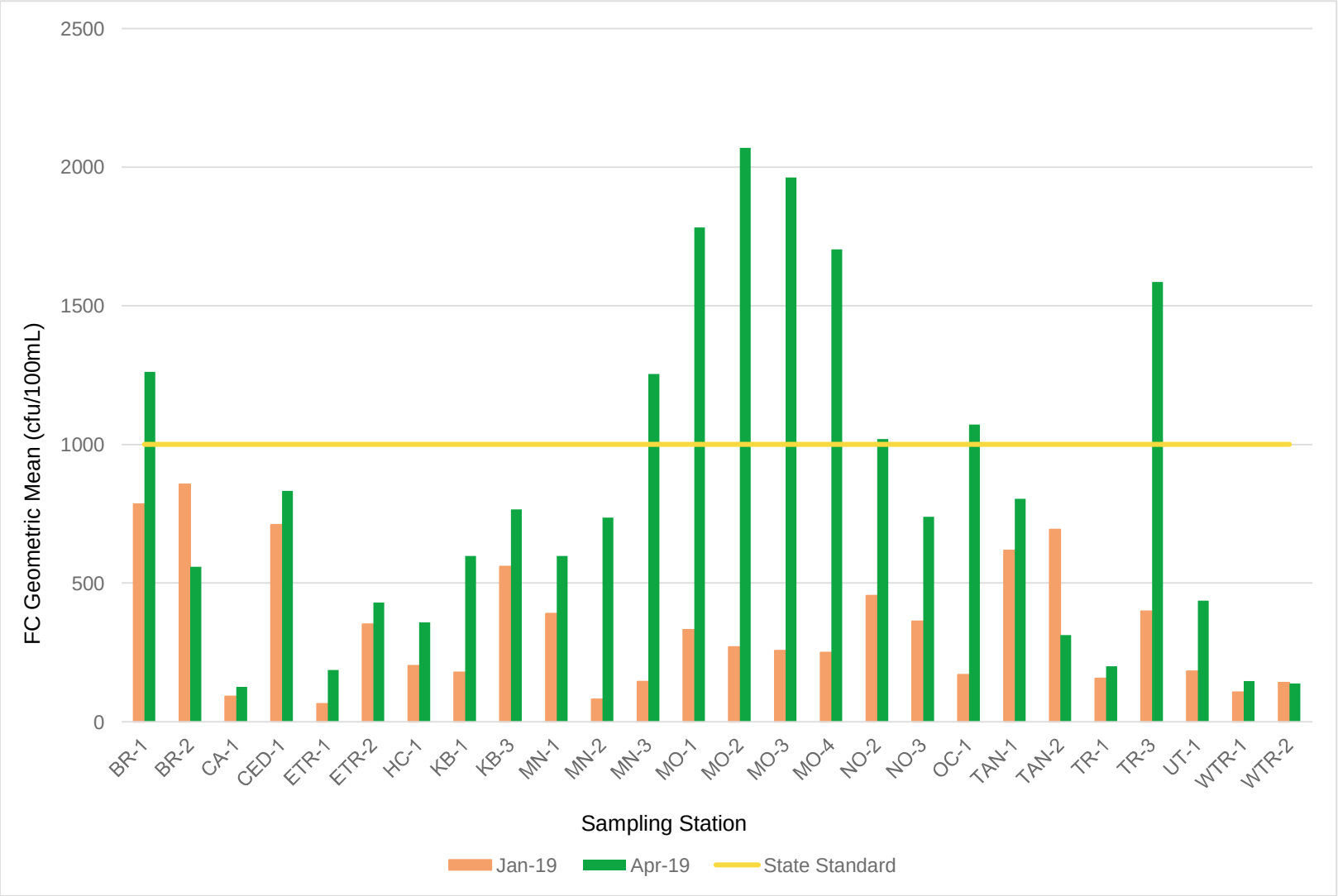


Figure 3. Fecal Coliform Geometric Means (January 2019 and April 2019)

3.1.3 May–October Data

Results for the May–October period, which includes data collected in June 2019, are presented in Table 7 and on Figure 4. In Table 7, the red and green colors of the cells containing geometric mean results indicate whether results from a sample exceeded the water quality standard; red values indicate an exceedance, and green values indicate no exceedance. One FC geometric mean was computed during May-October for the 2019 study period. For the June sampling period, results from all stations exceeded the 200 CFU/100 mL state standard except WTR-1.

Table 7. Fecal Coliform Bacteria Geometric Means (June 2019) and Exceedance of State Standards

Date	Jun-19	
Station	FC Geometric Mean (#16) cfu/100 mL (May-Oct)	Exceedences of Standard
BR-1	1411	
BR-2	1880	
CA-1	398	
CED-1	1987	
ETR-1	243	
ETR-2	660	
HC-1	897	
KB-1	799	
KB-3	2466	
MN-1	245	
MN-2	219	
MN-3	470	
MO-1	278	
MO-2	424	
MO-3	341	
MO-4	313	
NO-2	3224	
NO-3	1924	
OC-1	880	
TAN-1	1773	
TAN-2	1987	
TR-1	296	
TR-3	3240	
UT-1	256	
WTR-1	133	
WTR-2	379	
State Standard	**200**	

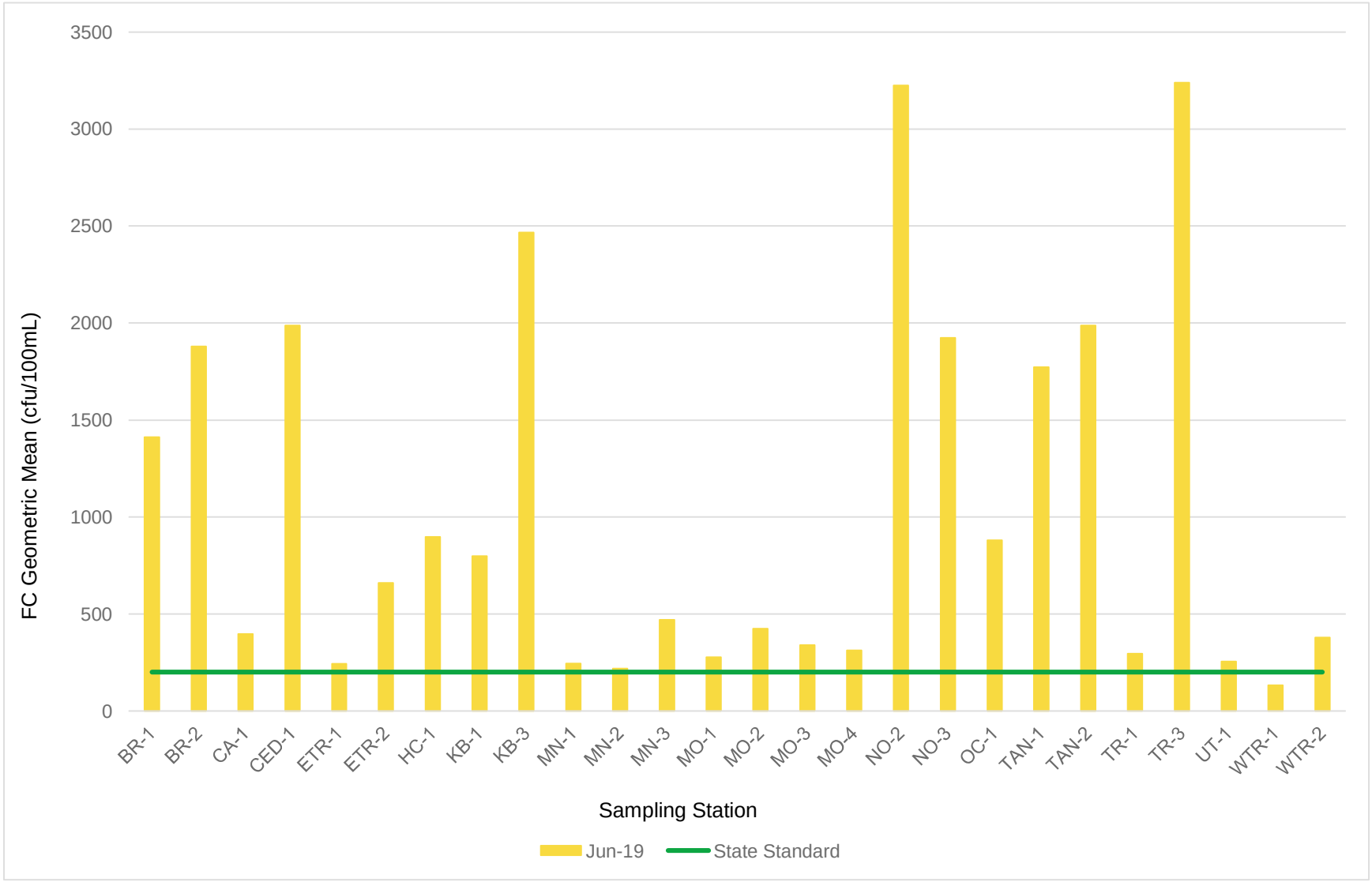


Figure 4. Fecal Coliform Geometric Means (June 2019)

3.2 pH

pH measurements collected for stations KB-1 and KB-3 during the study period are shown in Table 8 and on Figure 5. Results in green represent measurements within the standard limit, while results in red represent measurements outside of standard limits of 6.0 to 8.5. For KB-1, most measurements were below the Georgia standard for pH. For KB-3, most measurements were within the standard range. pH measured for KB-1 ranged from 5.40 to 6.25 and exhibited a median of 5.73. pH measured for KB-3 ranged from 5.83 to 6.79 and exhibited a median of 6.24. No consistent trends were observed for station KB-1 or KB-3. Results for KB-1 were slightly lower than those for KB-3 throughout the study period. The standard deviations computed for KB-1 samples and KB-3 samples were 0.26 and 0.32, respectively.

Table 8. pH measured at KB-1 and KB-3

Date	KB-1	KB-3
1/3/2019	5.6	5.8
1/9/2019	6.1	6.3
1/16/2019	6.0	6.4
1/23/2019	5.6	6.1
4/8/2019	5.6	6.0
4/10/2019	5.4	5.9
4/15/2019	6.0	6.8
4/17/2019	6.3	6.7
6/4/2019	5.7	6.4
6/17/2019	5.5	5.9
6/19/2019	5.8	6.7
6/26/2019	5.7	6.2
Number of Samples	12	12
Min	5.4	5.8
Max	6.3	6.8
Median	5.7	6.2
Standard Deviation	0.3	0.3

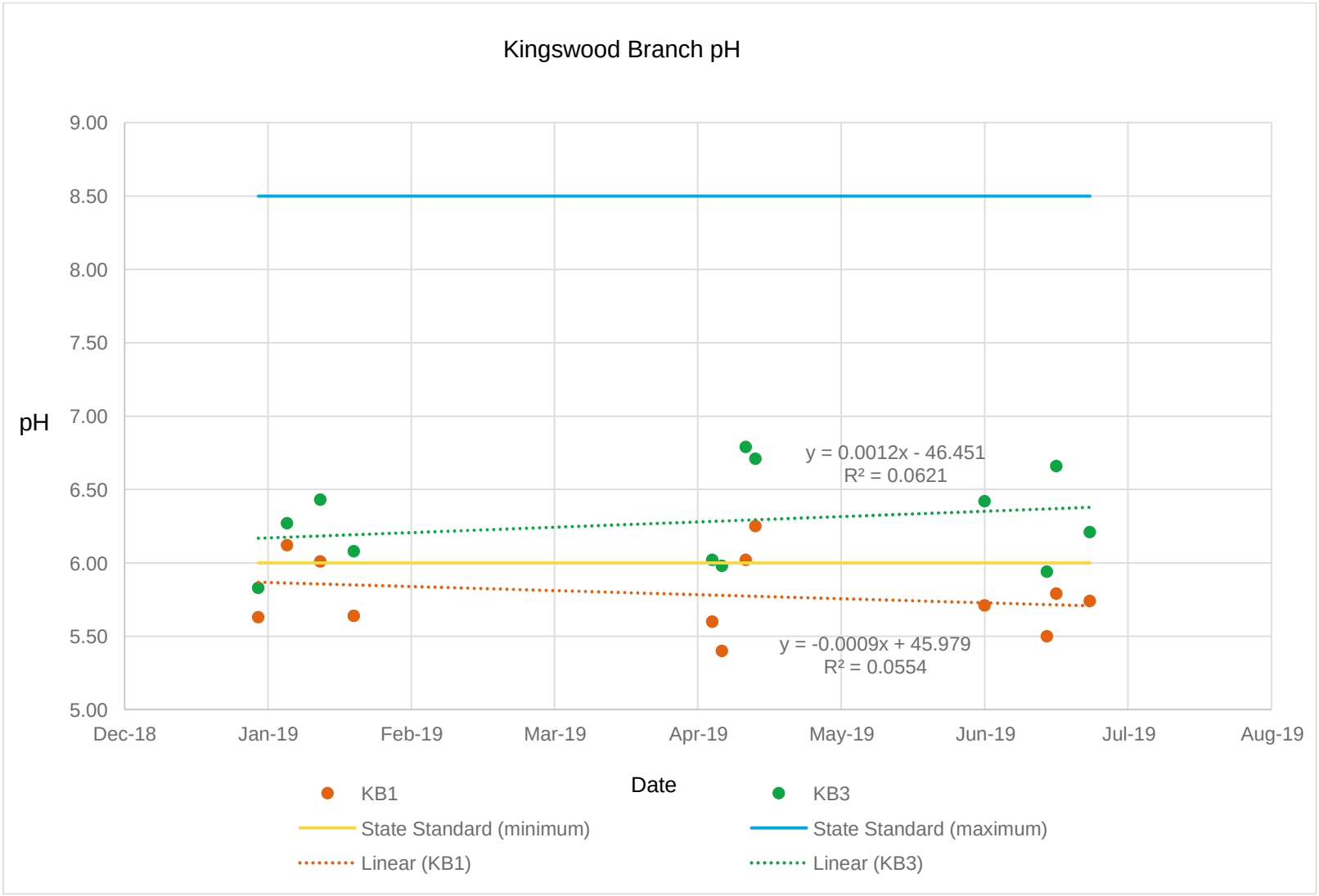


Figure 5. pH Measured at KB-1 and KB-3 Monitoring Stations

3.3 Total Suspended Solids

TSS concentrations (milligrams [mg]/L) measured for CA-1, NC-1, and NC-2 for the study period are presented in Table 9 and on Figure 6. Results for station CA-1 were high in January but were low for the rest of the year. Results for NC-1 and NC-2 were consistently between 3 and 6 mg/L.

Table 9. Total Suspended Solids (mg/L) Measured at CA-1, NC-1, and NC-2

Date	CA-1	NC-1	NC-2
1/8/2019	14.50	4.00	3.90
4/11/2019	3.00	6.00	6.00
6/5/2019	4.80	3.00	3.00

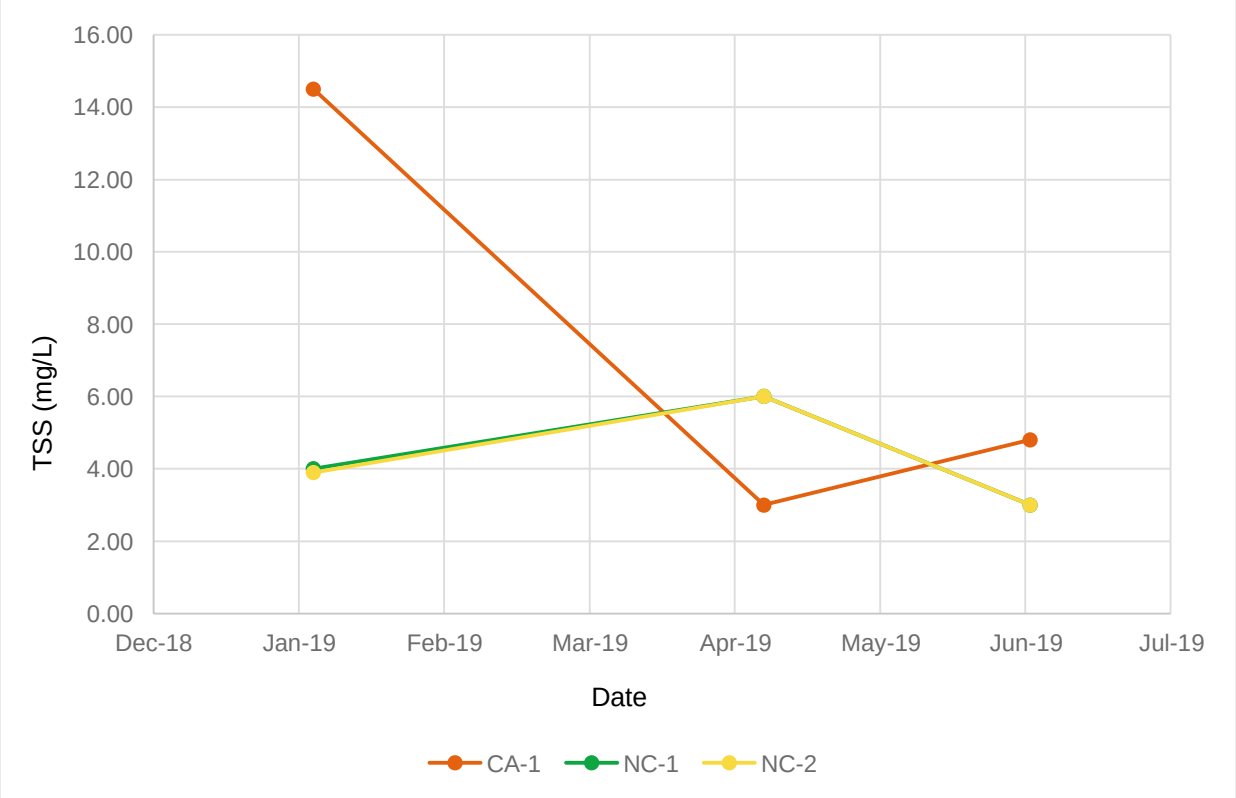


Figure 6. Total Suspended Solids Measured at CA-1, NC-1, and NC-2

3.4 Quality Assurance/Quality Control

QA/QC procedures were followed during the data collection, data entry, and data analysis components of the project according to the protocols described in the Plan (January 2016). The QA/QC procedures included the collection of blank and duplicate samples throughout the data collection period, completion

of chain-of-custody forms for grab samples delivered to the laboratory for analyses, calibration of the water quality meter used to measure pH in-situ before each pH sampling event, and data entry and data verification checks on the data entered into the master Excel spreadsheet. In total, 23 blank samples and 24 duplicate samples were collected and analyzed during the study period of record.

4 DISCUSSION

4.1 Sampling Results

The reason exceedances of state standards for FC were frequent for the May–October season compared to the November–April season is unclear. In some cases, it was due to the lower geometric mean criteria. During the May – October season, the state standard for geometric mean is 200 CFU/100 mL. During the November – April season, the state standard for geometric mean is 1,000 CFU/100 mL. Nine of the geometric means from the April sampling event exceeded the standard. During the May–October season, FC geometric means were higher than the state standard at all sampling stations except WTR-1 during the June sampling event.

The rainfall totals for all three months sampled are higher than the 30-year average, especially in June. High rainfall could have contributed to high results in June. Rainfall data in 2019 compared with the 30-year average (1981 – 2010) are shown in Table 10.

Table 10. Monthly Rainfall Totals for Athens, Georgia (National Weather Service 2019)

	2019 Rainfall (in)	30-year Average (in)
January	5.34	4.05
April	3.38	3.15
June	7.03	4.18

Most pH measurements for station KB-1 were below the standard range. Most measurements for KB-3 attained state standards.

TSS levels for station CA-1 were high in January but were low for the rest of the year. It is unclear why levels were so high in January. TSS levels for NC-1 and NC-2 were consistently between 3 and 6 mg/L.

4.2 BMP Effectiveness Evaluation

The effectiveness of the BMPs described in Section 2.2 was evaluated in relation to water quality monitoring results collected since implementation of the Plan in October 2015. A summary of the effectiveness evaluations completed for each BMP is provided in Table 10. In general, BMPs are considered to be successful because of the implementation progress made by ACCGOV during the reporting period. However, many variables regarding BMP effectiveness and associated uncertainties are unknown and unmeasured. As a result, the evaluation of BMP effectiveness summarized in Table 11 is considered preliminary and qualitative.

Table 11. Best Management Practices Effectiveness Evaluation

BMP Type	Targeted POCs	Implementation Status	Effectiveness Evaluation	Rationale
Pet waste stations	FC	Implemented, ongoing	Effective	ACC staff continues to actively monitor for pet waste "hot spots" and will install additional pet waste stations or move current stations based on needs. FC results attained standards for most stations during November–April season.
Sewer evaluation	FC	Implemented, ongoing	Effective	About 2,600,000 feet of sewer lines cleaned by Rodder trucks and flash/vacuum trucks. FC results attained standards for most stations during November–April season.
Septic system management	FC	Implemented, ongoing	Effective	ACC continued public education and outreach efforts for proper septic system management.
Street sweeping	FC and TSS	Implemented, ongoing	Effective	In 2019, approximately 824 miles of roadways were swept, resulting in removal of 6,800 cubic feet of debris from roadways.
TSS reduction: increased construction inspections in Noketchee Creek, Carr Creek, and Middle Oconee watersheds	TSS	Implemented, ongoing	Effective	In 2019, ACCGOV continued inspections in the Noketchee Creek and Carr Creek watersheds, as well as the Middle Oconee watershed. TSS results measured for NC-1 and NC-2 during the 2019 reporting period were low. Results ranged from 3 mg/L to 6 mg/L.

Arcadis also looked at data trends over the entire monitoring period to assess general BMP effectiveness. Appendix B contains charts showing FC by stream, pH measurements, and TSS results since sampling began. Each dataset was fitted with a trendline. Table 12 contains statements concerning the trend of water quality in each stream. It is difficult to make statements about water quality trends based on these trendlines. The data are scattered, producing very low R-squared values. For FC, results at all stations are fluctuating. For pH, measurements at both stations are fluctuating. For TSS, measurements at all stations are fluctuating.

Table 12. Trends in Water Quality by Stream

Reach	FC	pH	TSS
Brooklyn Creek	Fluctuating		
Carr Creek	Fluctuating		Fluctuating
Cedar Creek	Fluctuating		
East Fork Trail Creek	Fluctuating		
Hunnicut Creek	Fluctuating		
Kingswood Branch	Fluctuating	Fluctuating	
McNutt Creek	Fluctuating		
Middle Oconee River	Fluctuating		
Noketchee Creek	Fluctuating		Fluctuating
North Oconee River	Fluctuating		
Oconee River	Fluctuating		
Tanyard Creek	Fluctuating		
Trail Creek	Fluctuating		
West Fork Trail Creek	Fluctuating		

Water quality in all stream reaches appears to be fluctuating. Sample measurements for all POCs are scattered around linear trendlines. Population growth, development, and aging infrastructure are possible explanations for fluctuating water quality.

5 CONCLUSIONS

The MS4 Permit requires permittees to review the Georgia 303(d) List annually to determine if additional impaired waters within the Permit area have been listed. As discussed in the 2018 Annual Report, a pH impairment for Carr Creek was added to the approved 2016 303(d) List. Monitoring for pH at Carr Creek was not implemented in 2019 but has been added to the contract for 2020. EPD published a draft 303(d) List in December 2018, which was approved in June 2019. ACCGOV reviewed it and determined that a pH impairment was added for Noketchee Creek. In 2020, pH monitoring will be conducted at NC-1 and NC-2. Another change in the 2018 303(d) List was that the pH impairment on Kingswood Branch was removed although Kingswood Branch is still listed for FC.

Most pH measurements for Kingswood Branch (stations KB-1 and KB-3) attained state standards until mid-2018. Beginning in August 2018, pH levels began to decrease below the state standard range, especially for KB-1. Therefore, in 2019, ACC will continue to monitor pH on Kingswood Branch.

It is difficult to evaluate BMP effectiveness and trends in water quality due to the limited and scattered data sets and many other unstudied variables and uncertainties. ACCGOV has made significant progress on BMP initiatives since the implementation of the Plan in October 2015. Water quality appears to be

fluctuating, and ACCGOV plans to continue with significant BMP initiatives in 2020 to reduce the impacts of POCs and ultimately achieve water quality standards for receiving waters. It is possible that the fluctuating water quality improvement could be due to population growth; development; aging infrastructure; and an increase in the pet population, use of parks, and waste despite the pet waste management program. One project ACCGOV is implementing to address aging infrastructure and a growing population is the Brooklyn Creek Interceptor Improvements. The project includes replacing the sewer interceptor from the trunk line at the Middle Oconee River up to Baxter Street, as well as increasing pipe size to provide greater capacity based on population projections for the future. Another project ACCGOV is implementing is the installation of a trench grate within new sidewalks along Clayton Street between Pulaski and Thomas Streets. This will collect runoff from the sidewalks and convey the first flush to the structural soil within the approximately 5-foot-wide tree trench. Pollutants on the sidewalk currently run directly through a storm pipe system to a small tributary of the North Oconee River. ACCGOV also plans to begin implementing projects suggested in the nine WMPs completed in 2018.

6 REFERENCES

Arcadis-Tetra Tech. 2016. Athens-Clarke County Impaired Waters Monitoring and Implementation Plan and Sampling and Quality Assurance Plan (SQAP). Prepared for Athens-Clarke County, Georgia. 54 pp. January 12.

Georgia Department of Natural Resources, Environmental Protection Division, Water Protection Branch. 1999. Water Quality Assurance Manual. June 1999, revised January 2005. 82 pp. Available at: https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Water_Protection_Branch_Quality_Assurance_Manual_Revision2005.pdf

Georgia Department of Natural Resources, Environmental Protection Division. 2018. Georgia 2018 305(b)/303(d) List of Waters. Approved by United States Environmental Protection Agency June 14, 2019. Available at: http://epd.georgia.gov/georgia-305b303d-list-documents.

Georgia Department of Natural Resources, Environmental Protection Division. 2017. General NPDES Stormwater Permit No. GAG610000. Effective December 6, 2017 through December 5, 2022. 46 pp. Available at: https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Phase%20II%202017%20final%20permit.pdf

Jacobs. 2019. Unified Government of Athens-Clarke County Watershed Protection Plan 2018-2019 Annual Report. Prepared for Athens-Clarke County Public Utilities Department. June 30.

National Weather Service, National Oceanic and Atmospheric Administration. 2019. Rainfall Scorecard for Athens, Georgia. [Web Page] Located at: http://www.weather.gov/ffc/rainfall_scorecard.

APPENDIX A

Water Quality Sample Results (January 2019 – June 2019)

Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather notes	Water notes	Other notes	Geomean number	Season
1/3/2019	0930	McNutt Creek	MN3			500	500	Light rain	Flow up several inches. Brown tint. Visibility 2'		14	November-April
1/3/2019	0950	Middle Oconee	MO1			1100	1100	Light rain	High flow. Up 2'. Turbid brown. Visibility .5'		14	November-April
1/3/2019	1015	Hunnicutt Creek	HC1			300	300	Light rain	Moderate flow. Up a few inches. Very slightly turbid		14	November-April
1/3/2019	1015	Hunnicutt Creek	HC1	Blank	<	20	#N/A	Light rain	Moderate flow. Up a few inches. Very slightly turbid		14	November-April
1/3/2019	1020	Middle Oconee	MO2			500	500	Light rain	High flow up 1'-2'. Turbid brown. Visibility .5'		14	November-April
1/3/2019	1020	Middle Oconee	MO2	Duplicate		500	#N/A	Light rain	High flow up 1'-2'. Turbid brown. Visibility .5'		14	November-April
1/3/2019	1030	Kingswood Branch	KB1			300	300	Light rain	Moderatly flow. Slightly turbid.		14	November-April
1/3/2019	1045	Kingswood Branch	KB3			500	500	Light rain	Slow flow. Slightly turbid.	Fresh sand deposits on bar.	14	November-April
1/3/2019	1100	McNutt Creek	MN2			500	500	Light rain	High flow, up 6". Turbid brown		14	November-April
1/3/2019	1115	McNutt Creek	MN1			3000	3000	Light rain	High flow. Turbid brown.		14	November-April
1/3/2019	1120	Middle Oconee	MO3			500	500	Light rain	High flow. Turbid brown.		14	November-April
1/3/2019	1140	Unnamed Tributary	UT1			110	110	Light rain	Moderate flow. Clear water.	Heavy recent sand and 1-2cm gravel deposits.	14	November-April
1/3/2019	1155	Middle Oconee	MO4			220	220	Light rain	High flow. Turbid brown. Visibility .5'		14	November-April
1/3/2019	1205	Oconee River	OC1			130	130	Light rain	High flow. Turbid brown. Visibility .5'		14	November-April
1/3/2019	1215	Cedar Creek	CED1			300	300	Light rain			14	November-April
1/8/2019	1210	North Oconee	NO3			300	300		High flow. Turbid brown. Visibility .5'		14	November-April
1/8/2019	0925	Brooklyn Creek	BR2			500	500		Moderate flow. Clear water.		14	November-April
1/8/2019	0915	Brooklyn Creek	BR1			2400	2400		Moderate flow. Clear water.		14	November-April
1/8/2019	0940	Tanyard Creek	TAN2			1400	1400		Slow flow. Clear water.		14	November-April
1/8/2019	0945	Tanyard Creek	TAN1			110	110		Moderate flow. Clear water.		14	November-April
1/8/2019	1120	West Trail Creek	WTR1			220	220		Moderate flow. Slightly turbid brown.		14	November-April
1/8/2019	1120	West Trail Creek	WTR1	Duplicate		500	#N/A		Moderate flow. Slightly turbid brown.		14	November-April
1/8/2019	1105	East Trail Creek	ETR1			170	170		Moderate flow. Slightly turbid brown.		14	November-April
1/8/2019	1050	East Trail Creek	ETR2			300	300		Moderate flow, up 3". Slightly turbid brown.		14	November-April
1/8/2019	1035	West Trail Creek	WTR2			500	500	Light rain	Moderate flow. Slightly turbid.		14	November-April
1/8/2019	1025	Trail Creek	TR1			110	110	Light rain	Moderate flow. Turbid brown, visibility 1'		14	November-April
1/8/2019	1005	Trail Creek	TR3			500	500	Light rain	Slow flow backed up 1' high from Oconee River. Turbid brown. Visibility 1.5'		14	November-April
1/8/2019	1010	North Oconee	NO2			500	500	Light rain	Moderate flow, up 2'. Turbid brown. Visibility .5'		14	November-April
1/8/2019	1200	Carr Creek	CA1			20	20		Moderate flow. Turbid light brown/tan. Visibility 2'		14	November-April
1/8/2019	1130	Noketchee Creek	NC1			500	500		Moderate flow. Slightly turbid. Visibility 2.5'		14	November-April
1/9/2019	1035	McNutt Creek	MN3			130	130	Sunny	Moderate flow. Very slightly turbid.		14	November-April
1/9/2019	1050	Middle Oconee	MO1			130	130	Sunny	Moderate flow. Turbid brown, visibility .5'		14	November-April
1/9/2019	1115	Hunnicutt Creek	HC1			230	230	Sunny	Moderate flow. Clear water		14	November-April
1/9/2019	1120	Middle Oconee	MO2			300	300	Sunny	Moderate flow. Turbid brown. Visibility .5'	1' of fresh sand deposits on shoreline.	14	November-April
1/9/2019	1130	Kingswood Branch	KB1			40	40	Sunny	Moderate flow. Clear water		14	November-April
1/9/2019	1130	Kingswood Branch	KB1	Blank	<	20	#N/A	Sunny	Moderate flow. Clear water		14	November-April
1/9/2019	1150	Kingswood Branch	KB3			170	170	Sunny	Slow flow. Very faintly turbid. Visibility 3'+		14	November-April
1/9/2019	1150	Kingswood Branch	KB3	Duplicate		1100	#N/A	Sunny	Slow flow. Very faintly turbid. Visibility 3'+		14	November-April
1/9/2019	1155	McNutt Creek	MN2			40	40	Sunny	Moderate flow. Faintly turbid.		14	November-April
1/9/2019	1210	McNutt Creek	MN1			140	140	Sunny	Moderate flow. Turbid brown.		14	November-April
1/9/2019	1220	Middle Oconee	MO3			300	300	Sunny	Moderate flow. Turbid brown.		14	November-April
1/9/2019	1235	Unnamed Tributary	UT1			40	40	Sunny	Moderate flow. Clear water		14	November-April
1/9/2019	1255	Middle Oconee	MO4			130	130	Sunny	Moderate flow. Clear water		14	November-April
1/9/2019	1310	Oconee River	OC1			220	220	Sunny	Moderate flow. Clear water		14	November-April
1/9/2019	1325	Cedar Creek	CED1			500	500	Sunny	Moderate flow. Turbid brown.		14	November-April
1/10/2019	1330	North Oconee	NO3			300	300	Sunny	Moderate flow. Clear water		14	November-April
1/10/2019	1120	Brooklyn Creek	BR2			300	300	Sunny	Moderate flow. Clear water		14	November-April
1/10/2019	1110	Brooklyn Creek	BR1			300	300	Sunny	Moderate flow. Clear water		14	November-April
1/10/2019	1130	Tanyard Creek	TAN2			300	300	Sunny	Slow flow in pool. Clear water.		14	November-April
1/10/2019	1135	Tanyard Creek	TAN1			1100	1100	Sunny	Slow flow. Clear water faint gray tint.		14	November-April
1/10/2019	1310	West Trail Creek	WTR1			20	20	Sunny	Moderate flow. Slightly turbid.		14	November-April
1/10/2019	1300	East Trail Creek	ETR1			20	20	Sunny	Moderate flow. Slightly turbid. Visibility 2.5'+		14	November-April
1/10/2019	1300	East Trail Creek	ETR1	Blank	<	20	#N/A	Sunny	Moderate flow. Slightly turbid. Visibility 2.5'+		14	November-April
1/10/2019	1240	East Trail Creek	ETR2			230	230	Sunny	Moderate flow. Slightly turbid. Visibility 2.5'+		14	November-April
1/10/2019	1240	East Trail Creek	ETR2	Duplicate		130	#N/A	Sunny	Moderate flow. Slightly turbid. Visibility 2'		14	November-April
1/10/2019	1225	West Trail Creek	WTR2			40	40	Sunny	Moderate flow. Slightly turbid. Green tint. Visibility 2'		14	November-April
1/10/2019	1215	Trail Creek	TR1			70	70	Sunny	Moderate flow. Slightly turbid. Green tint.		14	November-April

Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather Notes	Water Notes	Other Notes	Geomean Number	Season
1/10/2019	1155	Trail Creek	TR3			170	170	Sunny	Slow flow. Slightly turbid. Visibility 2.5'		14	November-April
1/10/2019	1200	North Oconee	NO2			300	300	Sunny	Moderate flow. Turbid brown.		14	November-April
1/10/2019	1320	Carr Creek	CA1		<	20	10	Sunny	Moderate flow. Slightly turbid. Gray cast.		14	November-April
1/16/2019	1045	McNutt Creek	MN3			170	170	Sunny	Moderate flow. Slightly tinted water.		14	November-April
1/16/2019	1110	Middle Oconee	MO1			170	170	Sunny	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/16/2019	1135	Hunnicutt Creek	HC1			220	220	Sunny	Moderate flow. Clear water.		14	November-April
1/16/2019	1140	Middle Oconee	MO2			270	270	Sunny	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/16/2019	1155	Kingswood Branch	KB1			170	170	Sunny	Moderate flow. Clear water.		14	November-April
1/16/2019	1205	Kingswood Branch	KB3			5000	5000	Sunny	Slow flow. Clear water with slight tint.		14	November-April
1/16/2019	1210	McNutt Creek	MN2			110	110	Sunny	Moderate flow. Slightly turbid. Visibility 2.5'		14	November-April
1/16/2019	1225	McNutt Creek	MN1			500	500	Sunny	Moderate flow. Slightly turbid. Visibility 2.5'		14	November-April
1/16/2019	1235	Middle Oconee	MO3			170	170	Sunny	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/16/2019	1255	Unnamed Tributary	UT1			500	500	Sunny	Moderate flow. Clear water.		14	November-April
1/16/2019	1325	Middle Oconee	MO4			170	170	Sunny	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/16/2019	1340	Oconee River	OC1			170	170	Sunny	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/16/2019	1340	Oconee River	OC1	Duplicate		170	#N/A	Sunny	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/16/2019	1350	Cedar Creek	CED1			1300	1300	Sunny	Moderate flow. Slightly turbid water.		14	November-April
1/16/2019	1350	Cedar Creek	CED1	Blank	<	20	#N/A	Sunny	Moderate flow. Slightly turbid water.		14	November-April
1/17/2019	1320	North Oconee	NO3			80	80	Partly cloudy	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/17/2019	1055	Brooklyn Creek	BR2			210	210	Partly cloudy	Moderate flow. Clear water.		14	November-April
1/17/2019	1040	Brooklyn Creek	BR1			700	700	Partly cloudy	Moderate flow. Clear water.		14	November-April
1/17/2019	1105	Tanyard Creek	TAN2			1100	1100	Partly cloudy	Moderate flow. Clear water.		14	November-April
1/17/2019	1112	Tanyard Creek	TAN1			500	500	Partly cloudy	Moderate flow. Clear water.		14	November-April
1/17/2019	1255	West Trail Creek	WTR1			230	230	Partly cloudy	Moderate flow. Clear water. Slight tint.		14	November-April
1/17/2019	1245	East Trail Creek	ETR1			40	40	Partly cloudy	Moderate flow. Clear water. Slight tint.		14	November-April
1/17/2019	1230	East Trail Creek	ETR2			170	170	Partly cloudy	Moderate flow. Clear water.		14	November-April
1/17/2019	1215	West Trail Creek	WTR2			40	40	Partly cloudy	Moderate flow. Clear water.		14	November-April
1/17/2019	1200	Trail Creek	TR1			70	70	Partly cloudy	Moderate flow. Water looks clear up close and shallow. Looks slightly turbid with green tint in deep water.		14	November-April
1/17/2019	1200	Trail Creek	TR1	Duplicate		40	#N/A	Partly cloudy	Moderate flow. Water looks clear up close and shallow. Looks slightly turbid with green tint in deep water.		14	November-April
1/17/2019	1130	Trail Creek	TR3			270	270	Partly cloudy	Slow flow. Slightly turbid.		14	November-April
1/17/2019	1130	Trail Creek	TR3	Blank	<	20	#N/A	Partly cloudy	Slow flow. Slightly turbid.		14	November-April
1/17/2019	1140	North Oconee	NO2			220	220	Partly cloudy	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/17/2019	1308	Carr Creek	CA1			70	70	Partly cloudy	Moderate flow. Slightly turbid. Light gray tint.		14	November-April
1/23/2019	1030	McNutt Creek	MN3			40	40	Overcast	Moderate flow. Slightly tinted.		14	November-April
1/23/2019	1030	McNutt Creek	MN3	Duplicate		80	#N/A	Overcast	Moderate flow. Slightly tinted.		14	November-April
1/23/2019	1100	Middle Oconee	MO1			500	500	Overcast	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/23/2019	1100	Middle Oconee	MO1	Blank	<	20	#N/A	Overcast	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/23/2019	1120	Hunnicutt Creek	HC1			110	110	Overcast	Moderate flow. Slightly tinted.		14	November-April
1/23/2019	1125	Middle Oconee	MO2			130	130	Overcast	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/23/2019	1140	Kingswood Branch	KB1			500	500	Overcast	Moderate flow. Clear water.		14	November-April
1/23/2019	1150	Kingswood Branch	KB3			230	230	Overcast	Slow flow. Slightly tinted.		14	November-April
1/23/2019	1200	McNutt Creek	MN2			20	20	Overcast	Moderate flow. Slightly tinted.		14	November-April
1/23/2019	1215	McNutt Creek	MN1			110	110	Overcast	Moderate flow. Slightly turbid. Visibility 2.5'		14	November-April
1/23/2019	1225	Middle Oconee	MO3			170	170	Overcast	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/23/2019	1245	Unnamed Tributary	UT1			500	500	Overcast	Moderate flow. Clear water.		14	November-April
1/23/2019	1330	Middle Oconee	MO4			800	800	Overcast	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/23/2019	1345	Oconee River	OC1			170	170	Overcast	Moderate flow. Turbid brown. Visibility 1.5'		14	November-April
1/23/2019	1358	Cedar Creek	CED1			1300	1300	Overcast	Moderate flow. Slightly turbid. Visibility 2.5'		14	November-April
1/24/2019	1300	North Oconee	NO3			2400	2400	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility .5'		14	November-April
1/24/2019	1045	Brooklyn Creek	BR2		>	16000	17000	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility 1-1.5'		14	November-April
1/24/2019	1045	Brooklyn Creek	BR2	Blank	<	20	#N/A	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility 1-1.5'		14	November-April
1/24/2019	1025	Brooklyn Creek	BR1			750	750	1"+ rain overnight. Overcast.	Moderate flow. Sightly turbid brown. Visibility 2-2.5'		14	November-April
1/24/2019	1025	Brooklyn Creek	BR1	Duplicate		300	#N/A	1"+ rain overnight. Overcast.	Moderate flow. Sightly turbid brown. Visibility 2-2.5'		14	November-April
1/24/2019	1055	Tanyard Creek	TAN2			500	500	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility 2-2.5'		14	November-April
1/24/2019	1105	Tanyard Creek	TAN1			2400	2400	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility 1.5-2'		14	November-April
1/24/2019	1235	West Trail Creek	WTR1			130	130	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility .5-1'		14	November-April
1/24/2019	1222	East Trail Creek	ETR1			130	130	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility .5-1'		14	November-April
1/24/2019	1210	East Trail Creek	ETR2			1300	1300	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility .5'		14	November-April
1/24/2019	1150	West Trail Creek	WTR2			500	500	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility .5'		14	November-April

Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather Notes	Water Notes	Other Notes	Geomean Number	Season
1/24/2019	1140	Trail Creek	TR1			1100	1100	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Visibility .5-1'		14	November-April
1/24/2019	1125	Trail Creek	TR3			1100	1100	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Level up 1'. Visibility .5-1'		14	November-April
1/24/2019	1115	North Oconee	NO2			1300	1300	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Level up 1'. Visibility .5-1'		14	November-April
1/24/2019	1245	Carr Creek	CA1			5000	5000	1"+ rain overnight. Overcast.	Moderate flow. Turbid brown. Level up .5'. Visibility .5'		14	November-April
4/8/2019	0900	McNutt Creek	MN3			1100	1100	9AM cloudy. Noon overcast, light rain.	Moderate flow. Slightly turbid brown. Visibility 2'		15	November-April
4/8/2019	0925	Middle Oconee	MO1			700	700	9AM cloudy. Noon overcast, light rain.	Moderate flow. Slightly turbid brown. Visibility 1'		15	November-April
4/8/2019	0950	Hunnicutt Creek	HC1			230	230	9AM cloudy. Noon overcast, light rain.	Moderate flow. Clear water.		15	November-April
4/8/2019	0955	Middle Oconee	MO2			500	500	9AM cloudy. Noon overcast, light rain.	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/8/2019	1015	Kingswood Branch	KB1			500	500	9AM cloudy. Noon overcast, light rain.	Moderate flow. Clear water.		15	November-April
4/8/2019	1015	Kingswood Branch	KB1	Blank	<	20	#N/A	9AM cloudy. Noon overcast, light rain.	Moderate flow. Clear water.		15	November-April
4/8/2019	1020	Kingswood Branch	KB3			300	300	9AM cloudy. Noon overcast, light rain.	No discernable flow. Clear water.	Beaver tracks on sand bar.	15	November-April
4/8/2019	1020	Kingswood Branch	KB3	Duplicate		500	#N/A	9AM cloudy. Noon overcast, light rain.	No discernable flow. Clear water.	Beaver tracks on sand bar.	15	November-April
4/8/2019	1030	McNutt Creek	MN2			300	300	9AM cloudy. Noon overcast, light rain.	Moderate flow. Slightly turbid brown.		15	November-April
4/8/2019	1045	McNutt Creek	MN1			300	300	9AM cloudy. Noon overcast, light rain.	Moderate flow. Slightly turbid. Visibility 2.5'		15	November-April
4/8/2019	1100	Middle Oconee	MO3			300	300	9AM cloudy. Noon overcast, light rain.	Moderate flow. Turbid brown. Visibility 1.5"		15	November-April
4/8/2019	1110	Unnamed Tributary	UT1			300	300	9AM cloudy. Noon overcast, light rain.	Moderate flow. Clear water.	Dark olive green algae mat on bed.	15	November-April
4/8/2019	1125	Middle Oconee	MO4			500	500	9AM cloudy. Noon overcast, light rain.	Moderate flow. Turbid brown. Visibility 1.5"		15	November-April
4/8/2019	1140	Oconee River	OC1			800	800	9AM cloudy. Noon overcast, light rain.	Moderate flow. Turbid brown. Visibility 1.5"		15	November-April
4/8/2019	1150	Cedar Creek	CED1			500	500	9AM cloudy. Noon overcast, light rain.	Moderate flow. Very slightly turbid.	Algae on sand bed.	15	November-April
4/9/2019	1100	North Oconee	NO3			300	300	830AM overcast, light rain. 11AM overcast.	Moderate flow. Turbid brown. Visibility 1.5"		15	November-April
4/9/2019	0835	Brooklyn Creek	BR2			2400	2400	830AM overcast, light rain. 11AM overcast.	Moderate flow. Clear water.		15	November-April
4/9/2019	0835	Brooklyn Creek	BR2	Blank	<	20	#N/A	830AM overcast, light rain. 11AM overcast.	Moderate flow. Clear water.		15	November-April
4/9/2019	0825	Brooklyn Creek	BR1			1300	1300	830AM overcast, light rain. 11AM overcast.	Moderate flow. Clear water.		15	November-April
4/9/2019	0850	Tanyard Creek	TAN2			230	230	830AM overcast, light rain. 11AM overcast.	Moderate flow. Clear water.		15	November-April
4/9/2019	0850	Tanyard Creek	TAN2	Duplicate		230	#N/A	830AM overcast, light rain. 11AM overcast.	Moderate flow. Clear water.		15	November-April
4/9/2019	0855	Tanyard Creek	TAN1			1300	1300	830AM overcast, light rain. 11AM overcast.	Moderate flow. Clear water with gray cast.		15	November-April
4/9/2019	1035	West Trail Creek	WTR1			800	800	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown.	Fine organic particles in sample (six tries).	15	November-April
4/9/2019	1025	East Trail Creek	ETR1			130	130	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown.		15	November-April
4/9/2019	1010	East Trail Creek	ETR2			1300	1300	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown.		15	November-April
4/9/2019	0955	West Trail Creek	WTR2			500	500	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown.		15	November-April
4/9/2019	0945	Trail Creek	TR1			800	800	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown.		15	November-April
4/9/2019	0910	Trail Creek	TR3			5000	5000	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown.		15	November-April
4/9/2019	0915	North Oconee	NO2			500	500	830AM overcast, light rain. 11AM overcast.	Moderate flow. Slightly turbid brown. Visibility 1.5'		15	November-April
4/9/2019	1050	Carr Creek	CA1			500	500	830AM overcast, light rain. 11AM overcast.	Moderate flow.		15	November-April
4/10/2019	1025	McNutt Creek	MN3			500	500	Clear	Moderate flow. Slightly turbid brown.		15	November-April
4/10/2019	1025	McNutt Creek	MN3	Duplicate		300	#N/A	Clear	Moderate flow. Slightly turbid brown.		15	November-April
4/10/2019	1010	Middle Oconee	MO1			3000	3000	Clear	Moderate flow. Turbid brown. Visibility .5'		15	November-April
4/10/2019	1010	Middle Oconee	MO1	Blank	<	20	#N/A	Clear	Moderate flow. Turbid brown. Visibility .5'		15	November-April
4/10/2019	0905	Hunnicutt Creek	HC1			250	250	Clear	Moderate flow. Clear water.		15	November-April
4/10/2019	0910	Middle Oconee	MO2			2400	2400	Clear	Moderate flow. Turbid brown. Visibility .5'		15	November-April
4/10/2019	0930	Kingswood Branch	KB1			1700	1700	Clear	Moderate flow. Clear water.		15	November-April
4/10/2019	0940	Kingswood Branch	KB3			1100	1100	Clear	No discernable flow. Clear water.	Scum film (pollen?) on surface.	15	November-April
4/10/2019	0950	McNutt Creek	MN2			250	250	Clear	Moderate flow. Slightly turbid brown.		15	November-April
4/10/2019	1050	McNutt Creek	MN1			500	500	Clear	Moderate flow. Slightly turbid brown.		15	November-April
4/10/2019	1055	Middle Oconee	MO3			5000	5000	Clear	Moderate flow. Turbid brown. Visibility .5'		15	November-April
4/10/2019	1110	Unnamed Tributary	UT1			1100	1100	Clear	Moderate flow. Clear water.	Brown algae on bed	15	November-April
4/10/2019	1125	Middle Oconee	MO4			1700	1700	Clear	Moderate flow. Turbid brown. Visibility .5'		15	November-April
4/10/2019	1135	Oconee River	OC1			1100	1100	Clear	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/10/2019	1145	Cedar Creek	CED1			500	500	Clear	Moderate flow. Clear water.		15	November-April
4/11/2019	1350	North Oconee	NO3			500	500	Partly cloudy	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/11/2019	1100	Brooklyn Creek	BR2			230	230	Partly cloudy	Moderate flow. Clear water.		15	November-April
4/11/2019	1045	Brooklyn Creek	BR1			3000	3000	Partly cloudy	Moderate flow. Clear water.		15	November-April
4/11/2019	1110	Tanyard Creek	TAN2			372	372	Partly cloudy	Moderate flow. Clear water.		15	November-April
4/11/2019	1115	Tanyard Creek	TAN1			500	500	Partly cloudy	Moderate flow. Clear water.		15	November-April
4/11/2019	1300	West Trail Creek	WTR1			20	20	Partly cloudy	Moderate flow. Clear water with slight brown tint.		15	November-April
4/11/2019	1300	West Trail Creek	WTR1	Duplicate		170	#N/A	Partly cloudy	Moderate flow. Clear water with slight brown tint.		15	November-April

Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather Notes	Water Notes	Other Notes	Geomean Number	Season
4/11/2019	1250	East Trail Creek	ETR1			170	170	Partly cloudy	Moderate flow. Clear water with slight brown tint.		15	November-April
4/11/2019	1250	East Trail Creek	ETR1	Blank	<	20	#N/A	Partly cloudy	Moderate flow. Clear water with slight brown tint.		15	November-April
4/11/2019	1235	East Trail Creek	ETR2			110	110	Partly cloudy	Moderate flow. Slight brown tint.		15	November-April
4/11/2019	1225	West Trail Creek	WTR2			40	40	Partly cloudy	Moderate flow. Slightly turbid.		15	November-April
4/11/2019	1215	Trail Creek	TR1			170	170	Partly cloudy	Moderate flow. Slightly turbid. Green tint.		15	November-April
4/11/2019	1130	Trail Creek	TR3			1100	1100	Partly cloudy	Moderate flow slightly turbid brown.	Red tint from upstream dye test by students.	15	November-April
4/11/2019	1200	North Oconee	NO2			800	800	Partly cloudy	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/11/2019	1340	Carr Creek	CA1			230	230	Partly cloudy	Moderate flow. Clear water.		15	November-April
4/15/2019	1020	McNutt Creek	MN3			5000	5000	Clear	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/15/2019	1040	Middle Oconee	MO1			16000	16000	Clear	Moderate flow. Turbid brown. Visibility .5'. Flow up 1'		15	November-April
4/15/2019	1105	Hunnicutt Creek	HC1			1300	1300	Clear	Moderate flow. Slightly turbid brown.		15	November-April
4/15/2019	1110	Middle Oconee	MO2			9000	9000	Clear	Moderate flow. Turbid brown. Visibility .5'. Flow up 1'	Organic fragments in sample	15	November-April
4/15/2019	1120	Kingswood Branch	KB1			300	300	Clear	Moderate flow. Very slightly tinted.		15	November-April
4/15/2019	1130	Kingswood Branch	KB3			1300	1300	Clear	Flow barely discernable. Clear water.		15	November-April
4/15/2019	1140	McNutt Creek	MN2			3000	3000	Clear	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/15/2019	1140	McNutt Creek	MN2	Duplicate		3000	#N/A	Clear	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/15/2019	1155	McNutt Creek	MN1			5000	5000	Clear	Moderate flow. Turbid brown. Visibility 1'		15	November-April
4/15/2019	1205	Middle Oconee	MO3			9000	9000	Clear	Moderate flow. Turbid brown. Visibility .5'	Organic fragments in sample	15	November-April
4/15/2019	1205	Middle Oconee	MO3	Blank	<	20	#N/A	Clear	Moderate flow. Turbid brown. Visibility .5'	Organic fragments in sample	15	November-April
4/15/2019	1230	Unnamed Tributary	UT1			220	220	Clear	Moderate flow. Clear water.	Less algae on bed than last week.	15	November-April
4/15/2019	1255	Middle Oconee	MO4			9000	9000	Clear	Moderate flow. Turbid brown. Visibility .5'. Flow up 1'	Organic fragments in sample	15	November-April
4/15/2019	1305	Oconee River	OC1			5000	5000	Clear	Moderate flow. Turbid brown. Visibility .5'		15	November-April
4/15/2019	1320	Cedar Creek	CED1			2400	2400	Clear	Moderate flow. Clear water with very slight tint.		15	November-April
4/16/2019	1300	North Oconee	NO3			9000	9000		Moderate flow. Turbid brown. Visibility .5'. Flow up 1'	Organic fragments in sample	15	November-April
4/16/2019	1115	Brooklyn Creek	BR2			220	220		Moderate flow. Clear water.		15	November-April
4/16/2019	1115	Brooklyn Creek	BR2	Blank	<	20	#N/A		Moderate flow. Clear water.		15	November-April
4/16/2019	1100	Brooklyn Creek	BR1			1300	1300		Moderate flow. Clear water.		15	November-April
4/16/2019	1100	Brooklyn Creek	BR1	Duplicate		500	#N/A		Moderate flow. Clear water.		15	November-April
4/16/2019	1120	Tanyard Creek	TAN2			140	140		Moderate flow. Clear water.		15	November-April
4/16/2019	1130	Tanyard Creek	TAN1			800	800		Moderate flow. Clear water.		15	November-April
4/16/2019	1240	West Trail Creek	WTR1			170	170		Moderate flow. Slight brown tint.		15	November-April
4/16/2019	1230	East Trail Creek	ETR1			110	110		Moderate flow. Slight brown tint.		15	November-April
4/16/2019	1215	East Trail Creek	ETR2			340	340		Moderate flow. Slight brown tint.		15	November-April
4/16/2019	1205	West Trail Creek	WTR2			230	230		Moderate flow. Slight brown tint.		15	November-April
4/16/2019	1155	Trail Creek	TR1			170	170		Moderate flow. Slight green tint. Slightly turbid.		15	November-April
4/16/2019	1140	Trail Creek	TR3			230	230		Slow flow due to NF Oconee backwater. Turbid brown. Visibility 1.5'		15	November-April
4/16/2019	1145	North Oconee	NO2			9000	9000		Moderate flow. Turbid brown. Visibility .5'. Flow up 1'		15	November-April
4/16/2019	1250	Carr Creek	CA1			20	20		Moderate flow. Clear water.		15	November-April
4/17/2019	1030	McNutt Creek	MN3			900	900	Clear	Moderate flow. Clear water with slight brown tint.		15	November-April
4/17/2019	1050	Middle Oconee	MO1			300	300	Clear	Moderate flow. Turbid brown. Visibility 1'.		15	November-April
4/17/2019	1120	Hunnicutt Creek	HC1			220	220	Clear	Moderate flow. Clear water.		15	November-April
4/17/2019	1125	Middle Oconee	MO2			1700	1700	Clear	Moderate flow. Turbid brown. Visibility .5'. Flow up 1'		15	November-April
4/17/2019	1135	Kingswood Branch	KB1			500	500	Clear	Moderate flow. Clear water.		15	November-April
4/17/2019	1145	Kingswood Branch	KB3			800	800	Clear	Flow barely discernable. Clear water w/ slight gray tint.		15	November-April
4/17/2019	1155	McNutt Creek	MN2			1300	1300	Clear	Moderate flow. Clear water.		15	November-April
4/17/2019	1210	McNutt Creek	MN1			170	170	Clear	Moderate flow. Clear water. Slightly brown tint.		15	November-April
4/17/2019	1220	Middle Oconee	MO3			1100	1100	Clear	Moderate flow. Turbid brown. Visibility .5'. Flow up 1'		15	November-April
4/17/2019	1245	Unnamed Tributary	UT1			500	500	Clear	Moderate flow. Clear water.		15	November-April
4/17/2019	1305	Middle Oconee	MO4			1100	1100	Clear	Moderate flow. Turbid brown. Visibility 1'.		15	November-April
4/17/2019	1320	Oconee River	OC1			300	300	Clear	Moderate flow. Turbid brown. Visibility 1'.		15	November-April
4/17/2019	1320	Oconee River	OC1	Duplicate		800	#N/A	Clear	Moderate flow. Turbid brown. Visibility 1'.		15	November-April
4/17/2019	1335	Cedar Creek	CED1			800	800	Clear	Moderate flow. Clear water. Very slight tint.		15	November-April

Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather Notes	Water Notes	Other Notes	Geomean Number	Season
4/17/2019	1335	Cedar Creek	CED1	Blank	<	20	#N/A	Clear	Moderate flow. Clear water. Very slight tint.		15	November-April
4/18/2019	1330	North Oconee	NO3			220	220	Cloud cover	Moderate flow. Turbid brown. Visibility 1'.		15	November-April
4/18/2019	1125	Brooklyn Creek	BR2			800	800	Cloud cover	Moderate flow. Clear water.		15	November-April
4/18/2019	1115	Brooklyn Creek	BR1			500	500	Cloud cover	Moderate flow. Clear water.		15	November-April
4/18/2019	1130	Tanyard Creek	TAN2			800	800	Cloud cover	Moderate flow. Clear water.		15	November-April
4/18/2019	1140	Tanyard Creek	TAN1			800	800	Cloud cover	Moderate flow. Clear water with gray tint.		15	November-April
4/18/2019	1305	West Trail Creek	WTR1			170	170	Cloud cover	Moderate flow. Slightly brown tint.		15	November-April
4/18/2019	1250	East Trail Creek	ETR1			500	500	Cloud cover	Moderate flow. Clear water with slight brown tint.		15	November-April
4/18/2019	1235	East Trail Creek	ETR2			700	700	Cloud cover	Moderate flow. Clear water with slight brown tint.		15	November-April
4/18/2019	1225	West Trail Creek	WTR2			80	80	Cloud cover	Moderate flow. Clear water with slight brown tint.		15	November-April
4/18/2019	1215	Trail Creek	TR1			70	70	Cloud cover	Moderate flow. Very slightly turbid green tint.		15	November-April
4/18/2019	1150	Trail Creek	TR3			5000	5000	Cloud cover	Moderate flow. Very slightly turbid green tint.		15	November-April
4/18/2019	1200	North Oconee	NO2			300	300	Cloud cover	Moderate flow. Turbid brown. Visibility 1.5'.		15	November-April
4/18/2019	1200	North Oconee	NO2	Blank	<	20	#N/A	Cloud cover	Moderate flow. Turbid brown. Visibility 1.5'.		15	November-April
4/18/2019	1320	Carr Creek	CA1			110	110	Cloud cover	Moderate flow. Clear water.	Light tan silt on bed.	15	November-April
4/18/2019	1320	Carr Creek	CA1	Duplicate		20	#N/A	Cloud cover	Moderate flow. Clear water.	Light tan silt on bed.	15	November-April
6/4/2019	1040	McNutt Creek	MN3			1300	1300	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Gray tint. Visibility ~24". Did not look turbid		16	May-October
6/4/2019	1040	McNutt Creek	MN3	Duplicate		800	#N/A	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Gray tint. Visibility ~24". Did not look turbid		16	May-October
6/4/2019	1110	Middle Oconee	MO1			80	80	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Slightly turbid. Brown tint.	Flow down 1'	16	May-October
6/4/2019	1110	Middle Oconee	MO1	Blank	<	20	#N/A	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Slightly turbid. Brown tint.	Flow down 1'	16	May-October
6/4/2019	1140	Hunnicutt Creek	HC1			220	220	Overcast, 75F at 1040AM. Over 20 days without rain.	Moderate flow. Clear.	Green algae on bed not noticed before	16	May-October
6/4/2019	1145	Middle Oconee	MO2			270	270	Overcast, 75F at 1040AM. Over 20 days without rain.	Moderate flow. Slightly turbid.		16	May-October
6/4/2019	1205	Kingswood Branch	KB1			1700	1700	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Clear water.		16	May-October
6/4/2019	1215	Kingswood Branch	KB3			16000	16000	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Clear water.		16	May-October
6/4/2019	1225	McNutt Creek	MN2			40	40	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Clear water.		16	May-October
6/4/2019	1245	McNutt Creek	MN1			80	80	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Clear water.	Slight gray tint	16	May-October
6/4/2019	1255	Middle Oconee	MO3			80	80	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Clear water.	Slight green tint	16	May-October
6/4/2019	1320	Unnamed Tributary	UT1			800	800	Overcast, 75F at 1040AM. Over 20 days without rain.	Moderate flow. Clear water.		16	May-October
6/4/2019	1345	Middle Oconee	MO4			80	80	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Green tinted water slightly		16	May-October
6/4/2019	1405	Oconee River	OC1			80	80	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Water slightly green		16	May-October
6/4/2019	1415	Cedar Creek	CED1			800	800	Overcast, 75F at 1040AM. Over 20 days without rain.	Low flow. Clear water.		16	May-October
6/5/2019	1325	North Oconee	NO3			130	130	Overcast, 75F	Low flow. Turbid brown. Visibility 12"		16	May-October
6/5/2019	1110	Brooklyn Creek	BR2			250	250	Overcast, 75F	Moderate flow. Clear water.		16	May-October
6/5/2019	1055	Brooklyn Creek	BR1			300	300	Overcast, 75F	Low flow. Clear water.		16	May-October
6/5/2019	1055	Brooklyn Creek	BR1	Duplicate		300	#N/A	Overcast, 75F	Low flow. Clear water.		16	May-October
6/5/2019	1120	Tanyard Creek	TAN2			1300	1300	Overcast, 75F	Low flow. Clear water.		16	May-October
6/5/2019	1120	Tanyard Creek	TAN2	Blank	<	20	#N/A	Overcast, 75F	Low flow. Clear water.		16	May-October
6/5/2019	1130	Tanyard Creek	TAN1			2200	2200	Overcast, 75F	Low flow. Clear with gray tint.		16	May-October
6/5/2019	1300	West Trail Creek	WTR1			210	210	Overcast, 75F	Low flow. Slight green tint.		16	May-October
6/5/2019	1250	East Trail Creek	ETR1			300	300	Overcast, 75F	Low flow. Clear with slight turbid haze.		16	May-October
6/5/2019	1225	East Trail Creek	ETR2			800	800	Overcast, 75F	Low flow. Turbid with green/brown tint.		16	May-October
6/5/2019	1215	West Trail Creek	WTR2			1300	1300	Overcast, 75F	Low flow. Clear water.		16	May-October
6/5/2019	1205	Trail Creek	TR1			170	170	Overcast, 75F	Low flow. Green tinted water.		16	May-October
6/5/2019	1145	Trail Creek	TR3			9000	9000	Overcast, 75F	Low flow. Clear water. Green tint.		16	May-October
6/5/2019	1155	North Oconee	NO2			220	220	Overcast, 75F	Low flow. Turbid brown. Visibility 1'		16	May-October
6/5/2019	1315	Carr Creek	CA1			80	80	Overcast, 75F	Low flow. Clear water.		16	May-October

Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather Notes	Water Notes	Other Notes	Geomean Number	Season
6/17/2019	1000	McNutt Creek	MN3			170	170	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Slightly gray tint. Very low flow. Low turbidity		16	May-October
6/17/2019	1100	Middle Oconee	MO1			300	300	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Brown tint. Low flow, fast moving water. 9" visibility.		16	May-October
6/17/2019	1125	Hunnicutt Creek	HC1			800	800	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Clear water. Green algae present		16	May-October
6/17/2019	1130	Middle Oconee	MO2			500	500	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Moderate flow. Fast moving water. Brown/turbid.		16	May-October
6/17/2019	1145	Kingswood Branch	KB1			800	800	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Clear water.	Evidence of recent flooding. Landscaping crew right next to/upstream of sampling point	16	May-October
6/17/2019	1145	Kingswood Branch	KB1	Duplicate		300	#N/A	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Clear water.	Evidence of recent flooding in vegetation. Landscaping crew right next to/upstream of sampling point	16	May-October
6/17/2019	1200	Kingswood Branch	KB3			800	800	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Water completely still. Small amount of vegetative debris film on top of water.		16	May-October
6/17/2019	1200	Kingswood Branch	KB3	Blank	<	20	#N/A	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Water completely still. Small amount of vegetative debris film on top of water.		16	May-October
6/17/2019	1210	McNutt Creek	MN2			230	230	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Low flow. Clear water. Fast moving.		16	May-October
6/17/2019	1230	McNutt Creek	MN1			500	500	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Low flow. Clear with slight gray tint. Fast moving		16	May-October
6/17/2019	1240	Middle Oconee	MO3			300	300	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Fast flow. Brown tint. Beer cans in water.		16	May-October
6/17/2019	1300	Unnamed Tributary	UT1			220	220	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Low flow. Clear water.		16	May-October
6/17/2019	1320	Middle Oconee	MO4			300	300	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Fast moving. Low flow. Brown tint.		16	May-October
6/17/2019	1330	Oconee River	OC1			300	300	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Low flow. Brown tint. Fast moving.		16	May-October
6/17/2019	1345	Cedar Creek	CED1			3000	3000	Partly cloudy, sunny. 76F at 1000. Heavy rains ~1 week ago	Low flow. Slight gray tint.		16	May-October
6/18/2019	0855	North Oconee	NO3			1300	1300	Cloudy	Average flow. Moderate turbidity.		16	May-October
6/18/2019	0915	Brooklyn Creek	BR2			1300	1300	Cloudy	Average flow. Clear to bottom 1'.	s recently cleared of vegeta	16	May-October
6/18/2019	0925	Brooklyn Creek	BR1			2400	2400	Cloudy	Average flow. Clear to bottom 6"		16	May-October
6/18/2019	0925	Brooklyn Creek	BR1	Duplicate		1300	#N/A	Cloudy	Average flow. Clear to bottom 6"		16	May-October
6/18/2019	0940	Tanyard Creek	TAN2			5000	5000	Cloudy	Average flow. Clear to bottom 4"		16	May-October
6/18/2019	0945	Tanyard Creek	TAN1			2400	2400	Cloudy	Average flow. Clear to bottom 6". Brown algae on bed		16	May-October
6/18/2019	1000	West Trail Creek	WTR1			110	110	Cloudy	Low-average flow. Clear to bottom 8"		16	May-October
6/18/2019	1015	East Trail Creek	ETR1			130	130	Cloudy	Low-average flow. Moderate turbidity.		16	May-October
6/18/2019	1035	East Trail Creek	ETR2			800	800	Cloudy	Low-average flow. Slightly turbid. Depth 6"		16	May-October
6/18/2019	1045	West Trail Creek	WTR2			300	300	Cloudy	Low flow. Turbid with gray-green tinge.		16	May-October
6/18/2019	1055	Trail Creek	TR1			500	500	Cloudy	Average flow. Moderately turbid. Visibility 1'		16	May-October
6/18/2019	1105	Trail Creek	TR3			3000	3000	Cloudy	Average flow. Clear to bottom 6"		16	May-October
6/18/2019	1110	North Oconee	NO2			1700	1700	Cloudy	Average flow. Turbid. Visibility 6"		16	May-October
6/18/2019	1125	Carr Creek	CA1			800	800	Cloudy	Average flow. Clear to bottom 1'.		16	May-October
6/18/2019	1125	Carr Creek	CA1	Blank	<	20	#N/A	Cloudy	Average flow. Clear to bottom 1'.		16	May-October
6/19/2019	0935	McNutt Creek	MN3			1300	1300	Cloudy. Rain yesterday evening.	Average flow. Moderate turbidity.		16	May-October
6/19/2019	0955	Middle Oconee	MO1			500	500	Cloudy. Rain yesterday evening.	Average flow. Turbid. Visibility <6"		16	May-October
6/19/2019	1020	Hunnicutt Creek	HC1			16000	16000	Cloudy. Rain yesterday evening.	Average flow. Slightly turbid.		16	May-October
6/19/2019	1020	Hunnicutt Creek	HC1	Duplicate		16000	#N/A	Cloudy. Rain yesterday evening.	Average flow. Slightly turbid.		16	May-October
6/19/2019	1025	Middle Oconee	MO2			800	800	Cloudy. Rain yesterday evening.	Average flow. Turbid. Visibility <6"		16	May-October
6/19/2019	1040	Kingswood Branch	KB1			1300	1300	Cloudy. Rain yesterday evening.	Average flow. Clear to bottom 3"		16	May-October
6/19/2019	1050	Kingswood Branch	KB3			1700	1700	Cloudy. Rain yesterday evening.	Standing water. Clear to bottom 1'		16	May-October
6/19/2019	1100	McNutt Creek	MN2			500	500	Cloudy. Rain yesterday evening.	Average flow. Slightly turbid. Depth 8"		16	May-October
6/19/2019	1115	McNutt Creek	MN1			300	300	Partly cloudy.	Average flow. Slightly turbid. Visibility 2'		16	May-October
6/19/2019	1125	Middle Oconee	MO3			800	800	Partly cloudy.	Average flow. Moderate turbidity. Visibility 1'		16	May-October

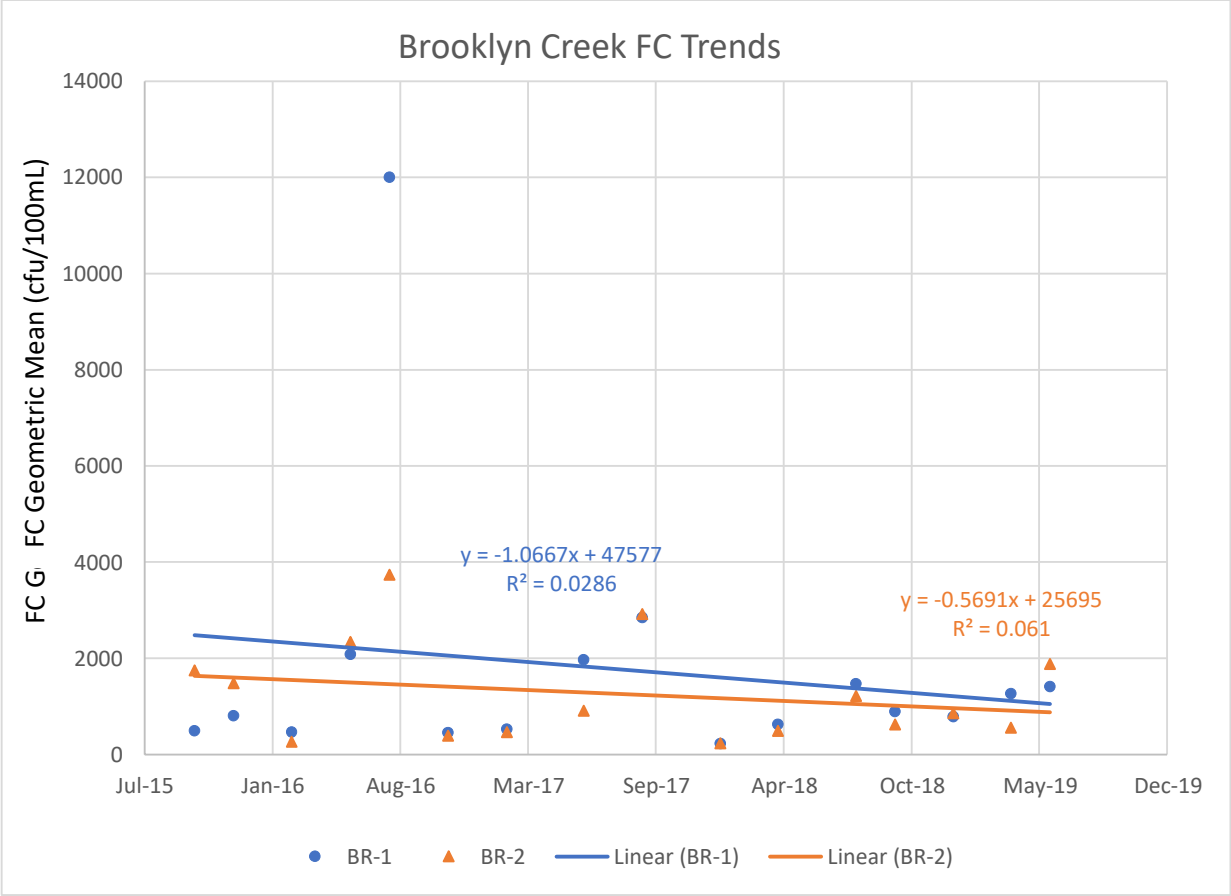
Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

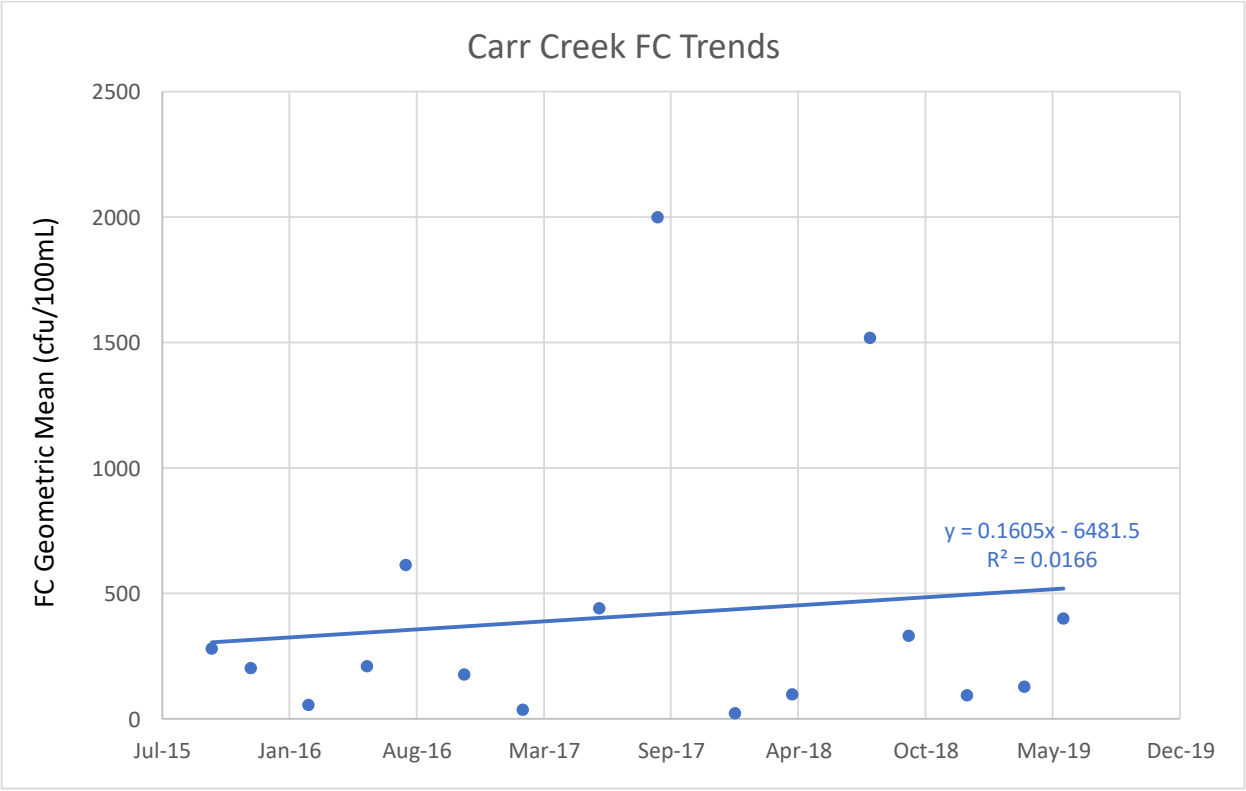
Date collected	Time collected	Stream	Station	Blank or duplicate	Less than or greater than	Reported value	Value for geomean	Weather Notes	Water Notes	Other Notes	Geomean Number	Season
6/19/2019	1140	Unnamed Tributary	UT1			110	110	Sunny	Average flow. Clear to bottom 3"		16	May-October
6/19/2019	1205	Middle Oconee	MO4			800	800	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/19/2019	1225	Oconee River	OC1			5000	5000	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/19/2019	1240	Cedar Creek	CED1			5000	5000	Sunny	Average flow. Clear to bottom 1'.		16	May-October
6/19/2019	1240	Cedar Creek	CED1	Blank	<	20	#N/A	Sunny	Average flow. Clear to bottom 1'.		16	May-October
6/20/2019	1315	North Oconee	NO3			9000	9000	Sunny/partly cloudy. 73F at 1030	Brown color. Low visibility 4-6". Fast moving.		16	May-October
6/20/2019	1315	North Oconee	NO3	Blank	<	20	#N/A	Sunny/partly cloudy. 73F at 1030	Brown color. Low visibility 4-6". Fast moving.		16	May-October
6/20/2019	1055	Brooklyn Creek	BR2			16000	16000	Sunny/partly cloudy. 73F at 1030	Clear. Slow moving water. Gray tint.		16	May-October
6/20/2019	1040	Brooklyn Creek	BR1			5000	5000	Sunny/partly cloudy. 73F at 1030	Clear. Fast moving water. Low flow.		16	May-October
6/20/2019	1040	Brooklyn Creek	BR1	Duplicate		5000	#N/A	Sunny/partly cloudy. 73F at 1030	Clear. Fast moving water. Low flow.		16	May-October
6/20/2019	1105	Tanyard Creek	TAN2			3000	3000	Sunny/partly cloudy. 73F at 1030	Clear to bottom. Fast moving. Low flow.		16	May-October
6/20/2019	1110	Tanyard Creek	TAN1			1700	1700	Sunny/partly cloudy. 73F at 1030	Gray tint. Clear to bottom 8-12". Slow flow.		16	May-October
6/20/2019	1250	West Trail Creek	WTR1			170	170	Sunny/partly cloudy. 73F at 1030	Visible to bottom 8-12". Slightly brown tint. Average flow.		16	May-October
6/20/2019	1235	East Trail Creek	ETR1			300	300	Sunny/partly cloudy. 73F at 1030	Slight brown tint. Visible to bottom ~8"		16	May-October
6/20/2019	1220	East Trail Creek	ETR2			270	270	Sunny/partly cloudy. 73F at 1030	Slight brown tint. Visibility 6-8"		16	May-October
6/20/2019	1205	West Trail Creek	WTR2			230	230	Sunny/partly cloudy. 73F at 1030	Gray tint. Clear to bottom. Fast flowing.		16	May-October
6/20/2019	1145	Trail Creek	TR1			300	300	Sunny/partly cloudy. 73F at 1030	Low visibility 8-12". Fast flowing. Low flow.		16	May-October
6/20/2019	1130	Trail Creek	TR3			2400	2400	Sunny/partly cloudy. 73F at 1030	Clear to bottom. Slow flow.		16	May-October
6/20/2019	1135	North Oconee	NO2		>	16000	17000	Sunny/partly cloudy. 73F at 1030	Brown water. Poor visibility 4-6"		16	May-October
6/20/2019	1300	Carr Creek	CA1			1300	1300	Sunny/partly cloudy. 73F at 1030	Average flow. Clear water. Visible to bottom.		16	May-October
6/26/2019	0900	McNutt Creek	MN3			170	170	Sunny	Average flow. Slightly turbid. Depth 1'		16	May-October
6/26/2019	0920	Middle Oconee	MO1			500	500	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/26/2019	0945	Hunnicutt Creek	HC1			230	230	Sunny	Average flow. Slightly turbid.		16	May-October
6/26/2019	0950	Middle Oconee	MO2			300	300	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/26/2019	0950	Middle Oconee	MO2	Duplicate		170	#N/A	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/26/2019	1000	Kingswood Branch	KB1			230	230	Sunny	Average flow. Clear to bottom 4"		16	May-October
6/26/2019	1010	Kingswood Branch	KB3			1700	1700	Sunny	Standing water. Almost no flow. Clear to bottom 1'		16	May-October
6/26/2019	1020	McNutt Creek	MN2			500	500	Sunny	Average flow. Clear to bottom 6"		16	May-October
6/26/2019	1035	McNutt Creek	MN1			300	300	Sunny	Average flow. Slightly turbid. Depth 1.5'		16	May-October
6/26/2019	1045	Middle Oconee	MO3			700	700	Sunny	Average flow. Moderately turbid. Visibility 1'		16	May-October
6/26/2019	1055	Unnamed Tributary	UT1			220	220	Sunny	Average flow. Clear to bottom 3"		16	May-October
6/26/2019	1110	Middle Oconee	MO4			500	500	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/26/2019	1125	Oconee River	OC1			5000	5000	Sunny	Average flow. Turbid. Visibility <6"		16	May-October
6/26/2019	1135	Cedar Creek	CED1			1300	1300	Sunny	Average flow. Clear to bottom 1.5'		16	May-October
6/26/2019	1135	Cedar Creek	CED1	Blank	<	20	#N/A	Sunny	Average flow. Clear to bottom 1.5'		16	May-October
6/27/2019	1045	North Oconee	NO3			9000	9000	Cloudy	Average flow. Moderatelty turbid. Visibility 1'		16	May-October
6/27/2019	1100	Brooklyn Creek	BR2			2400	2400	Cloudy	Average flow. Clear to bottom 1.5'		16	May-October
6/27/2019	1110	Brooklyn Creek	BR1			1100	1100	Cloudy	Average flow. Clear to bottom 4"		16	May-October
6/27/2019	1120	Tanyard Creek	TAN2			800	800	Cloudy	Average flow. Clear to bottom 4"		16	May-October
6/27/2019	1130	Tanyard Creek	TAN1			1100	1100	Cloudy	Average flow. Clear to bottom 1'		16	May-October
6/27/2019	1130	Tanyard Creek	TAN1	Duplicate		2400	#N/A	Cloudy	Average flow. Clear to bottom 1'		16	May-October
6/27/2019	1145	West Trail Creek	WTR1			80	80	Cloudy	Average flow. Clear to bottom 6"		16	May-October
6/27/2019	1155	East Trail Creek	ETR1			300	300	Cloudy	Average flow. Clear to bottom 1'	Brown algae on bed	16	May-October
6/27/2019	1210	East Trail Creek	ETR2			1100	1100	Cloudy	Average flow. Clear to bottom 6"		16	May-October
6/27/2019	1225	West Trail Creek	WTR2			230	230	Cloudy	Average flow. Moderately turbid.	Green-grey tinge	16	May-October
6/27/2019	1230	Trail Creek	TR1			300	300	Cloudy	Average flow. Slightly turbid. Visibility 1.5'		16	May-October
6/27/2019	1240	Trail Creek	TR3			1700	1700	Cloudy	Average flow. Slightly turbid. Depth 1'		16	May-October
6/27/2019	1245	North Oconee	NO2		>	16000	17000	Cloudy	Average flow. Turbid. Visibility <6"		16	May-October
6/27/2019	1300	Carr Creek	CA1			300	300	Cloudy	Average flow. Clear to bottom 1.5'	Gray silt on bed.	16	May-October
6/27/2019	1300	Carr Creek	CA1	Blank	<	20	#N/A	Cloudy	Average flow. Clear to bottom 1.5'	Gray silt on bed.	16	May-October

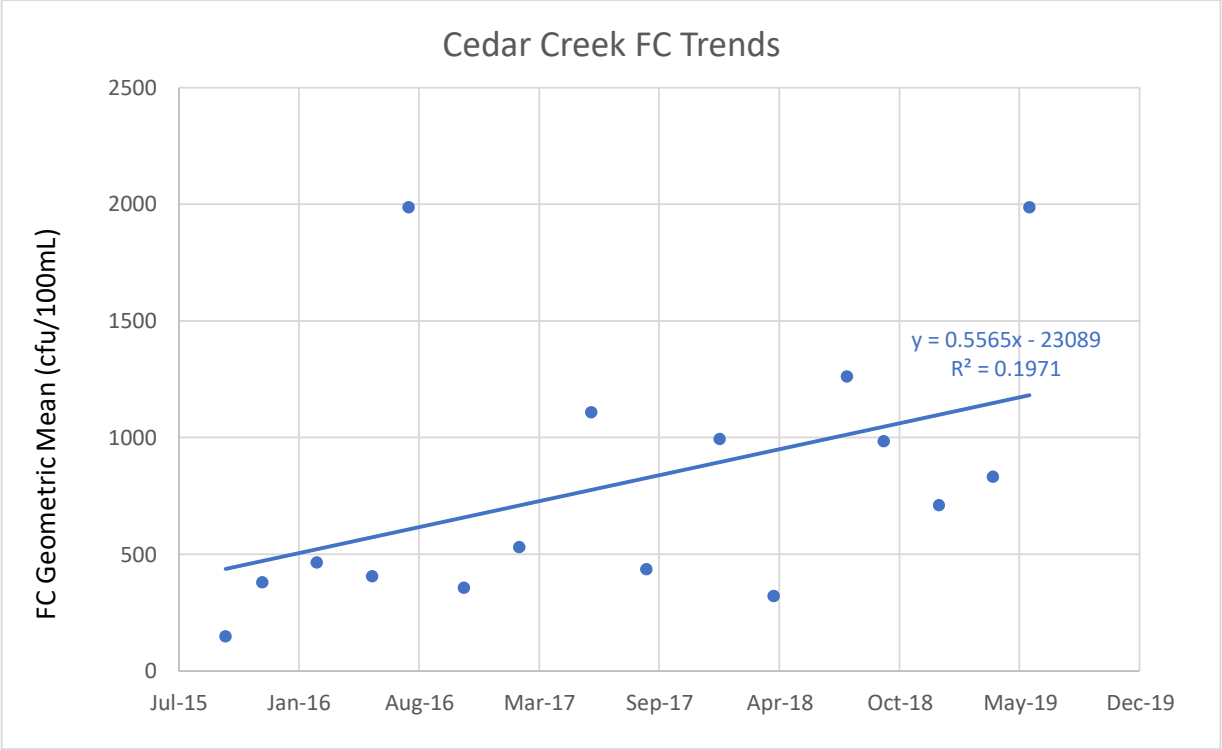
Values higlighted in red represent results exceeding the state standard of a maximum of 4000 cfu/100 mL for a single sample.

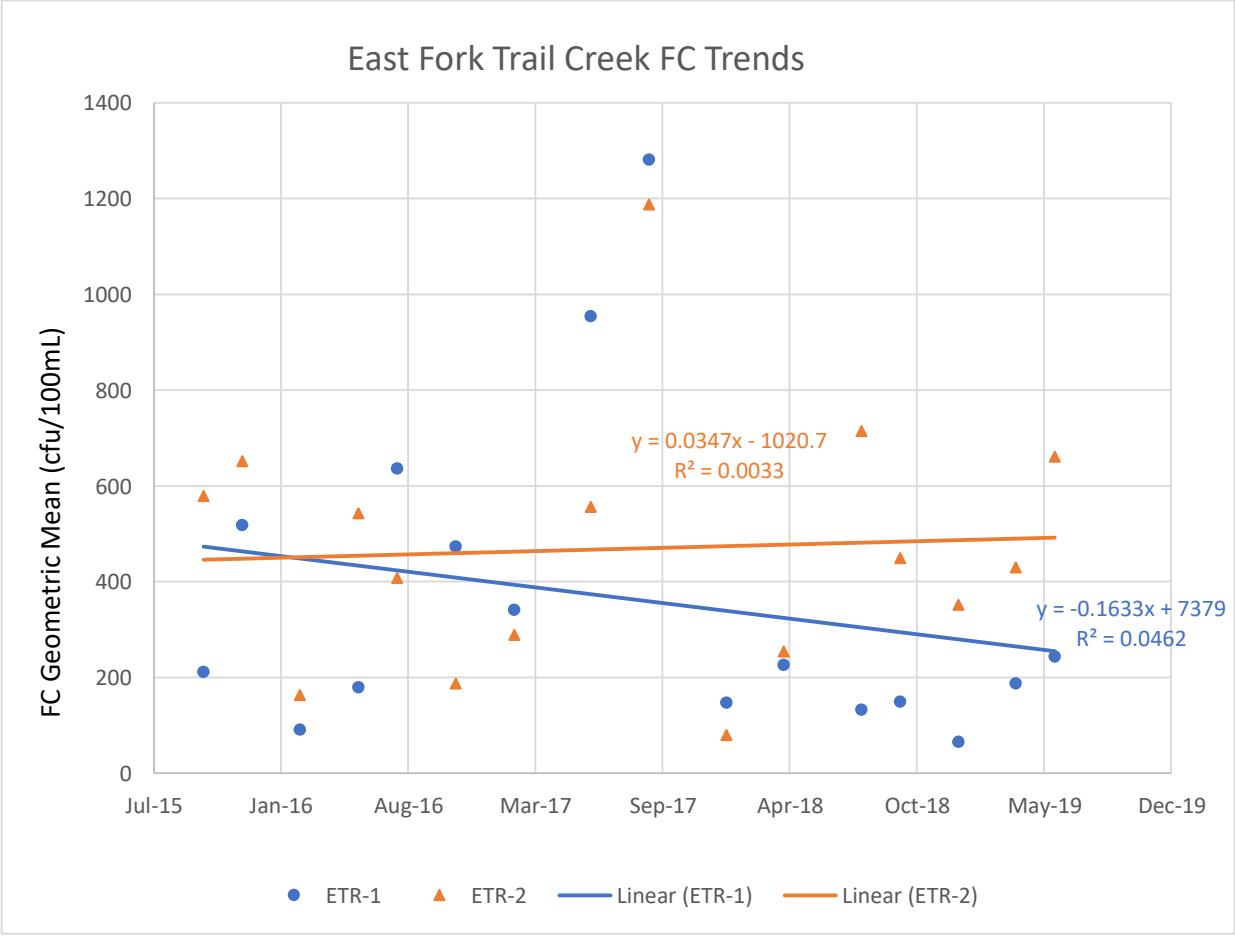
APPENDIX B

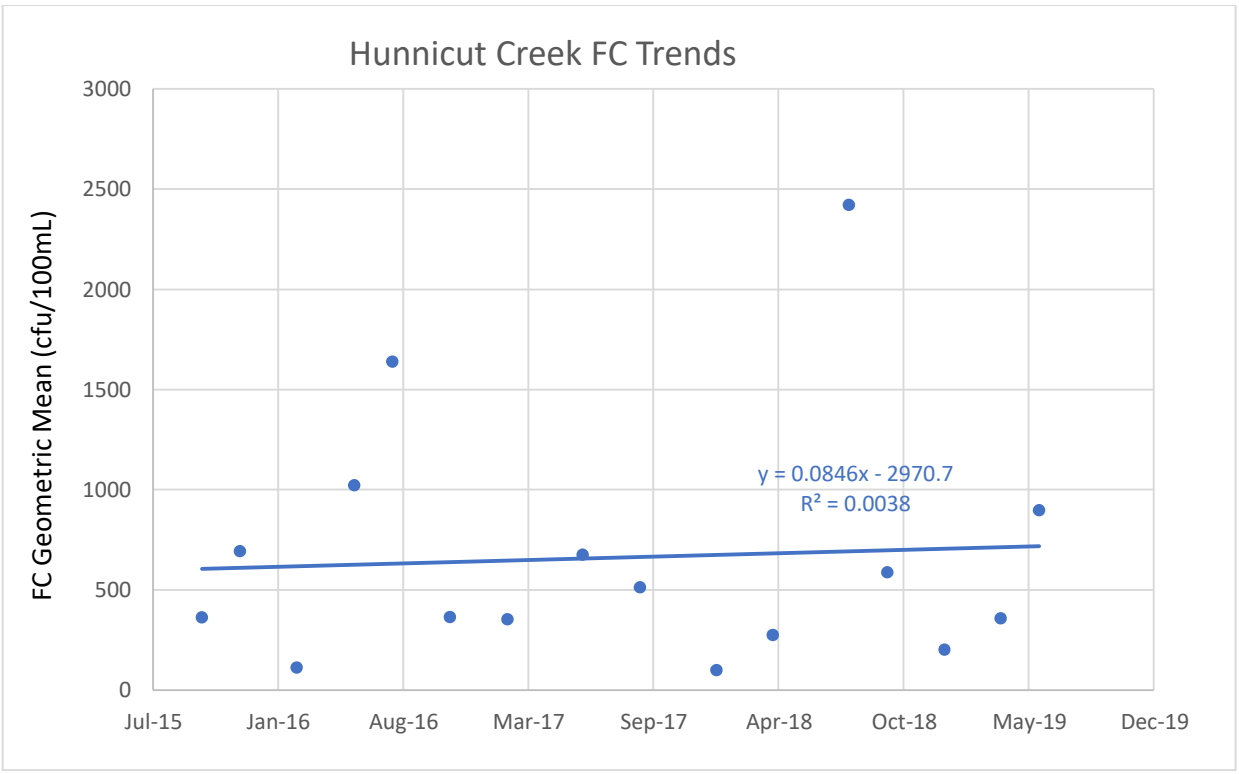
Water Quality Trends (October 2015 – June 2019)

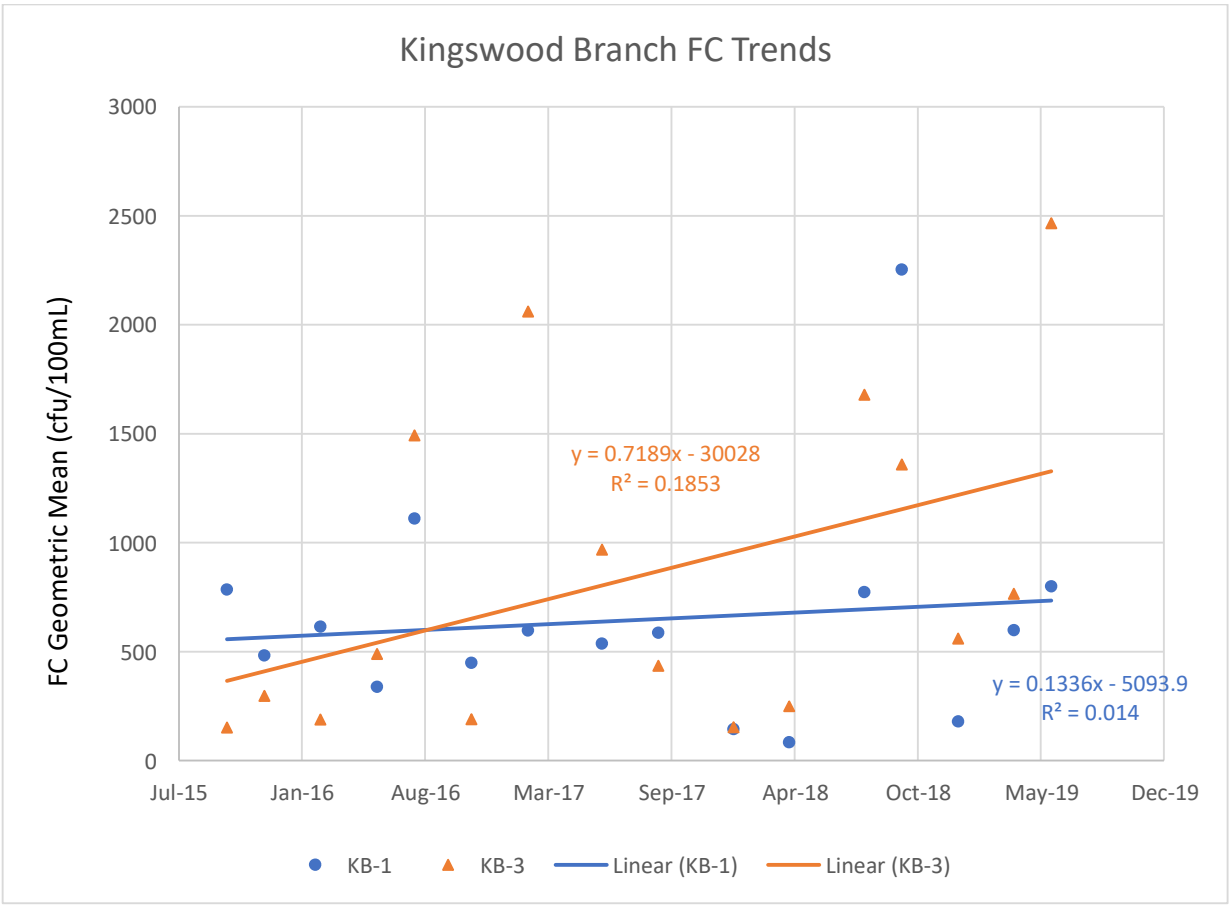

Brooklyn Creek FC Trends
FC Geometric Mean (cfu/100mL)
14000
12000
10000
8000
6000
4000
2000
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = -1.0667x + 47577
R² = 0.0286
y = -0.5691x + 25695
R² = 0.061
BR-1
BR-2
Linear (BR-1)
Linear (BR-2)

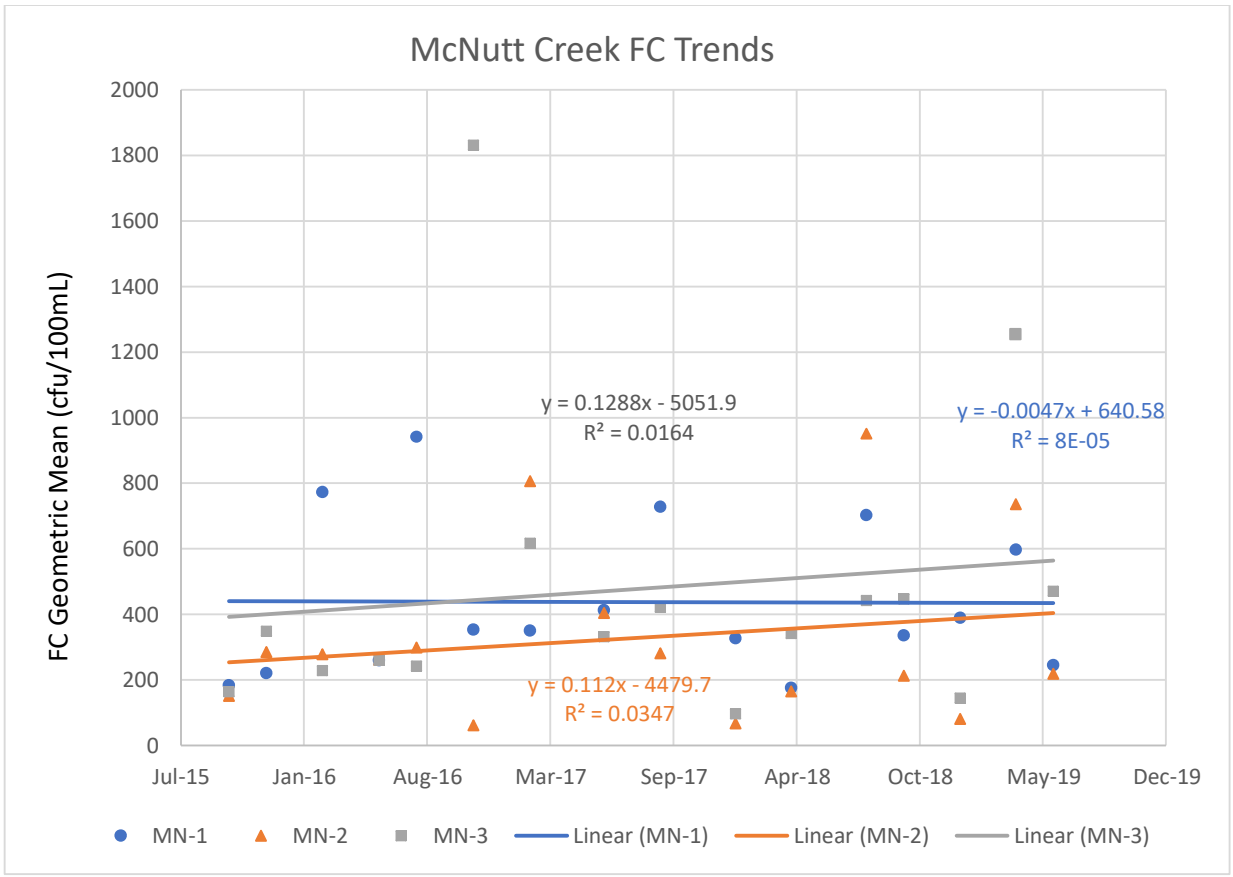

Carr Creek FC Trends
FC Geometric Mean (cfu/100mL)
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.1605x - 6481.5
R² = 0.0166

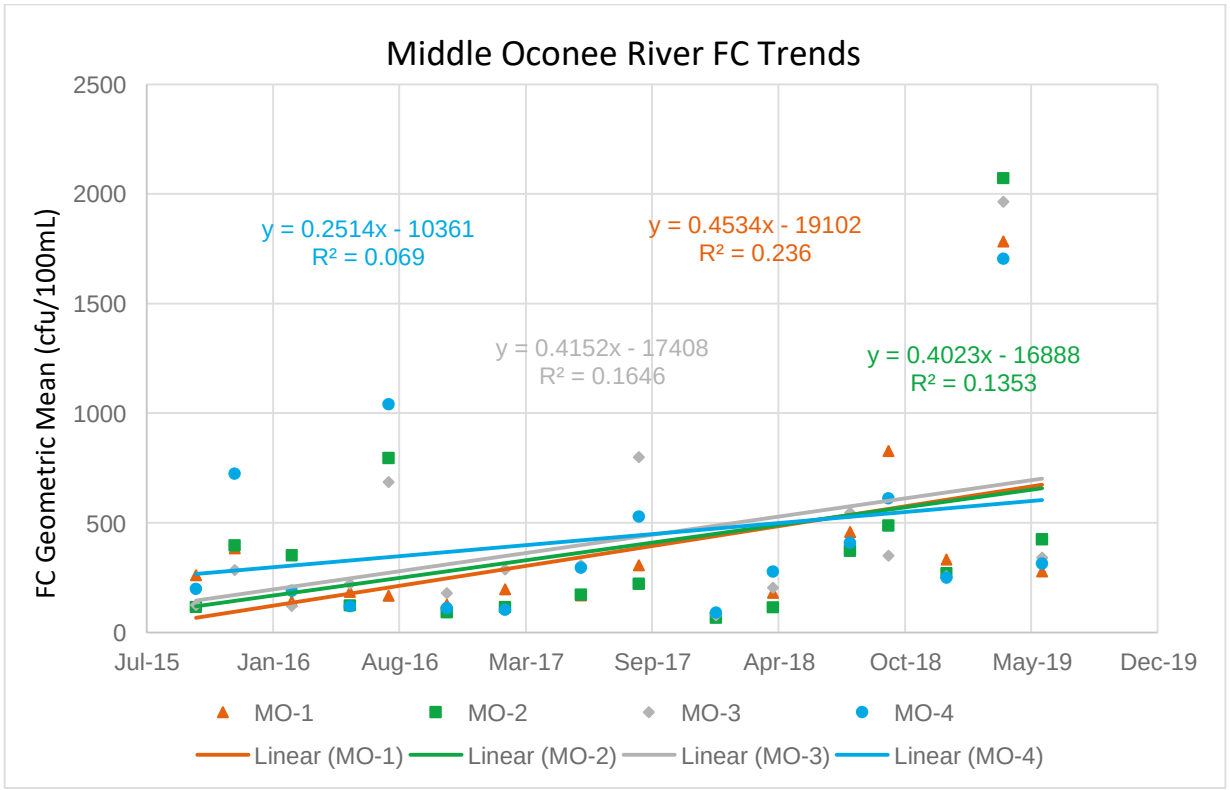

Cedar Creek FC Trends
FC Geometric Mean (cfu/100mL)
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.5565x - 23089
R² = 0.1971

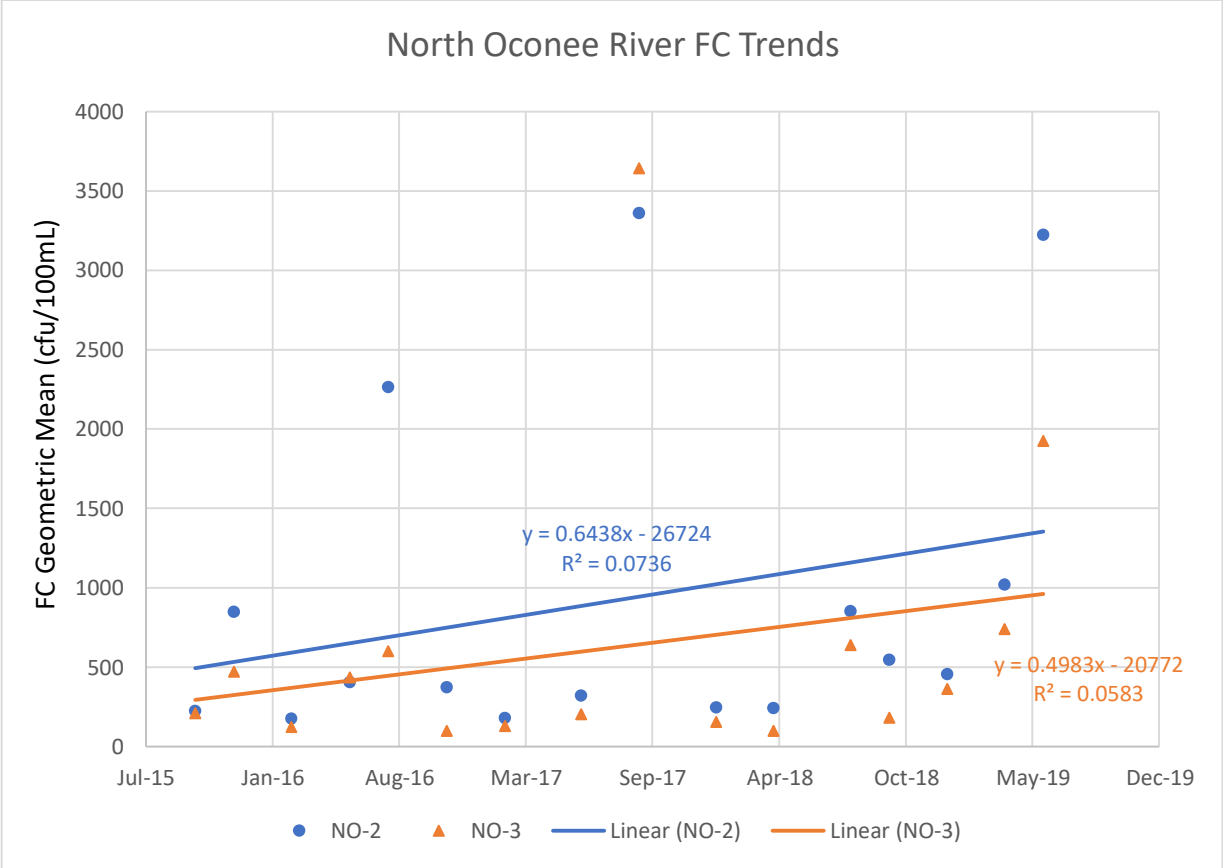

East Fork Trail Creek FC Trends
FC Geometric Mean (cfu/100mL)
1400
1200
1000
800
600
400
200
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.0347x - 1020.7
R² = 0.0033
y = -0.1633x + 7379
R² = 0.0462
ETR-1
ETR-2
Linear (ETR-1)
Linear (ETR-2)

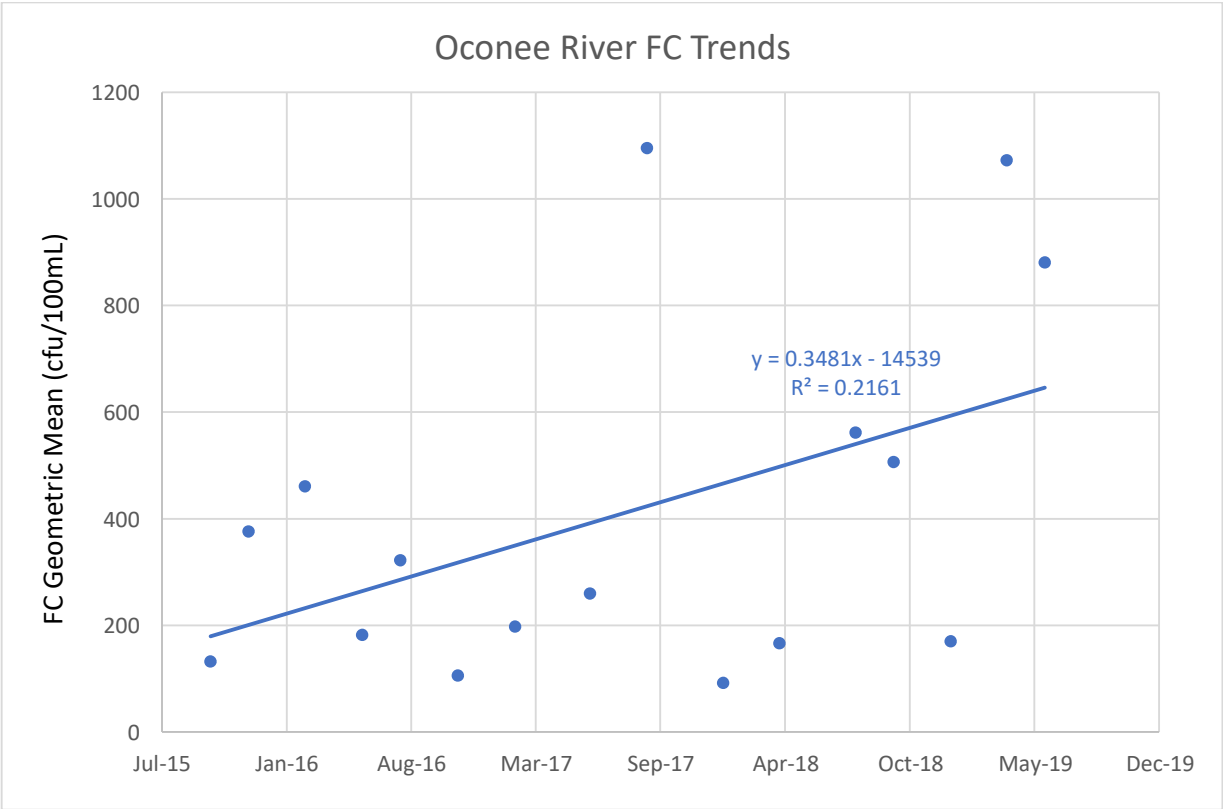

Hunnicut Creek FC Trends
FC Geometric Mean (cfu/100mL)
3000
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.0846x - 2970.7
R² = 0.0038

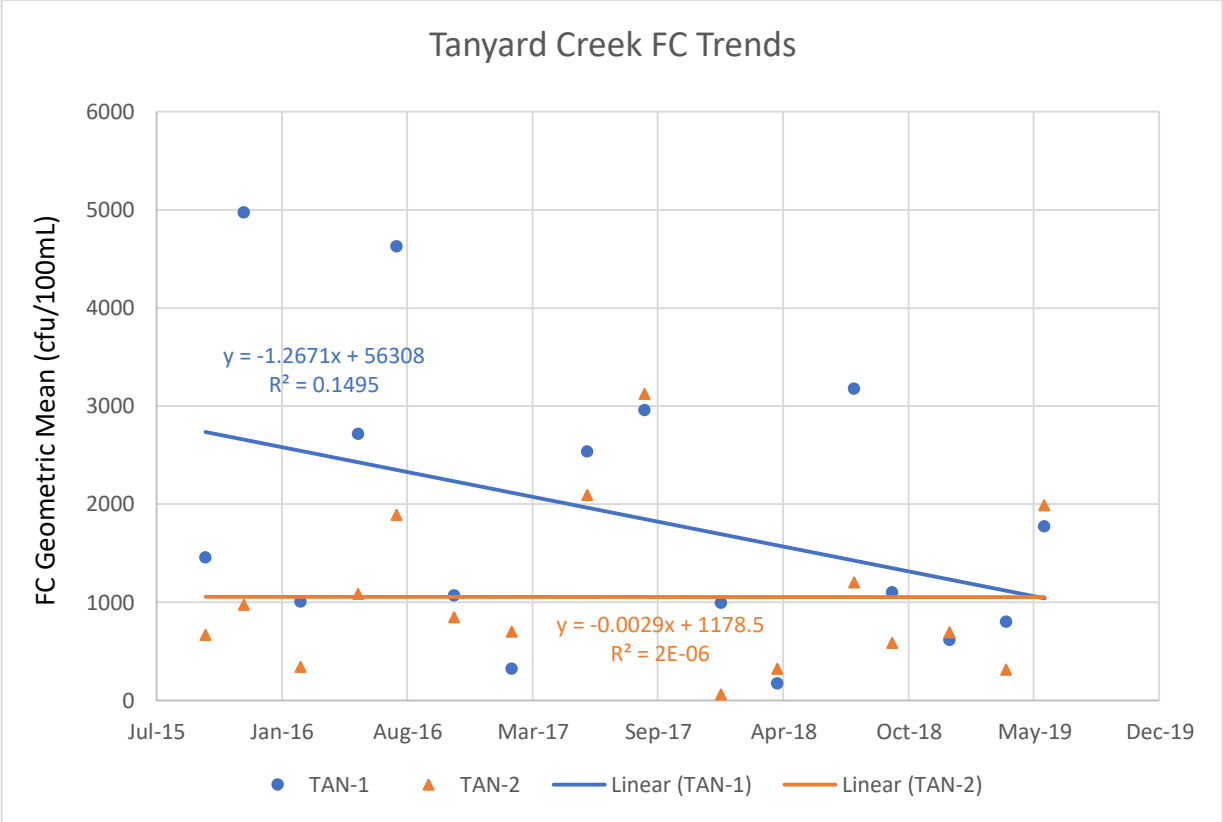

Kingswood Branch FC Trends
FC Geometric Mean (cfu/100mL)
3000
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.7189x - 30028
R² = 0.1853
y = 0.1336x - 5093.9
R² = 0.014
KB-1
KB-3
Linear (KB-1)
Linear (KB-3)

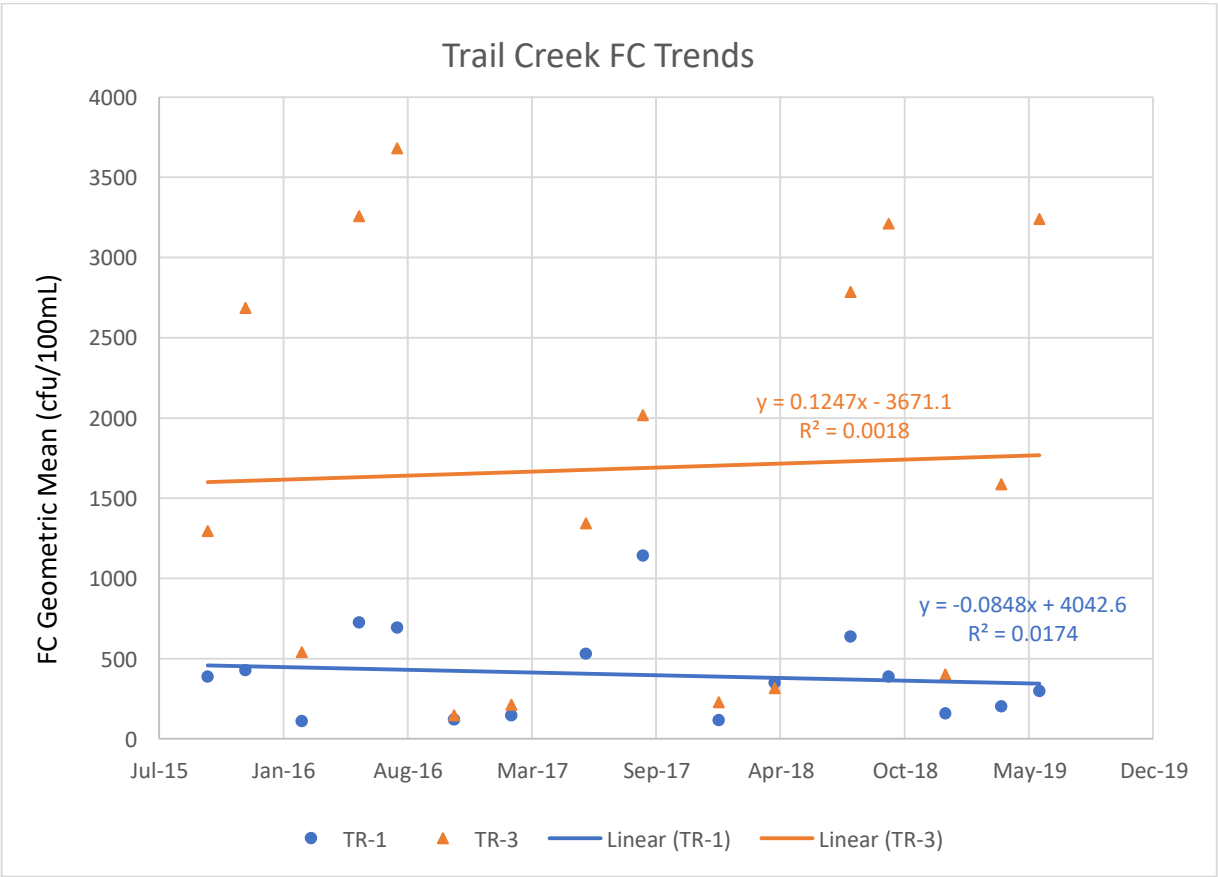

McNutt Creek FC Trends
FC Geometric Mean (cfu/100mL)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.1288x - 5051.9
R² = 0.0164
y = -0.0047x + 640.58
R² = 8E-05
y = 0.112x - 4479.7
R² = 0.0347
MN-1
MN-2
MN-3
Linear (MN-1)
Linear (MN-2)
Linear (MN-3)

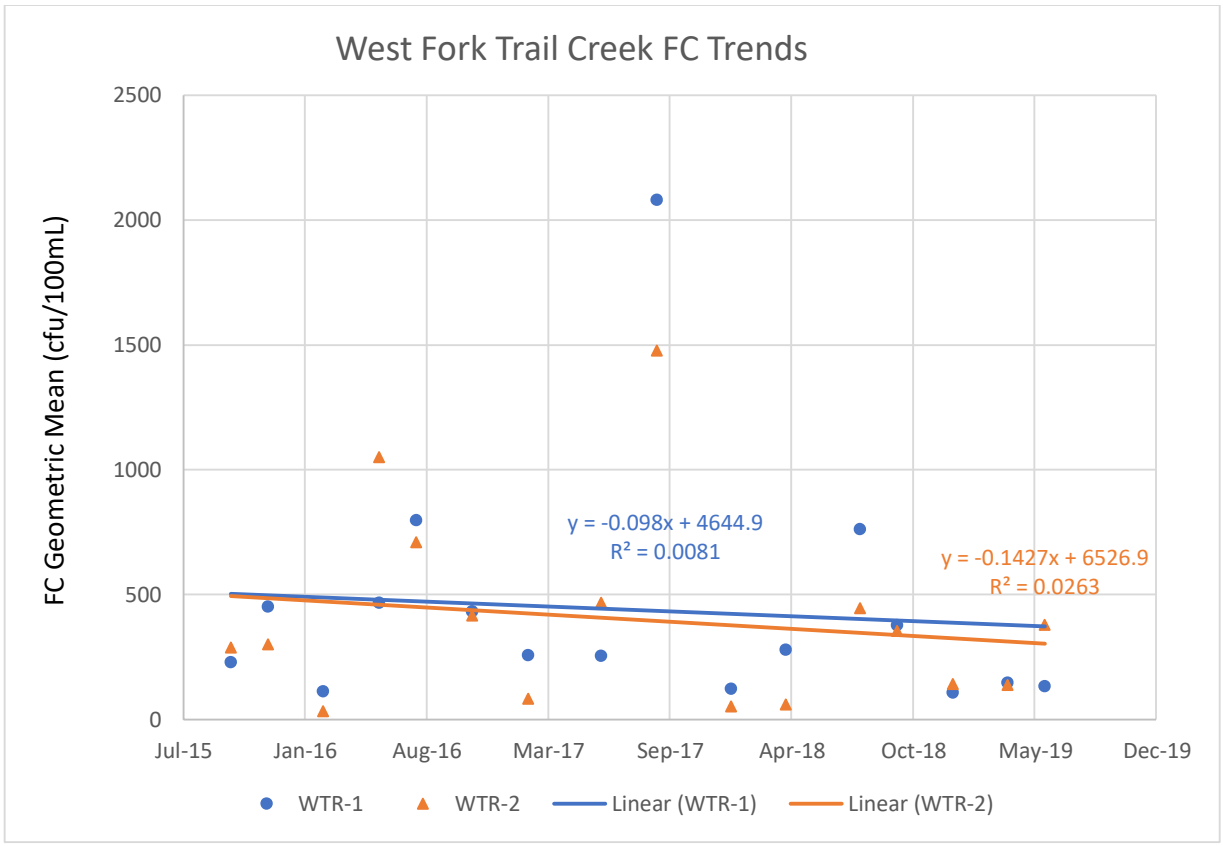

Middle Oconee River FC Trends
FC Geometric Mean (cfu/100mL)
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.2514x - 10361
R² = 0.069
y = 0.4534x - 19102
R² = 0.236
y = 0.4152x - 17408
R² = 0.1646
y = 0.4023x - 16888
R² = 0.1353
MO-1
MO-2
MO-3
MO-4
Linear (MO-1)
Linear (MO-2)
Linear (MO-3)
Linear (MO-4)

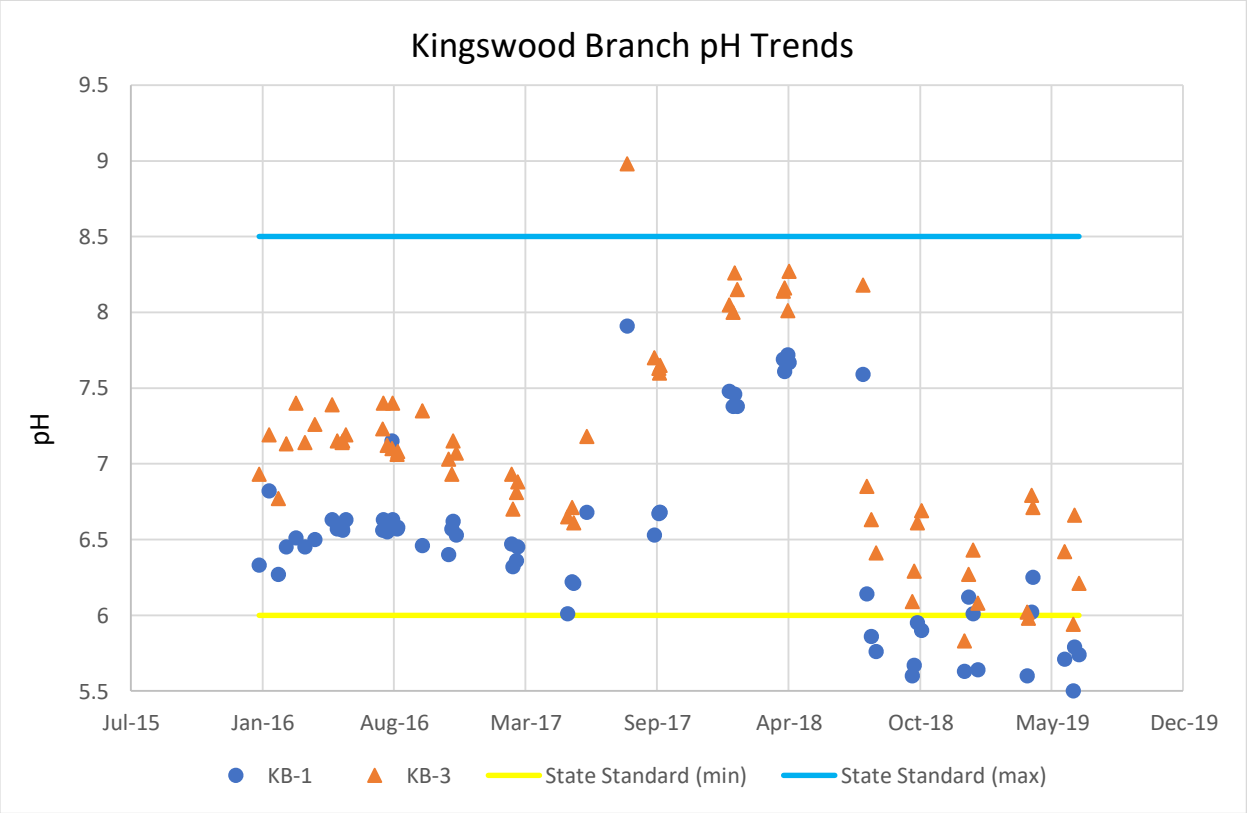

North Oconee River FC Trends
FC Geometric Mean (cfu/100mL)
4000
3500
3000
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.6438x - 26724
R² = 0.0736
y = 0.4983x - 20772
R² = 0.0583
NO-2
NO-3
Linear (NO-2)
Linear (NO-3)

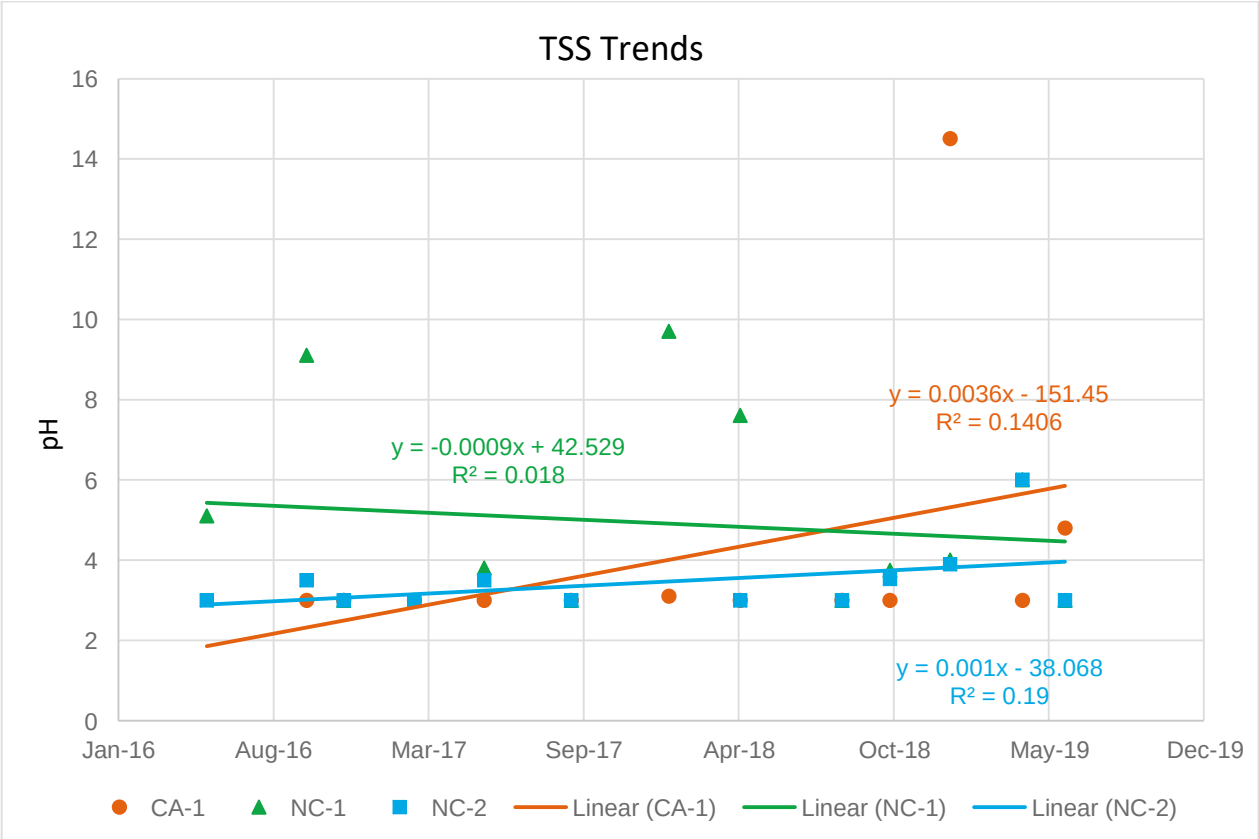

Oconee River FC Trends
FC Geometric Mean (cfu/100mL)
1200
1000
800
600
400
200
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = 0.3481x - 14539
R² = 0.2161


Tanyard Creek FC Trends
FC Geometric Mean (cfu/100mL)
6000
5000
4000
3000
2000
1000
0
y = -1.2671x + 56308
R² = 0.1495
y = -0.0029x + 1178.5
R² = 2E-06
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
TAN-1
TAN-2
Linear (TAN-1)
Linear (TAN-2)


Trail Creek FC Trends
FC Geometric Mean (cfu/100mL)
4000
3500
3000
2500
2000
1500
1000
500
0
y = 0.1247x - 3671.1
R² = 0.0018
y = -0.0848x + 4042.6
R² = 0.0174
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
TR-1
TR-3
Linear (TR-1)
Linear (TR-3)


West Fork Trail Creek FC Trends
FC Geometric Mean (cfu/100mL)
2500
2000
1500
1000
500
0
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = -0.098x + 4644.9
R² = 0.0081
y = -0.1427x + 6526.9
R² = 0.0263
WTR-1
WTR-2
Linear (WTR-1)
Linear (WTR-2)


Kingswood Branch pH Trends
pH
9.5
9
8.5
8
7.5
7
6.5
6
5.5
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
KB-1
KB-3
State Standard (min)
State Standard (max)


TSS Trends
pH
16
14
12
10
8
6
4
2
0
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
y = -0.0009x + 42.529
R² = 0.018
y = 0.0036x - 151.45
R² = 0.1406
y = 0.001x - 38.068
R² = 0.19
CA-1
NC-1
NC-2
Linear (CA-1)
Linear (NC-1)
Linear (NC-2)

Arcadis U.S., Inc.

2839 Paces Ferry Road

#900

Atlanta, Georgia 30339

Tel 770 431 8666

Fax 770 435 2666

www.arcadis.com