TENNESSEE
DIVISION OF WATER RESOURCES

FISCAL YEAR 2018-2019
SURFACE WATER
MONITORING AND ASSESSMENT
PROGRAM PLAN

July 2018

Tennessee Department of Environment and Conservation
Division of Water Resources
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TABLE OF CONTENTS

Page Number

LIST OF FIGURES AND TABLES

LIST OF TABLES

EXECUTIVE SUMMARY

The purpose of this document is to establish overall goals and objectives for key elements of the Tennessee Department of Environment and Conservation (TDEC), Division of Water Resources Watershed Stewardship and Support Branch, surface water quality monitoring program. Information concerning ground water monitoring will be provided in a separate document by the Water Supply Branch.

The United States Environmental Protection Agency (EPA) is requiring states to implement or commit to developing a monitoring program strategy. The details of this initiative can be found in the document, *Elements of a State Monitoring and Assessment Program,* published in March 2003. This initiative is intended to serve as a tool to assist EPA and the states in determining whether a monitoring program meets the requirements of Clean Water Act Section 106 (e)(1). EPA recommended the following ten elements be included in a state's monitoring program strategy:

A. A long-term state monitoring strategy
B. Identification of monitoring objectives
C. Selection of a monitoring design
D. Identification of core and non-critical water quality indicators
E. Development of quality management and quality assurance plans
F. Use of accessible electronic data systems
G. Methodology for assessing attainment of water quality standards
H. Production of water quality reports
I. Periodic review of monitoring program
J. Identification of current and future resource needs

Tennessee spent considerable time prior to the publication of EPA's recommendations developing an effective monitoring and assessment strategy, which has been used for many years. Publication of EPA's guidance resulted in the review and refinement of the existing plan to make certain all elements were included.

Tennessee already incorporates all 10 elements in its existing monitoring strategy. Those 10 elements have been outlined in this document. Additional information on monitoring strategies, assessment and listing strategies can be found in Tennessee's Consolidated Assessment and Listing Methodology (CALM), TDEC 2018.

Tennessee has developed a nutrient criteria development plan. The division has published Quality System Standard Operating Procedures (QSSOP's) for conducting bacteriological, chemical, biological, periphyton stream surveys, as well as a Quality Assurance Project Plan for 106 Monitoring. These documents can be accessed on the Department's website at https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html

The purpose of the division’s water quality monitoring program is to provide an accurate and defensible accounting of Tennessee's progress towards meeting the goals established in the federal Clean Water Act and the Tennessee Water Quality Control Act.

Data are collected and interpreted in order to:

- ♦ Assess the condition of the state’s waters.
- ♦ Identify problem areas with parameter values that violate Tennessee numerical or narrative water quality standards.
- ♦ Identify causes and sources of water quality problems.
- ♦ Document areas with potential human health threats from fish tissue contamination or elevated bacteria levels.
- ♦ Establish trends in water quality.
- ♦ Gauge compliance with NPDES permit limits.
- ♦ Document damage to streams for enforcement efforts, if appropriate.
- ♦ Document baseline conditions by monitoring reference stream within the same ecoregion or watershed or for downstream comparison or prior to a potential impact.
- ♦ Assess water quality improvements based on site remediation, Best Management Practices, and other restoration strategies.
- ♦ Identify proper stream-use classification, including antidegradation policy implementation.
- ♦ Identify natural reference conditions on an ecoregion basis for refinement of water quality standards.

Since 1996, Tennessee’s monitoring program has been based on a five-year watershed cycle. The first cycle was completed in 2001. The second cycle was completed in 2006. A third cycle was completed in 2011. The fourth cycle was completed in 2016. The fifth assessment cycle will be completed in 2021.

Tennessee relies heavily on ecoregion reference data to assess impairment and has spent much effort in developing regional reference guidelines for wadeable streams. In 2008, the division initiated monitoring to establish reference guidelines for headwater streams. A future challenge is to develop similar guidelines for rivers, lakes and reservoirs. A major limiting factor to this goal is funding and staff availability.

Note: All activities are funded by Section 106 Grant Funds unless otherwise noted.

I. ELEMENTS OF TENNESSEE'S SURFACE WATER MONITORING AND ASSESSMENT PROGRAM

A. Monitoring Program Strategy

The Division of Water Resources (DWR) has a comprehensive monitoring program that serves its water quality management needs and addresses all the state's surface waters including streams, rivers, lakes, reservoirs and wetlands.

In 1996, the Division of Water Pollution Control, currently DWR, adopted a watershed approach that reorganized existing programs and focused on place-based water quality management. The primary goals of the watershed approach are:

1. Provide for more focused and comprehensive water quality monitoring and assessment.
2. Assist in the calculation of pollutant limits for permitted dischargers.
3. Develop watershed water quality management strategies that integrate controls for regulated and non-regulated sources of pollution.
4. Increase public awareness of water quality issues and provide opportunities for public involvement.

There are 55 USGS eight-digit hydrologic units (HUC) in the state that have been divided into five monitoring groups for assessment purposes. One group, consisting of between 9 and 16 watersheds, is monitored and another is assessed each year. This allows intense monitoring of a limited number of watersheds each year with all watersheds monitored every five years. The watershed cycle provides for a logical progression from data collection and assessments through TMDL development and permit issuance. The watershed cycle coincides with the development of permits that are issued to industries, municipalities, mining and commercial entities.

The key activities involved in each five-year cycle are:

1. **Planning.** Existing data and reports from appropriate federal, state, and local agencies and citizen-based organizations are compiled and used to describe the quality of rivers and streams, and to determine monitoring priorities

2. **Monitoring.** Field data is collected by DWR staff for streams previously prioritized. These results supplement existing data and are used for water quality assessment.

3. **Assessment**. Monitoring data is used to determine if the streams support their designated uses based on stream classifications and water quality criteria. The assessment is used to create the Integrated Report (303(d) List and the 305(b) Report).

4. **Wasteload Allocation/TMDL**. Monitoring data are used to determine pollutant limits for permitted dischargers releasing treated wastewater to the watershed. Limits are set to ensure that water quality is protective. TMDLs are studies that determine the point and

nonpoint source contributions of a pollutant in the watershed and propose strategies to achieve water quality standards.

5. **Permits.** Issuance and expiration of all discharge permits is synchronized to the five-year watershed cycle. Approximately 1,100 individual permits are issued by Tennessee under the federal National Pollutant Discharge Elimination System (NPDES).

6. **Watershed Water Quality Management Plans.** These watershed plans include a general watershed description, water quality assessment summary results, inventory of point and nonpoint sources, water quality concerns, federal, state, and local initiatives, and management strategies. Completed plans can be accessed on TDEC's website at https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/watersheds-by-basin.html

One of the advantages of this approach is that it considers all sources of pollution including discharges from industries and municipalities as well as runoff from agriculture and urban areas. Another advantage is the coordination of local, state and federal agencies and the encouragement of public participation.

B. Monitoring Objectives

The purpose of the division's water quality monitoring program is to provide a measure of Tennessee's progress towards meeting the goals established in the federal Clean Water Act and the Tennessee Water Quality Control Act. To accomplish this task, data are collected and interpreted in order to:

1. Assess the condition of the state's waters, both geographically and temporally.

2. Identify specific problem areas where parameter values violate Tennessee numerical or narrative water quality standards.

3. Identify probable causes and significant sources of water quality problems.

4. Document areas with potential human health threats from fish tissue contamination or elevated bacteria levels. Identify those areas where the public may need to be warned to avoid water contact or fish consumption.

5. Establish trends in water quality.

6. Gauge water quality conditions downstream of point source dischargers as an additional compliance check.

7. Document baseline conditions prior to a potential impact or as a reference stream for downstream or other sites within the same ecoregion and/or watershed.

8. Provide data for TMDL studies.

9. Assess water quality improvements based on site remediation, enforcement, Best Management Practices, TMDL implementation and other restoration strategies.

10. Identify proper stream-use classification, plus assist in the implementation of the Antidegradation Statement.

11. Identify natural reference conditions on an ecoregion basis for refinement of water quality standards.

12. Identify and protect wetlands.

C. Monitoring Design

The division incorporates several approaches in its surface water monitoring design. The primary monitoring design is a five-year rotational cycle (Figure 1) based on USGS eight-digit Hydrologic Unit Code (HUC) sized watersheds. Also, Tennessee relies heavily on ecoregions to serve as a geographical framework for establishing regional water quality expectations (Arnwine et al, 2000).

Watersheds

The watershed approach serves as an organizational framework for systematic assessment of the state's water quality. By viewing the entire drainage area as a whole, the division is better able to address water quality conditions through an organized schedule. This unified approach affords a more in-depth study of each watershed and encourages coordination of public and governmental organizations.

The watershed approach is a five-year cycle that has the following goals:

1. Commits to monitoring strategies that result in an accurate assessment of water quality.

2. Partners with other agencies to obtain the most current water quality and quantity data.

3. Assesses water quality based on most recent data and water quality standards.

4. Establishes TMDLs by integrating point and non-point source pollution.

5. Synchronizes discharge permit issuance to coincide with the development of TMDLs.

In attaining the watershed goals mentioned above, five major objectives are to be met:

1. Transparency in assessments and TMDLs.
2. Attain good representation of all local interests at public meetings and continue a dialogue with local interest throughout the five-year cycle.
3. Develop implementation plans for impaired waters.
4. Monitor water quality intensively within each watershed at the appropriate time in the five-year watershed cycle.
5. Establish TMDLs based on best available monitoring data and sound science.

The 55 USGS eight digit HUC codes found in Tennessee are addressed by groups on a five-year cycle that coincides with permit issuance. Each watershed group contains between 9 and 16 watersheds. (Table 1).

Figure 1: Graphic Representation of the Watershed Approach.

More details for the management approach may be found on the DWR home page https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/watershed-management-approach.html

The watershed management groups and timeline are shown in Figure 2 and Table 1.

Monitoring activities are coordinated with Tennessee Valley Authority (TVA), Department of Energy (DOE), Tennessee Wildlife Resources Agency (TWRA), United States Geological Survey (USGS), and United States Army Corps of Engineers (USACE) to avoid duplication of effort and increase watershed coverage.

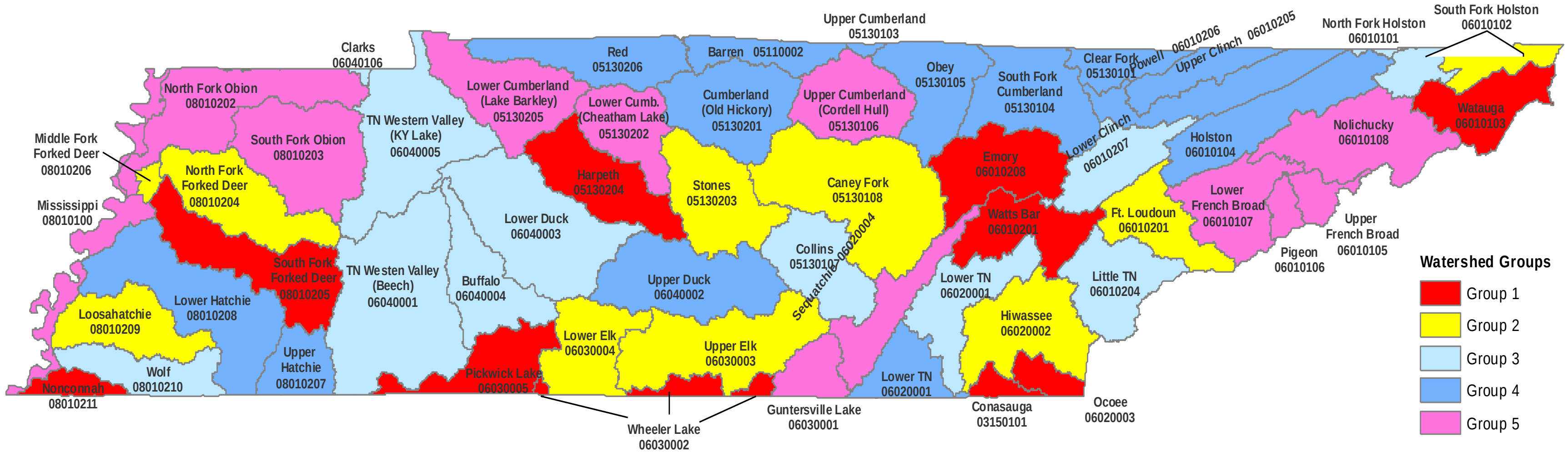


Figure 2: Tennessee Watershed Management Groups

Table 1. Watershed Groups and Monitoring Years

Group /Year	Watershed	HUC	EFO	Watershed	HUC	EFO
1 1996 2001 2006 2011 2016	Conasauga	03150101	CH	Ocoee	06020003	CH
	Harpeth	05130204	N	Pickwick Lake	06030005	CL, J
	Watauga	06010103	JC	Wheeler Lake	06030002	CL
	Upper TN (Watts Bar)	06010201	K, CH, CK	South Fork of the Forked Deer	08010205	J
	Emory	06010208	K, CK	Nonconnah	08010211	M
2 1997 2002 2007 2012 2017	Caney Fork	05130108	CK, CH, N	Upper Elk	06030003	CL
	Stones	05130203	N	Lower Elk	06030004	CL
	S. Fork Holston (u/s Boone Dam)	06010102	JC	North Fork Forked Deer	08010204	J
	Upper TN (Fort Loudoun)	06010201	K	Forked Deer	08010206	J
	Hiwassee	06020002	CH	Loosahatchie	08010209	M
3 1998 2003 2008 2013 2018	Collins	05130107	CK, CH, CL	TN Western Valley (Beech)	06040001	J
	N. Fork Holston	06010101	JC	Lower Duck	06040003	CL
	S. Fork Holston (d/s Boone Dam)	06010102	JC	Buffalo	06040004	CL, N
	Little Tennessee (Tellico)	06010204	K	TN Western Valley (KY Lake)	06040005	N, J
	Lower Clinch	06010207	K	Wolf	08010210	M
	Tennessee (Chickamauga)	06020001	CH	Clarks	06040006	J
4 1999 2004 2009 2014 2019	Barren	05110002	N	Holston	06010104	JC, K
	Clear Fork of the Cumberland	05130101	K, MS	Upper Clinch	06010205	JC, K
	Upper Cumberland	05130103	CK	Powell	06010206	JC, K
	South Fork Cumberland	05130104	K	Tennessee (Nickajack)	06020001	CH
	Obey	05130105	CK	Upper Duck	06040002	CL
	Cumberland (Old Hickory Lake)	05130201	N	Upper Hatchie	08010207	J
	Red	05130206	N	Lower Hatchie	08010208	J,M

Group /Year	Watershed	HUC	EFO	Watershed	HUC	EFO
5 2000 2005 2010 2015 2020	Lower Cumberland (Cheatham)	05130202	N	Nolichucky	06010108	JC, K
	Lower Cumberland (Lake Barkley)	05130205	N	Sequatchie	06020004	CH
	Upper Cumberland (Cordell Hull)	05130106	CK, N	Guntersville	06030001	CH, CL
	Upper French Broad	06010105	K	Mississippi	08010100	M, J
	Pigeon	06010106	K	Obion	08010202	J
	Lower French Broad	06010107	K	Obion South Fork	08010203	J

Key to EFOs:

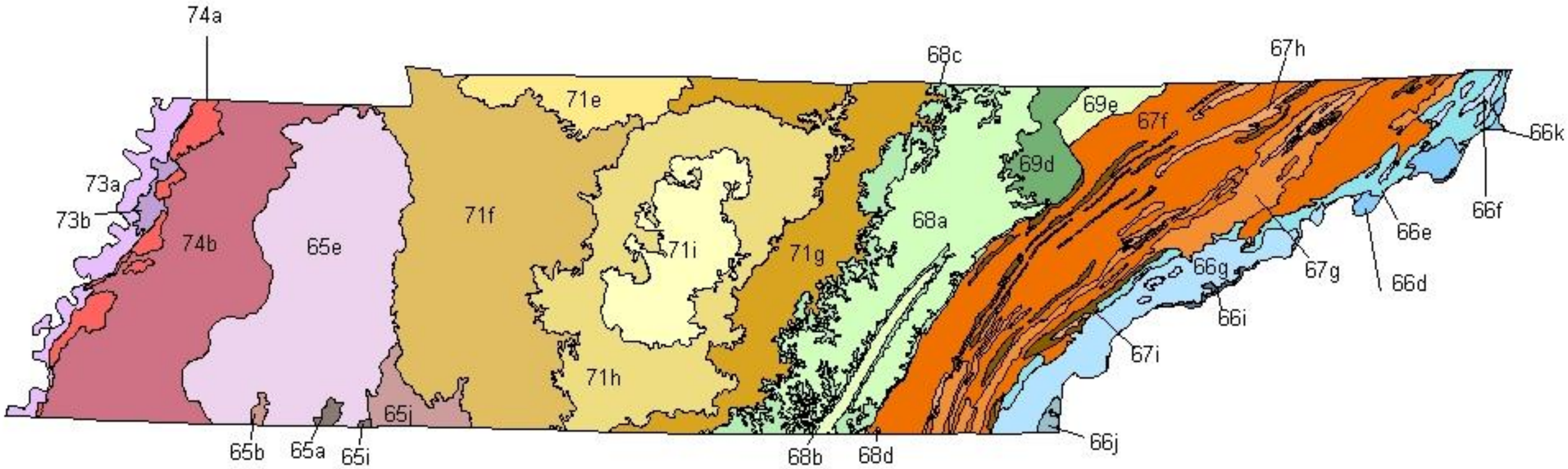
CH	Chattanooga	J	Jackson	M	Memphis
CK	Cookeville	JC	Johnson City	N	Nashville
CL	Columbia	K	Knoxville		

Ecoregions

Tennessee relies heavily on ecoregions to serve as a geographical framework for establishing regional water quality expectations (Arnwine et al, 2000). Tennessee has 31 Level IV ecoregions (Figure 3).

Since 1999, sites have been monitored as part of the five-year watershed cycle. New reference sites are added as they are located during watershed monitoring, while some of those originally selected sites have been dropped due to increased disturbances or unsuitability. Periphyton is also collected as a second biological indicator. In 2009, headwater streams were added to the reference monitoring program. There are approximately 130 active reference sites. This reference database has been used to establish regional guidelines for wadeable streams.

Six additional subregions have been delineated out of the original 25 in ecoregions 66, 68, 69 and 73 resulting in 31 Level IV ecoregions in Tennessee. In addition, the names of four subregions have been revised (65e, 66d, 69d and 73a). With the exception of 69e, the majority of new subregions are very small or the streams originate in a different subregion. Therefore, it may not be necessary or even possible to find reference streams. Until such time as reference sites can be established these subregions will be treated as part of their original subregion and/or bioregion for assessment purposes.



65a Blackland Prairie	66k Amphibolite Mountains	69e Cumberland Mountain Thrust Block
65b Flatwoods/Alluvial Prairie Margins	67f Southern Limestone/Dolomite Valleys and Low Rolling Hills	71e Western Pennyroyal Karst
65e Northern Hilly Gulf Coastal Plain	67g Southern Shale Valleys	71f Western Highland Rim
65i Fall Line Hills	67h Southern Sandstone Ridges	71g Eastern Highland Rim
65j Transition Hills	67i Southern Dissected Ridges & Knobs	71h Outer Nashville Basin
66d Southern Crystaline Ridges and Mountains	68a Cumberland Plateau	71i Inner Nashville Basin
66e Southern Sedimentary Ridges	68b Sequatchie Valley	73a Northern Holocene Meander Belts
66f Limestone Valleys and Coves	68c Plateau Escarpment	73b Northern Pleistocene Valley Trains
66g Southern Metasedimentary Mountains	68d Southern Table Plateaus	74a Bluff Hills
66i High Mountains	69d Dissected Appalachian Plateau	74b Loess Plains
66j Broad Basins		

Figure 3: Level IV Ecoregions in Tennessee

D. Monitoring Priorities

The division maintains a statewide monitoring system consisting of approximately 7,600 stations (Figure 4) sampled on a rotating basis. In addition, new stations are created every year to increase the number of assessed streams. Stations are sampled monthly, quarterly, semi-annually, or annually depending on the objectives of the project. Within each watershed cycle, the locations of monitoring stations are coordinated between the central office and staff in the eight Environmental Field Offices (EFOs) and the Mining Unit located across the state, based on the following priorities (Figure 5).

1. **Antidegradation Monitoring:** Before the division can authorize new or increased degradation in Tennessee waterbodies (some exceptions exist), the appropriate categories under the Antidegradation Policy must be determined. These categories are (1) Available Parameters or (2) Unavailable Parameters, (3) Exceptional Tennessee Waters, and (4) Outstanding National Resource Waters (ONRWs). ONRWs can only be established by promulgation by the Tennessee Board of Water Quality, Oil and Gas. Categories 1 and 2 are on a "parameter by parameter" basis considering the existing water quality of the stream. Exceptional Tennessee Waters (ETWs) must be identified by division staff based on 7 identifying characteristics established in Rule 0400-40-03-.06(4). Waterbodies can be in more than one category at a time, due to the parameter-specific nature of categories 1 and 2 above.

   Streams are evaluated as needed in response to requests for new or expanded National Pollutant Discharge Elimination System (NPDES) and Aquatic Resource Alteration Permit (ARAP) individual permits, including ARAP water withdrawal applications. When the waterbody requiring an antidegradation determination does not have recent water quality data from the last five years , surveys must be done by field office staff, unless the applicant is willing to provide the needed information in a timely manner. In some circumstances, older data may be used if the field staff believes they are still valid. Because the identification of antidegradation status must be determined prior to permit issuance, this work is done on the highest priority basis.

   Streams are evaluated for antidegradation status based on a standardized ETW and Waterbody Use Support evaluation process, which includes information on specialized recreation uses, scenic values, ecological consideration, biological integrity and attainment of water quality criteria. Since permit requests generally cannot be anticipated, these evaluations are generally not included in the workplan. The number of antidegradation evaluations conducted by the state is steadily increasing as the process becomes more refined and standardized.

2. **Posted Streams**: When the department issues advisories due to elevated public health risks from excessive pathogen or contaminant levels in fish, it accepts a responsibility to monitor changes in those streams. In the case of fishing advisories, in conjunction with the monitoring cycle, field office staff should determine when tissue samples were last collected. If appropriate, the state lab is contracted to sample in the upcoming watershed year, unless another agency like TWRA or TVA are willing to do the collections. During review of field office monitoring plans for the upcoming watershed year, central office may also discuss needed tissue sampling with the field office.

   For pathogen advisories, in conjunction with the monitoring cycle, monthly *E. coli* samples, plus at least one geo mean sample (5 samples in 30 days) must be collected and analyzed. If another entity (such as an MS4 program) has already planned to collect samples, that effort can substitute for division sampling, if staff have confidence that the other entity can meet data quality objectives. However, field office staff must confirm that this sampling is taking place, remembering that the ultimate responsibility to ensure that sampling is done remains with the division.

   Field office and central office staff review fish tissue and pathogen results and jointly decide if it appears that an advisory could be proposed for lifting or new advisories issued. Additionally, field office staff have the primary responsibility to ensure that existing signs on posted waterbodies are inspected periodically (annually is preferred) and replaced if damaged or removed.

3. **Ecoregion Reference Streams, Ambient Monitoring Stations, and Southeastern Monitoring Network Trend Stations (SEMN):** Established ecoregion or headwater reference stations are monitored according to the watershed approach schedule. Each station is sampled quarterly for chemical quality and pathogens as well as in spring and fall for macroinvertebrates and habitat. Periphyton is sampled once during the growing season (April – October). Both semi-quantitative single habitat and biorecon benthic samples are collected to provide data for both biocriteria and biorecon guidelines. If watershed screening efforts indicate a potential new reference site, more intensive reference stream monitoring protocols are used to determine potential inclusion in the reference database.

   Ambient Monitoring Sites are the division’s longest existing trend stations and any disruption in sampling over time reduces our ability to make comparisons. Regardless of monitoring cycle, all ambient stations must be sampled quarterly according to the set list of parameters established for this sampling effort.

   Southeastern Monitoring Network Stations (SEMN): Like ambient stations, SEMN stations within each field office area must be sampled every year according to the project plan and grant for this project, regardless of watershed cycle.

4. **Impaired segments:** Water quality limited streams are those that have one or more properties that violate water quality standards. They are considered impaired by pollutants and not fully meeting designated uses. (Streams where water quality is exactly at criteria levels also have "unavailable parameters" and would be considered water quality limited, but as they are not impaired, are not appropriate for 303(d) listing.)

   Like posted streams, by identifying these streams as not meeting water quality standards, the division accepts responsibility to develop control strategies and to continue monitoring in order to track progress towards restoration.

   Impaired waters are monitored, at a minimum, every five years coinciding with the watershed cycle. Waters that do not support fish and aquatic life are sampled once for macroinvertebrates (semi-quantitative sample preferred) and monthly for many of the listed pollutant(s). Streams with impacted recreational uses, such as those impaired due to pathogens are sampled monthly for *E. coli*. Another acceptable sampling strategy for *E. coli* is an approach in which an initial geometric mean is collected (5 samples within a 30-day period) in the first quarter. If the geomean is well over the existing water quality criterion of 126 colony forming units, the waterbody remains impaired with no additional *E. coli* sampling needed. If the geomean results meet the water quality criterion, staff will continue with monthly samples during the remainder of the monitoring cycle. If the geomean is not substantially over the criterion, field staff may at their discretion continue monthly monitoring in the hope that additional samples will indicate that the criterion is met.

   For parameters other than pathogens, resource limitations or data results may sometimes justify fewer sample collections. For example, there are cases where pollutants are at high enough levels that sampling frequency may be reduced while still providing a statistically sound basis for assessments. In other unavoidable circumstances, such as dry streams, samples cannot be collected during a monitoring cycle.

   When developing workplans prior to the next monitoring cycle, field office staff coordinate with the Division of Remediation (DoR) to confirm that any Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites currently on the 303(d) List are being monitored by either DoR or the permittee. These water quality data are reviewed to determine if the site continues to cause or contribute to violations of water quality standards. If data are not available, sampling should be designed to document water quality and provide a rationale for delisting if improvement is observed.

5. **Sampling downstream of Major Dischargers and CAFO's:** During each monitoring cycle, the major dischargers are identified in targeted watersheds. Stations are established at those waterbodies, if the facility does not currently have in-stream monitoring requirements built into their permit. The pollutant of concern and the effect it would have on the receiving stream may determine the location of the station. (Note: stations may not be required for dischargers into very large waterways such as the Mississippi River or large reservoirs.) Frequent collection (monthly recommended) of parameters should include those being discharged, plus a semi-quantitative single habitat (SQSH) survey if the stream is wadeable. Stations downstream of STPs or industries that discharge nutrients should include a SQSH, plus monthly nutrient monitoring.

   Stations should also be established downstream of CAFOs with individual permits or others in which water quality based public complaints have been received. The emphasis should be on monitoring biointegrity (SQSH survey if the stream is wadeable or in a region in which SQBANK surveys can be done) and monthly nutrient and pathogen sampling.

6. **TMDL:** Effectiveness monitoring for completed TMDLs in the watershed group is coordinated between the Watershed Management Unit (WMU) manager and the EFOs to meet objectives for each TMDL. The frequency and parameters monitored for TMDL monitoring depends on the specific TMDL. Detailed information about TMDLs can be found in the department's 106 Monitoring QAPP, (TDEC, 2017), and in the document *Monitoring to Support TMDL Development* (2001).

7. **Special Project Monitoring**: Occasionally, the division is given the opportunity to compete for special EPA grant resources for monitoring and other water quality research projects. If awarded, activities related to these grants become a high priority because the division is under contract to achieve the milestone set out in the workplan.

   Normally, monitoring activities related to these projects are contracted out to the state lab. However, if problems arise, field offices might be called upon if the lab is unable to fulfill the commitment. Examples of historical special studies include: sediment oxygen demand surveys, nutrient studies, ecoregion delineation, coalfield studies, air deposition surveys, reference stream monitoring, and various probabilistic monitoring designs.

8. **Watershed Monitoring**: In addition to the previous priorities, each EFO should monitor additional stations to confirm continued support of designated uses and to increase the number of assessed waterbodies. Macroinvertebrate biorecons, habitat assessments, and

field measurements of DO, specific conductance, pH and temperature are conducted at the majority of these sites. These priorities include:

- Previously assessed segments, particularly large ones, that would likely revert to Category 3 unassessed status. (Note that a single site per assessed segment is generally adequate if assessment was supporting and no changes are evident).

- Sites below ARAP activities or extensive nonpoint source impacts in wadeable streams where biological impairment is suspected. Examples might be unpermitted activities, violations of permit conditions, failure to install or maintain BMPs, large-scale development, clusters of stormwater permits, or a dramatic increase in impervious surfaces.

- Unassessed reaches especially in third order or larger streams or in disturbed headwaters.

8. In addition to monitoring conducted by EFO staff in conjunction with the watershed cycle, other types of monitoring include:

a. **Fish Consumption Advisory**: Fish tissue monitoring for fishing advisories is planned by a workgroup consisting of staff from DWR-TDEC, TVA, ORNL and TWRA. The workgroup historically met annually to coordinate a monitoring strategy. Fish tissue sampling for TDEC is contracted to the state laboratory.

b. **NPDES Monitoring**: Tennessee is requiring some permitted dischargers to conduct upstream and downstream biological and habitat monitoring consistent with the division's macroinvertebrate QSSOP (TDEC, 2017). These data are submitted to the state for evaluation. In this way, Tennessee can supplement its monitoring program and permitted dischargers can take the lead in providing information about their receiving stream.

c. **Reservoir Monitoring:** Tennessee is dependent on TVA and USACE for the majority of these data. Timeline for monitoring is dependent on availability of these agencies or federal funding if they are not available.

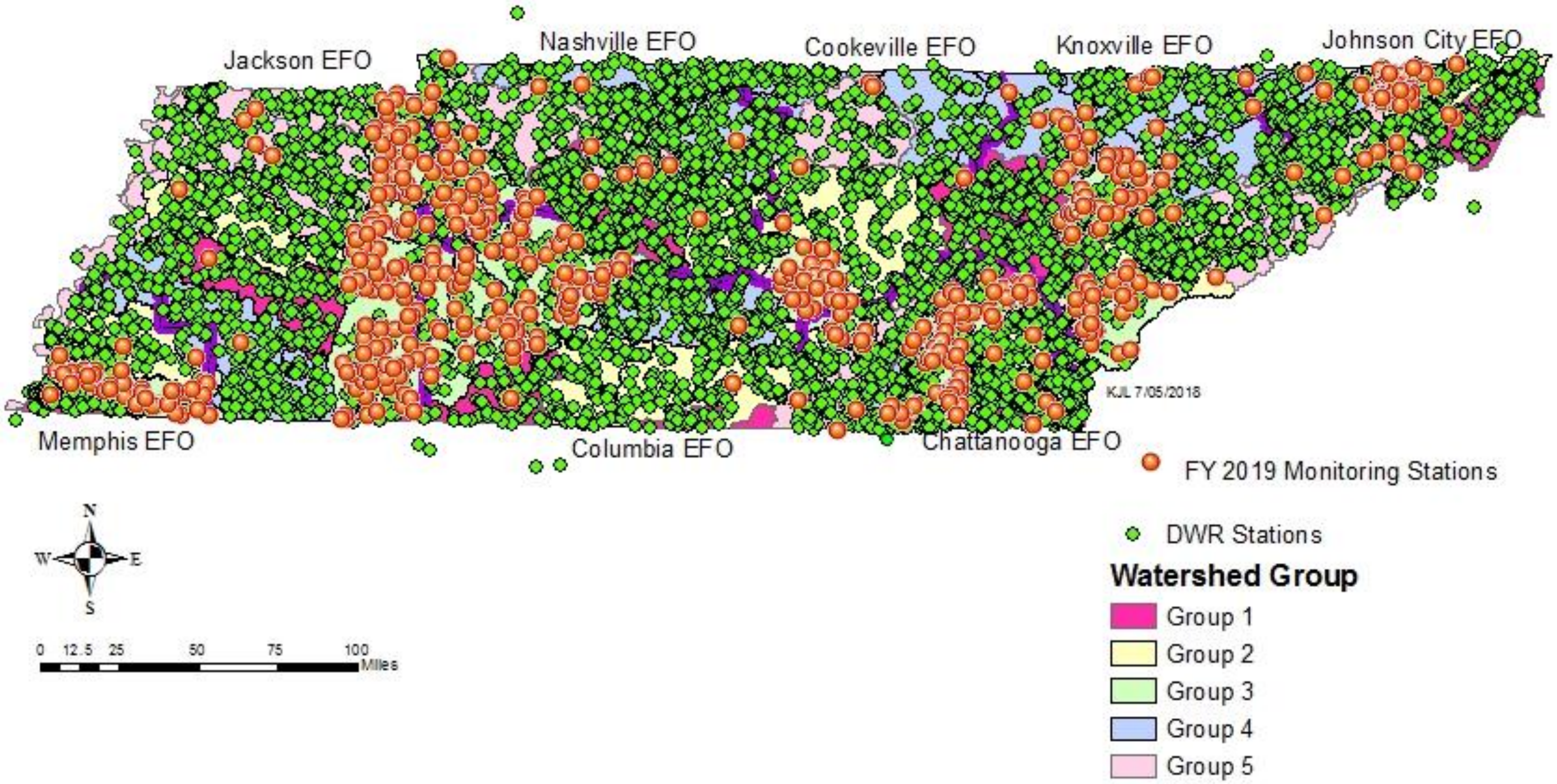


Figure 4: Water Quality Monitoring Stations in Tennessee.
(Includes biological, chemical and bacteriological stations.)

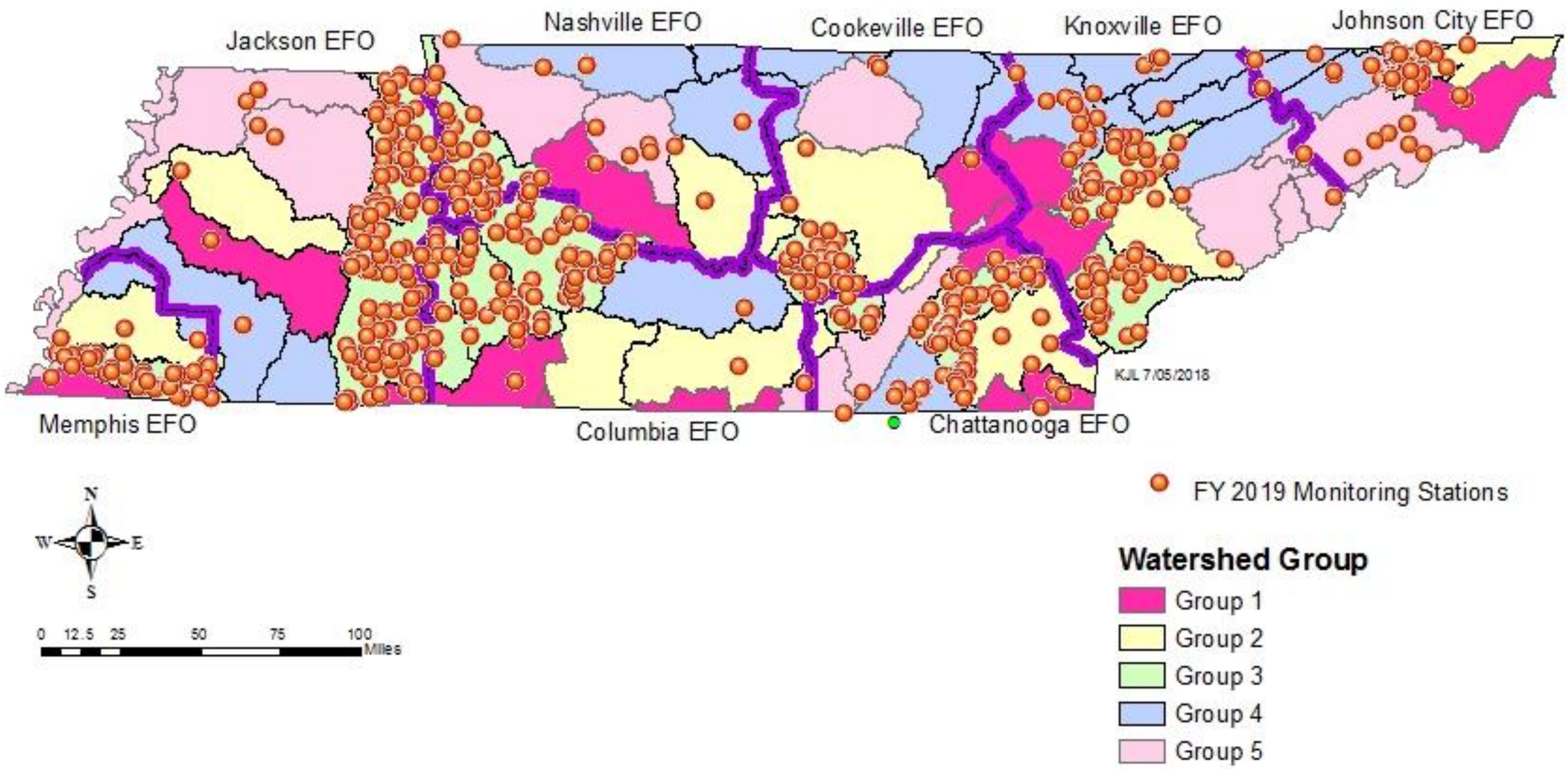


Figure 5: Monitoring Stations Scheduled to be Sampled Between July 2018 and June 2019
(Includes biological, chemical and bacteriological stations.)

Large Reservoirs (> 1000 acres)

Tennessee has 29 large reservoirs ranging from the 1,749 acre Chilhowee Reservoir on the Little Tennessee River to the 99,500 acre Kentucky Lake on the Tennessee River. Twenty-seven of these reservoirs are managed by the Tennessee Valley Authority (TVA) (Table 2) or the U.S. Army Corps of Engineers (USACE) (Table 3). All but four are routinely monitored. Seven are shared with other states. These shared lakes include Kentucky Lake, Lake Barkley and Dale Hollow (Kentucky), South Holston Lake (Virginia), Guntersville Lake (Alabama), Pickwick Lake (Alabama and Mississippi), and Calderwood Lake (North Carolina). Expertise and data are available from TVA, USACE and Alcoa Power Generating Incorporated (APGI).

Table 2: Reservoirs sampled by TVA

Beech	Melton Hill
Blue Ridge	Nickajack
Boone	Normandy
Cherokee	Norris
Chickamauga	Parksville
Douglas	Pickwick
Ft. Loudoun	South Holston
Ft. Patrick Henry	Tellico
Great Falls	Tims Ford
Guntersville	Watauga
Hiwassee	Watts Bar
Kentucky	Wheeler

Table 3: Reservoirs sampled by USACE

Dale Hollow	Old Hickory
Center Hill	Cheatham
J. Percy Priest	Barkley
Cordell Hull	

TVA samples reservoirs in three areas: the inflow area, which is generally riverine in nature, the transition zone or mid-reservoir, and the forebay. Due to meteorological conditions and year-to-year variation, TVA samples the reservoirs for five consecutive years. After that initial consecutive five years of sample collection, sampling occurs on an every other year basis (Table 4).

Table 4: TVA Sample Schedule

Ecological indicators	Sampling Frequency
benthic macroinvertebrates	Late autumn/early winter
chlorophyll	Monthly
dissolved oxygen	Monthly
fish assemblage	Autumn
sediment	Once in mid-summer

Medium Reservoirs (251- 1000 acres)

Tennessee has 16 reservoirs falling in this category. Six are fishing or recreational lakes managed by the TWRA. Eight reservoirs are managed by TVA, with 3 of these routinely monitored by TVA's Vital Signs Monitoring Program. One reservoir is monitored by Alcoa Aluminum for power production and one is municipal water supply reservoir.

Small Reservoirs (< 250 acres)

Tennessee has approximately 1,500 documented reservoirs smaller than 250 acres (a total that only includes reservoirs that are permitted under the Safe Dams or ARAP programs). There are probably many more. These include one TVA managed reservoir (Wilbur Lake), municipal lakes, state parks, city parks, resorts, community developments, agricultural ponds and private lakes. There is little historic data on many of these impoundments. Although they are small, they are often in headwater areas and have the potential to affect downstream reaches. In 2006, downstream reaches of 75 of these small impoundments were monitored as part of a probabilistic study funded by 104(b)3 (Arnwine, et.al., 2006)

E. Critical and Secondary Water Quality Indicators

a. Biological Water Quality Indicators Critical Biological

The state relies heavily on macroinvertebrate monitoring for assessing fish and aquatic life use support. Two types of biological monitoring represent the critical biological indicators in Tennessee.

Semi-quantitative Single Habitat macroinvertebrate samples (SQSH) are used for stream antidegradation category evaluations, TMDLs, permit compliance and enforcement, nutrient impaired streams as well as reference stream monitoring to refine biocriteria guidelines. In recent years this type of sampling has increased for routine watershed surveys. Regional biointegrity goals based on a multi-metric index composed of seven biometrics have been calculated and provide guidelines for each bioregion (TDEC, 2017).

For most bioregions, the seven semi-quantitative single habitat (SQSH) indices are:

1. Taxa Richness
2. EPT Richness (Ephemeroptera, Plecoptera, Trichoptera)
3. EPT Density – *Cheumatopsyche* spp.
4. North Carolina Biotic Index (NCBI)
5. Density of Oligochaetes and Chironomids
6. Density of Clingers – *Cheumatopsyche* spp.
7. Density of Tennessee nutrient tolerant organisms

In bioregion 73a, the seven semi-quantitative single habitat (SQSH) indices are:

1. Taxa Richness
2. ETO Richness (Ephemeroptera, Trichoptera, Odonata)
3. EPT Density – *Cheumatopsyche* spp.
4. North Carolina Biotic Index (NCBI)
5. Density of Oligochaetes and Chironomids
6. Density of CRMOL (Crustacea and Mollusca)
7. Density of Tennessee nutrient tolerant organisms

Macroinvertebrate biorecons are a screening tool used for many routine watershed assessments. Biorecons have been performed at reference streams to refine biorecon guidelines. At test streams, a multi-metric index comprised of three qualitative biometrics is calculated and compared to reference guidelines for the bioregion.

For most biorecons, the three biorecon biometrics are:

1. Taxa Richness
2. EPT Richness (Ephemeroptera, Plecoptera, Trichoptera)
3. Intolerant Taxa Richness

In bioregion 73, the three biorecon metrics are:

1. Taxa Richness
2. ETO Richness (Ephemeroptera, Trichoptera, Odonata)
3. CRMOL Richness (Crustacea and Mollusca)

b. Secondary Biological

- Fish IBI
- Periphyton (has been added to reference monitoring and may become critical in nutrient impaired streams once guidelines are developed).
- Chlorophyll *a*

2. **Habitat/Physical**

a. Critical

Habitat assessments adapted from protocols by Barbour et al. (1999) are conducted in conjunction with all biological monitoring and some chemical monitoring. The division has found these especially useful in assessing impairment due to riparian loss, erosion and sedimentation. The division’s macroinvertebrate QSSOP (TDEC, 2017) defines regional expectations based on reference streams for each of the parameters addressed in the assessment.

1. Epifaunal Substrate/Available Cover
2. Embeddedness of Riffles
3. Channel Substrate Characterization
4. Velocity Depth Regimes
5. Pool Variability
6. Sediment Deposition
7. Channel Flow Status
8. Channel Alteration
9. Frequency Re-oxygenation Zones
10. Channel Sinuosity
11. Bank Stability
12. Bank Vegetative Protection
13. Riparian Vegetative Zone Width

b. Secondary Physical/Habitat

- Canopy Cover
- Stream Profile
- Particle Count
- Flow

3. Critical and Secondary Chemical/Toxicological

The type of chemical sampling depends on the monitoring needs. Minimally, the following are collected:

- Routine Watershed Screenings: Critical: dissolved oxygen, pH, temperature, specific conductance. Parameters are found in Table 11.
- 303(d) List: Including, but not limited to the parameters the segment is listed for.
- Fish Consumption: Metals and/or priority organics. Metals may be limited to mercury only.
- Contact Advisory: Critical: *E. coli*, Non-critical: fecal coliform.
- Permit Compliance/Enforcement: Parameters limited in permit.
- Reference Streams: Ecoregion and FECO site parameters are found in Table 11.
- Monitoring is dependent on the type of TMDL needed.

F. Quality Management and Assurance Plans

The most recent version of TDEC’s Quality Management Plan was approved by EPA in November 2016. This plan is a part of TDEC’s agreement to develop and implement Standard Operating Procedures, Quality Assurance Project Plans, Data Quality Objectives, etc. EPA requires states that receive federal grant dollars to have a “Bureau Wide” Quality Management Plan under its grant conditions. Further, EPA occasionally reviews individual Division quality management documents when it conducts semi-annual and annual reviews.

TDEC DWR has developed three Quality System Standard Operating Procedures (QSSOP) for use as guidance for collecting water pollution control data and appropriate quality control in the state. The *QSSOP for Macroinvertebrate Stream Survey* (TDEC, 2017) was first published in March of 2002 and was revised in October 2006 and June 2011. The *QSSOP for Chemical and Bacteriological Sampling of Surface Waters* was first published in March of 2004 and revised in 2009,June 2011 (TDEC, 2011) and July 2018 (TDEC, 2018). The *QSSOP for Periphyton Stream Surveys* was completed in 2010 (TDEC, 2010). Each year, the division submits a *Quality Assurance Project Plan* to EPA (TDEC, 2017). This document describes monitoring, analyses, quality control, and assessment procedures used by the division to develop TMDLs, 305(b) and 303(d) assessments.

All documents are reviewed annually and revised as needed. A copy of any document revisions made during the year is sent to all appropriate stakeholders and posted on the website. A report is made to the Deputy Commissioner and Quality Assurance Manager of any changes that occur.

Division staff is trained on field techniques outlined in the documents during the division's annual meeting and during biological workshops. Biological, nutrient and metal samples are analyzed by the TDH Environmental Laboratories. Organic chemical, routine inorganic samples and most bacteriological and periphyton samples are analyzed by contract labs. The biological laboratory follows the QSSOP for macroinvertebrate (TDEC, 2017) and for periphyton (TDEC, 2010) sample analysis. The state and contract chemistry and bacteriological laboratories have standard operating procedures which follow approved EPA methodologies. EPA audits the state laboratories on a regular schedule.

Quality Assurance Guidelines for Macroinvertebrate Surveys as specified in the 2017 QSSOP:

1. 10% of habitat assessments and biological samples are repeated by a second investigator.
2. Chain of custody is maintained on all biological samples.
3. A bound log or digital sample log with backup is maintained for biological samples.
4. 10% of all biological samples are re-sorted and re-identified by a second taxonomist.
5. Reference collections are maintained at the central laboratory for each taxon found in Tennessee. New specimens are verified by outside experts.
6. A minimum of 10% of all data entry and statistical calculations are verified.
7. Staff are trained and updated on new techniques as a group during the division's annual meeting or biologists training workshop.
8. Taxonomic staff must pass taxonomic identification tests annually.

Quality Assurance Guidelines for Periphyton Stream Surveys as specified in the 2010 QSSOP:

The same quality assurance required for macroinvertebrate surveys is necessary for periphyton surveys, with the exception of the reference collections. A master collection of images of all taxa identified in the state is maintained at the central Laboratory. As with macroinvertebrates, new specimens are verified by outside experts.

Quality Assurance for Chemical Field Collections as specified in the 2018 QSSOP:

1. Duplicates, field, and equipment blanks, are collected at 10% of sites.
2. Trip blanks are collected at 10% of trips.
3. Temperature blanks are included in each sample cooler.
4. Water quality probes are calibrated weekly (DO is calibrated daily) and include daily post-calibrations.
5. Duplicate field measurements are recorded at each station.
6. Chain of custody is maintained on all samples.
7. Staff are trained and updated on new techniques as a group during the division's annual meeting or biologists training workshop.

G. Data Management through Electronic Data Systems

Tennessee's water quality assessment data are stored in EPA's Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS). ATTAINS is being used for the first time this year and replaces the previous EPA system, the Assessment Database (ADB). ATTAINS is also the EPA water quality assessment reporting tool replacing the previous narrative 303(d) List and 305(b) Reports. Assessments are geo-referenced and maps are provided to help users find streams within specific watersheds. Streams are color coded according to their water quality status.

The public has access to assessment information through TDEC's online assessment database. The website links information in the assessment database to an interactive map using the Geographic Information System (GIS) http://tn.gov/environment/article/wr-water-resources-data-viewer GIS mapping tool to reflect previous, current and potential stream mitigation projects across the state. The information for is updated daily.

In the early 1970s, EPA developed the national water quality STOrage and RETrieval database called STORET. This database allowed for easy access to bacteriological and chemical information collected throughout the state and nation. TDEC Water Pollution Control station locations and chemical and bacteriological data were uploaded into the database quarterly. In September 2009, EPA ceased support of the current format that data are uploaded to STORET. The last historical data upload from TDEC WPC was sent to EPA the end of September 2009. The historical STORET data is found at https://www.epa.gov/waterdata/water-quality-data-wqx

In 2009, EPA developed the Water Quality Exchange (WQX), to replace STORET. WQX is a framework that is intended to make it easier for States, Tribes, and others to submit and share water quality monitoring data over the Internet DWR has successfully loaded chemical and bacteriological data (post 2009), as well as all electronically available fish tissue and habitat data and detailed information for over 7600 monitoring stations into the WQX framework.

Macroinvertebrate and, periphyton data from 1996 through July 2017 are temporarily stored in the division's Access water quality database. DWR is uploading current biological data into an Oracle platform and is in the process of migrating earlier data from the Access Database. The chemical and bacteriological data are accessible to the public on the Division's permit data viewer: http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34510:::::: in the ambient monitoring tab.

H. Data Analysis/Assessment of Water Quality

The water quality assessment process in Tennessee consists of four parts:

1. Development of clean water goals (water quality standards) either by promulgating national numeric criteria, statewide narrative criteria, or regional goals based on reference conditions.

2. Implementation of a statewide water quality monitoring program, based on a watershed cycle.

3. Comparison of data to water quality standards for each waterbody in order to assess water quality and to categorize use support.

4. Geographic referencing of all water resources with the National Hydrography Dataset (NHD).

Water Quality Standards

The *Tennessee Water Quality Control Act* requires the protection of water quality in Tennessee. Tennessee first adopted water quality standards in 1967 and has amended them several times thereafter. Water quality standards consist of two principle regulations:

1. "Use Classifications for Surface Waters", Chapter 0400-40-04
2. "General Water Quality Criteria", Chapter 0400-40-03

The three essential elements comprising water quality standards as defined by Section 303 of the Federal Clean Water Act, PL 107 - 303, are stream use classifications, water quality criteria and the antidegradation statement.

Classification + Criteria + Antidegradation = Standards

1. Stream-use Classification

Tennessee's criteria specify baseline values for particular parameters of water quality necessary for the protection and maintenance of a prescribed use classification. The State has established seven principal uses of the waters for which criteria of quality are defined.

a. **Fish and Aquatic Life (FAL)** - Criteria protect fish and other aquatic life such as macroinvertebrates. These criteria are based on two types of toxicity. The first is acute toxicity, which refers to the level of a contaminant that causes death in organisms in a relatively short time. The other type is chronic toxicity. Chronic criteria are based on a lower level of a contaminant that causes death over a longer period of time or has other effects such as reproductive failure or the inhibition of growth. Fish and aquatic life criteria are generally the most stringent criteria for toxic substances.

b. **Recreation** - This classification protects the use of streams for swimming, wading, and fishing. Threats to the public's recreational uses of waters include loss of aesthetic values, elevated pathogen levels, and the accumulation of dangerous levels of metals or organic compounds in fish tissue. Tennessee coordinates with TVA, ORNL and TWRA to monitor levels of contaminants in fish. Waterbodies that pose an unacceptable risk to human health are posted for bacteriological or fish consumption advisories.

c. **Irrigation** - Irrigation criteria protect the quality of water so it may be used for agricultural needs.

d. **Livestock Watering and Wildlife** - These criteria protect farm animals and wildlife.

e. **Drinking Water Supply** - Drinking water criteria insure that water supplies contain no substances that might cause a public health threat, following conventional water treatment. Since many contaminants are difficult and expensive to remove, it is more cost-effective to keep pollutants from entering the water supply in the first place.

f. **Navigation** - This use is designed to protect navigational rivers and reservoirs from any alterations that would adversely affect commercial uses.

g. **Industrial Water Supply** - These criteria protect the quality of water used for industrial purposes.

Tennessee has approximately 60,000 stream miles and over 570,000 publicly owned lake and reservoir acres. Most are classified for at least four public uses: protection of fish and aquatic life, recreation, irrigation, and livestock watering and wildlife. These minimum use classifications comply with the Federal Water Pollution Control Act, which requires that all waters provide for the "protection and propagation of a balanced population of fish and wildlife, and allow recreational activities in and on the water" (U.S. Congress, 2002).

Specific designated Use Classifications for Surface Waters in Tennessee are listed in the Rules of TDEC, Chapter 0400-40-04 (TDEC-WQOGB, 2013). All surface waters that are not specifically listed in the regulations are classified for fish and aquatic life, recreation, irrigation, livestock watering and wildlife.

2. Water Quality Criteria and Assessment Methodologies

The Water Quality Oil and Gas Board (WQOGB) has assigned specific water quality criteria to each of the designated uses. These criteria establish the level of water quality needed to support each of the designated uses. There are two types of criteria:

- **Numeric criteria -** Establish measurable thresholds for physical parameters and chemical concentrations to support classified uses.

- **Narrative criteria -** Are written descriptions of water quality. These descriptions generally state that the waters should be "free from" particular types or effects of pollution. To help provide regional interpretations of narrative criteria, guidance documents have been developed by the division for biological integrity, habitat and nutrient narrative criteria.

The regulations require that the most stringent criteria be applied to the waterbody. Typically, the most stringent criteria are for the protection of fish and aquatic life or recreational uses. General Water Quality Criteria for surface waters in Tennessee are listed in the Rules of TDEC, Chapter 0400-40-03 (TDEC-WQOGB, 2013).

Water quality assessments are the application of water quality criteria to ambient monitoring results to determine if waters are supportive of all designated uses. To facilitate this process, several provisions have been made:

To help the division interpret water quality expectations for biological integrity, nutrients and habitat, guidance documents for wadeable streams have been developed. These documents are referred to in the General Water Quality Criteria (TDEC-WPCB, 2013).

- Numeric criteria define physical and chemical conditions that are required to maintain designated uses.

- In order to make defensible assessments, data quality objectives must be met. For some parameters, a minimum number of observations are required in order to have increased confidence in the accuracy of the assessment.

- Provisions in the water quality criteria instruct staff to determine whether violations are caused by man-induced or natural conditions. Natural conditions are not considered pollution.

- The magnitude, frequency and duration of violations are considered in the assessment process.

- ♦ Streams in some ecoregions naturally go dry or subterranean during prolonged periods of low flow. Evaluations of biological integrity differentiate whether streams have been recently dry or have been affected by man-induced conditions.

- ♦ Waterbodies on the 303(d) List remain on the list until sufficient recent data provide a rationale for removing the waterbody from the list.

The following guidelines are used for determining specific causes of pollution:

a. Metals and Organics Criteria

One or two chemical samples are not considered an accurate representation of stream conditions. Therefore, more than two observations are used in assessments. Acute fish and aquatic life protection criteria are used, unless a site has 12 or more chemical collections. If a site has 12 or more chemical collections, chronic criteria are applied.

Metals data are appropriately “translated” according to the water quality standards before being compared to criteria. For example, toxicity of metals is altered by stream hardness and the amount of total suspended solids in the stream. Widely-accepted methodologies are used to make these and other translations of the data. The division consults with EPA concerning the latest revisions to the national criteria and updates the state criteria as appropriate.

b. Pathogens

Waterbodies are not assessed as impaired due to high bacteria levels with less than three water samples. The only waters assessed with one or two observations are those previously listed due to elevated bacteria levels or streams with obviously gross conditions, such as failing animal waste lagoons.

E. coli data are generally considered more reflective of true pathogen risk than are fecal coliform data. During the 1997 triennial review process, Tennessee added *E. coli* criteria to its existing fecal coliform criteria. This gave the regulated community time to become accustomed to the new criteria before fecal coliform were removed during the 2003 review.

If flow data are available, low flow, dry season data are considered more meaningful than high flow, wet season data. In the absence of flow data, samples collected in late summer and fall are considered low flow or dry season samples. Wet season pathogen samples are not disregarded. They are simply given less weight than dry season pathogen samples.

c. Dissolved Oxygen

For streams identified as trout streams, including tailwaters, the minimum DO standard is 6.0 mg/L. Streams designated as supporting a naturally reproducing population of trout have a DO standard of not less than 8.0 mg/L. This also includes tributaries to naturally reproducing trout streams as well as all streams in the Great Smoky Mountains National Park. The DO standard in the Blue Ridge Mountains (Ecoregion 66) is 7.0 mg/L. Everywhere else in the state the DO standard is 5.0 mg/L. If the source of the low DO is a natural condition, such as ground water, spring, or wetland, then the low DO is considered a natural condition and not pollution.

d. Nutrients

Regional nutrient goals were developed based on reference condition and are used for guidance when assessing wadeable streams (Denton et al., 2001). Streams are not generally assessed as impaired by nutrients unless biological or aesthetic impacts are also documented.

One or two chemical nutrient observations are considered a valid assessment only if they are supported by evidence of biological impairment. For example, if the macroinvertebrate community in a stream is very poor and/or the amount of algae present indicates organic enrichment, then one or two nutrient samples could be used to identify a suspected cause of pollution.

e. Suspended Solids/Siltation

Historically, silt has been one of the primary pollutants in Tennessee waterways. The division has experimented with multiple ways to determine stream impairment due to siltation. These methods include visual observations, chemical analysis (total suspended solids), and macroinvertebrate/habitat surveys. Biological surveys that include a habitat assessment have proven to be the most satisfactory method for identification of impairment. Through monitoring reference streams, staff found that the appearance of sediment in the water is often, but not always, associated with loss of biological integrity. Additionally, ecoregions vary in the amounts of silt that can be tolerated before aquatic life is impaired. Thus, for water quality assessment purposes, it is important to establish whether or not aquatic life is being impaired. For those streams where loss of biological integrity can be documented, the habitat assessment can determine if the stream has excessive amounts of silt.

The division has developed regional expectations based on reference data for the individual habitat parameters most associated with sedimentation including embeddedness and sediment deposition. These values are published in the macroinvertebrate QSSOP (TDEC, 2017) and reviewed annually.

f. Biological Criteria

Biological surveys using macroinvertebrates as the indicator organisms are the preferred method for assessing support of the fish and aquatic life designated use in wadeable streams. Two standardized biological methods, biorecons and semi-quantitative single habitat (SQSH) samples, are used to produce a biological index score. These methods are described in the macroinvertebrate QSSOP (TDEC, 2017).

For watershed screening the most frequently utilized biological surveys has historically been qualitative biorecons. Biological scores are compared to qualitative metric values obtained in ecoregion reference streams. The principal metrics used are the total families (or genera), the number of mayfly, stonefly and caddisfly (EPT) families (or genera), and the number of pollution intolerant families (or genera) found in a stream. The biorecon index is scored on a scale that goes from 1 - 15. A score less than or equal to 5 is considered impaired. A score equal to or greater than 11 is considered supporting. Scores of 7 or 9 are ambiguous and must be supplemented with other information such as chemical data, habitat data or a more intensive biological survey.

If a more definitive assessment is needed in a wadeable stream, a single habitat, semi-quantitative sample is collected. To be comparable to ecoregions guidance, streams must be of comparable size as the reference streams in a given ecoregion and must have been sampled similarly and at least 80 percent of the upstream drainage in that ecoregion. If both biorecon and single habitat semi-quantitative data are available, and the assessments do not agree, more weight is given to the single habitat semi-quantitative samples unless it is determined the targeted habitat was naturally limiting. Streams are considered impaired where biological integrity falls below the expected range of conditions found at reference streams.

g. Habitat

Division staff use a standardized scoring system developed by EPA to rate the habitat in a stream (Barbour, et. al., 1999). The macroinvertebrate QSSOP (TDEC, 2017) provides guidance for completing a habitat assessment and how to evaluate the results. Habitat scores calculated by division biologists are compared to the guidelines developed from the ecoregion reference stream data. Streams with habitat scores lower than the guidance for the region are considered impaired, unless biological integrity meets expectations. If biological integrity meets ecoregional expectations, then poor habitat is not considered impairment.

h. pH

The pH criterion for wadeable streams is 6.0 - 9.0. For nonwadeable rivers, streams, reservoirs and wetlands the pH criterion is 6.5 - 9.0. Also, pH values cannot fluctuate more than 1.0 in 24 hours. Waterbodies with pH values outside these ranges are considered impaired.

3. Antidegradation

As one of the elements comprising Tennessee's water quality standards, the antidegradation statement has been contained in the criteria document since 1967. EPA has required the states, as a part of the standards process, to develop a policy and an implementation procedure for the antidegradation statement.

> "Additionally, the Tennessee Water Quality Standards shall not be construed as permitting the degradation of high quality surface waters. Where the quality of Tennessee waters is better than the level necessary to support propagation of fish, shellfish, and wildlife, or recreation in and on the water, that quality will be maintained and protected unless the Department finds, after intergovernmental coordination and public participation, that lowering water quality is necessary to accommodate important economic or social development in the area in which the waters are located." (TDEC-WQOGB, 2013).

A three-tiered antidegradation statement was incorporated into Tennessee's 1994 revisions. In the 1997 triennial review, the three tiers were more fully defined. A procedure for determining the proper tier of a stream was developed in 1998. The evaluation took into account specialized recreation, scenic considerations, ecology, biological integrity and water quality.

Tennessee further refined the antidegradation statement in 2004 specifying that alternatives analyses must take place before new or expanded discharges can be allowed in Tier I waters.

In 2006 the antidegradation statement was revised and the Tier designations were replaced by the following categories. (TDEC-WQCB, 2007). The antidegradation statement has been revised in the 2013 version of the Water Quality Standards. (TDEC-WQOGB, 2013).

a. **Unavailable parameters** exist where water quality is at, or fails to meet water quality criteria in Rule 0400-40-03-.06(2) (the criterion for one or more parameters)

b. **Available parameters** exist where water quality is better than the levels specified in the water quality criteria in Rule 0400-40-03-.06(3).

c. **Exceptional Tennessee Waters (ETW)** are waters that are in any one of the following categories (Rule 0400-40-03-.06(4)):

    - Waters within state or national parks, wildlife refuges, wilderness areas or natural areas.
    - State Scenic Rivers or Federal Wild and Scenic Rivers.
    - Federally-designated critical habitat or other waters with documented non-experimental populations of state or federally-listed threatened or endangered aquatic or semi-aquatic plants or animals.
    - Waters within areas designated Lands Unsuitable for Mining.
    - Waters with naturally reproducing trout.
    - Waters with exceptional biological diversity as evidenced by a score of 40 or 42 on the TMI (or a score of 28 or 30 in subregion 73a), provided that the sample is considered representative of overall stream conditions.
    - Other waters with outstanding ecological or recreational value as determined by the Department.

d. **Outstanding National Resource Waters** (ONRWs) - These Exceptional Tennessee Waters constitute an outstanding national resource due to their exceptional recreational or ecological significance. In 1998, the Water Pollution Control Board voted to accept six of the eight streams proposed for listing as ONRWs. The following streams or portions of the streams are designated as ONRWs are: Little River, Abrams Creek, West Prong Little Pigeon River, Little Pigeon River, Big South Fork Cumberland River and Reelfoot Lake (Rule 0400-40-03-.06(5).

In 1999, the Obed River was conditionally added as an ONRW. The condition placed upon the designation was that if the Obed were identified as the only viable drinking water source for Cumberland County, it would revert back to ETW status.

Information on waterbodies that have been evaluated and are identified as Exceptional Tennessee Waters is entered in the Waterlog database and is located on the TDEC website http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34304:1963060327755:::::

4. Categorization of Use Support and Assessment Process

In order to determine use support, it must be decided if the stream, river or reservoir meets water quality criteria. Monitored waters are compared to the most restrictive water quality standards to determine if they meet their designated uses. Generally, the most stringent criteria are for recreational use and support of fish and aquatic life.

To facilitate these analyses, all major rivers, streams, reservoirs and lakes have been placed into georeferencing sections called waterbody segments. These waterbody segments are given unique identification numbers that reference an eight-digit watershed Hydrologic Unit Code (HUC), plus a reach, and segment number.

All available water quality data are considered; however, not all data comply with state quality control standards and approved collection techniques. Assessments must be founded on scientifically sound monitoring methodologies. After use support is determined, waterbodies are placed in one of the five categories recommended by EPA.

- **Category 1** waters are those waterbody segments which have been monitored and meet water quality criteria for all uses. The biological integrity of Category 1 waters is comparable with reference streams in the same subecoregion and pathogen criteria are met. Previously these waterbodies were reported as fully supporting.

- **Category 2** waters have only been monitored for some uses and have been assessed as fully supporting of those uses, but have not been assessed for the other designated uses. Often these waterbodies have been assessed and are fully supporting of fish and aquatic life, but have not been assessed for recreational use. In previous assessments, these waters were assessed as fully supporting.

- **Category 3** waters have insufficient or outdated data and therefore have not been assessed. These waters are targeted for future monitoring. In previous assessments, these waterbodies were identified as not assessed.

- **Category 4** waters are waters that have been monitored and found to be impaired for one or more uses, but a TMDL is not required. These waters are included in the 303(d) impaired waters list. Category 4 has been subdivided into three subcategories. Previously, these waters were reported as either partially or non-supporting.

  - **Category 4a** impaired waters have had all necessary TMDLs approved by EPA.

  - **Category 4b** impaired waters do not require TMDL development since "other pollution control requirements required by local, State or Federal authority are expected to address all water-quality pollutants" (EPA, 2003).

  - **Category 4c** waters are those in which the impacts are not caused by a pollutant (e.g. certain habitat alterations).

- **Category 5** waters have been monitored, and found not to meet one or more water quality standards. In previous assessments, these waters have been identified as partially supporting or not supporting designated uses. Category 5 waterbodies are moderately to highly impaired by pollution and need the development of TMDLs for known impairments.

TDEC strongly prefers to base assessments on recently collected data. Judgments based on modeling or land use information are much harder to defend. With given resources, it is not possible to monitor all of Tennessee's waterbodies every two years for 305(b) reporting purposes. Therefore, monitoring and assessments are conducted on the five-year rotating schedule.

The division continues to increase its reliance on rapid biological assessments. These assessments provide a quick and accurate assessment of the general water quality and aquatic life use support in a stream. However, biological assessments do not provide information to pinpoint specific toxic pollutants or bacterial levels in water. The challenge in the next few years will be to combine biological assessments with chemical and bacteriological data so that both use support status and accurate cause and source information can be generated.

5. Data Sources

The division uses all reliable data gathered in the state for the assessment of Tennessee's waterways. These include data from TDEC, other state and federal agencies, citizens, universities, the regulated community, and the private sector. Every year, the division issues public notices requesting water quality data for use in the statewide water quality assessment. In addition other state and federal agencies known to have data are contacted directly for monitoring information. Tennessee regularly receives data from TVA, USGS, TWRA, and USACE. Biological and habitat data submitted by NPDES dischargers as part of permit requirements are also used.

All submitted data are considered. If data reliability cannot be established, submitted data are used to screen streams for future studies. If the data from the division and another reliable source do not agree, more weight is given to the division's data unless the other data are considerably more recent.

6. Data Use

The division's goal is to make assessments by quantifiable measures (objective) and therefore, require less professional (subjective) judgment (Table 5). DWR is accomplishing this goal as follows:

Criteria have been further refined to assist in the assessment of water quality data. The ecoregion project has dramatically reduced the uncertainty associated with the application of statewide narrative and numerical criteria.

By use of geographic referencing tools such as the National Hydrography Dataset (NHD), water segments have been further refined to allow more precise water quality assessments. Data from a sampling point are extrapolated over a much shorter distance than in the past. The decision on how far the information is applicable is made on a site-by-site basis using factors such as amount and type of data and the uniformity of the stream.

Minimum data requirements for some of the specific types of data have been set.

Critical periods have been determined for various criteria. Certain collection seasons and types of data have proven more important for the protection of specific water uses. For instance, the critical period for parameters like toxic metals or organics is the low flow season of late summer and early fall. Water contact activities like swimming and wading are most likely to occur in the summer.

Table 5. Types of Data Used in the Water Quality Assessment Process

Chemical Data	Biological Data	Physical Data	Sediment And Tissue Data
Compliance monitoring performed at the approximately 1,100 permitted dischargers in Tennessee. Data collected as a result of complaint investigations, fish kills, spills, and in support of enforcement activities.	Rapid biological surveys completed in association with the watershed project. These are performed primarily in tributary streams as a means of monitoring biological integrity.	Temperature and turbidity data collected throughout Tennessee.	Sediment and fish tissue data collected at various sites across Tennessee.
Over 7,600 stations are established by the division to support the watershed approach.	Ecoregion biological monitoring. Benthic and fish IBI scores calculated at many sites.	Quantitative assessments of habitat made in conjunction with biological surveys.	EPA's report *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States.*
Data collected at the division's 137 ecoregion reference (ECO & FECO) sites. (These stations provide a baseline to which other sites within that ecoregion can be compared.)	Bioassay studies of effluent toxicity at most major NPDES dischargers. Many minor facilities also do this type testing.	Time-of-travel studies of flow, dissolved oxygen sags and BOD decay rates.	Locations of existing fishing advisories in Tennessee.
Chemical data collected by other entities.	Biological data collected by other entities.	Physical data collected by other entities.	Sediment and tissue data collected by other entities.

Future Assessment Goals

The division is committed to the ecoregion approach, particularly for the assessment of wadeable rivers and streams. The use of regional reference streams has proven a valuable tool in establishing guidelines for use in determining whether waterbodies meet their designated uses. The division goals, which are to continue to improve the assessment process, are listed in Table 6.

Table 6. Future Assessment Goals

Goal	Milestone	Future Plans
Dissolved oxygen in wadeable streams	Published study of regional dissolved oxygen patterns in 2003 based on diurnal and daylight monitoring. Proposed regional minimum DO criteria based on reference monitoring in 2003.	Continued regional monitoring to enhance existing data. Incorporate criteria base on diurnal patterns (duration and frequency of minimum). Consideration of criteria based on diurnal DO swings in future triennial reviews.
Nutrients in wadeable streams	Published guidance document for regional limits of total phosphorus and nitrate + nitrite in 2001. Incorporated guidance in 2004 WQS.	Continued refinement.
Nutrients in lakes, rivers and non-wadeable streams	Developed criteria development plan in 2004 with revisions in 2007 and 2009. Established biomass criterion in Pickwick Reservoir in 2007.	As resources allow, compose study group of appropriate professionals. Target reservoir for pilot project. Review existing data and look for data gaps. Begin development of criteria guidelines.
Biocriteria	Published macroinvertebrate guidelines for wadeable streams in 2001 which were updated in 2004, 2006, 2011, and 2017. Incorporated guidelines in 2004 WQS. Began monitoring of headwater reference streams in 2009 and published guidelines in 2017. Began monitoring of periphyton at reference streams in 2008.	Continue testing wadeable streams guidelines. Develop guidelines for lakes, reservoirs and rivers Develop periphyton guidelines.

I. Water Quality Reports

Waterbodies will continue to be monitored to fulfill data needs for water quality standards, TMDLs, ATTAINS Integrated Report, and special projects. Progress will be tracked quarterly and provided to the DWR division head for review. An annual report will be submitted to EPA annually by December 31, 2018.

The ATTAINS Integrated Report submitted to EPA details the support status of Tennessee waters as well as sources and causes of pollution. Twenty percent of the state's watersheds are assessed each year with information in uploaded annually to the EPA ATTAINs database. Information for each assessed water body is available through the division's online assessment database. http://tdeconline.tn.gov/dwr/ Surface water chemical and bacteriological results may be viewed at http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34510:

The 303(d) list is a compilation of streams in Tennessee that are not currently meeting water quality standards in spite of the implementation of best available technology (BATs) or best management practices (BMPs). The list is updated in even calendar years as a part of the Integrated Report. The Final 2016 303(d) list was approved by EPA in December 2017 and may be found on TDEC's website.
https://www.tn.gov/content/dam/tn/environment/water/documents/wr_wq_303d-2016-final.pdf

The Proposed Final 2018 303(d) List was submitted to EPA in May 2018 and may be viewed at https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html

Tennessee's water quality standards require the incorporation of the antidegradation policy into regulatory decisions (Chapter 0400-40-03-.06). Part of the responsibility the policy places on the division is identification of Exceptional Tennessee Waters. In Exceptional Tennessee Waters, degradation cannot be authorized unless (1) there is no reasonable alternative to the proposed activity that would render it non-degrading and (2) the activity is in the economic or social interest of the public.

The division has compiled a list of streams based on the characteristics of Exceptional Tennessee Waters set forth in the regulation by the Tennessee Board of Water Quality, Oil and Gas. In general, these characteristics are streams with good water quality, important ecological values, valuable recreational uses, and/or outstanding scenery. Wherever possible, the division has utilized objective measures to apply these characteristics and the basis for each listing is provided. The list is on the TDEC website.
http://tdec.tn.gov:8080/pls/enf_reports/f?p=9034:34304:0::NO

Reports routinely produced by the division include technical publications, informational publications, criteria development reports, and standard operating procedures. In addition to reports, the division is committed to communicating information effectively. To reach this goal, the following products, among others, are provided as part of the reporting process:

- Access to on-line water quality data
- Water quality assessment reports and on-line assessment database
- Data and interpretation for NPDES permit support
- Technical data sets for consultants/researchers
- Spatial and mapping data using Geographical Information System (GIS) tools
- Public outreach information, including the Internet
- Presentations at professional, scientific, citizen and school group meetings

J. Monitoring Program Evaluation

The division evaluates its monitoring program during each planning and assessment cycle and incorporates changes as needed to provide the most comprehensive and effective plan possible with available resources.

1. Evaluation of Monitoring Program Strategy

During development of the annual monitoring workplan, both central office and EFO staff provide input into monitoring needs:

a. The monitoring plan is reviewed to make sure all sampling and assessment priorities are covered.
b. The ATTAINS is used to look for unassessed segments which are incorporated into the monitoring plan whenever possible.
c. During the monitoring plan development, Central Office and EFO staff coordinates location of monitoring stations and type of samples collected to insure adequate information is provided during that cycle.
d. The location of monitoring stations is coordinated with other state and federal agencies to eliminate duplication of effort.
e. At the end of each monitoring cycle, the plan is reviewed to make sure monitoring needs were covered. Uncompleted sampling or data gaps are incorporated into the next monitoring cycle or might be contracted to the state laboratory for completion.

2. Monitoring Objectives

During evaluation of monitoring objectives, the division strives to:

a. Determine where additional or more current data are needed to enhance the assessment process.
b. Target unassessed segments or those that were originally assessed qualitatively. Incorporate biological monitoring whenever possible to assess fish and aquatic life use support.
c. Develop or refine guidelines for narrative criteria: Refine wadeable streams and develop criteria for rivers, lakes and reservoirs (see nutrient workplan for details).
d. Biological: Refine wadeable streams and develop criteria for rivers, lakes and reservoirs.
e. Habitat: Refine wadeable streams and develop criteria for rivers, lakes and reservoirs.
f. Continue to refine regional numeric criteria whenever possible. Develop diurnal guidelines for dissolved oxygen levels.
g. Revisit monitoring sites every five years to look for changes.
h. Monitor below sites where BMPs or other restoration activities have taken place to assess effectiveness of improvement strategy.
i. Look for opportunities to analyze trends in water quality.

3. Monitoring Design

The division reviews the monitoring program during each cycle to ensure it is efficient and effective in generating data that serve management decision needs and meets the state's water quality management objectives.

a. The antidegradation survey process is reviewed and updated based on feedback from field staff.
b. Ecoregion reference sites are re-evaluated annually. New sites are added whenever possible. Existing sites are dropped if data show the water quality has degraded, the site is not typical of the region, or does not reflect the best attainable conditions. Data from other states are used to test suitability of reference sites. Currently the state is reviewing river, lake and reservoir data to target reference conditions in these systems.
c. Watershed groupings are reviewed and revised if needed to ensure staffing is available for adequate coverage.
d. Periodically, probabilistic monitoring results are compared to targeted monitoring results to check for bias in watershed assessment. Results from both types of monitoring are used in an integrated approach.

4. Critical and Non-Critical Water Quality Indicators

The division reviews both critical and non-critical water quality indicators minimally every three years as part of the triennial review process.

a. Biological guidelines for wadeable streams - New biometrics are tested for possible inclusion or replacement of existing index metrics. Additional reference data are incorporated and biometric ranges are adjusted if needed. Bioregions are tested and boundaries are adjusted if appropriate. Guidelines for rivers, lakes and reservoirs are currently in the initial development stage.

b. Nutrient guidelines - Additional reference data are incorporated and regional guidelines are adjusted if appropriate. Nutrient regions are tested and boundaries are adjusted if needed. Regional recommendations are tested against biological community data to test protectiveness. Guidelines for rivers, lakes and reservoirs are currently in the initial development stage.

c. Habitat guidelines - Additional reference data are incorporated and regional guidelines are adjusted if appropriate. Regional recommendations are tested against biological community data to test protectiveness. Guidelines for rivers, lakes and reservoirs are currently in the development stage.

d. Other narrative criteria are reviewed to determine whether guidelines can be developed using regional reference data.

e. Incorporation of national numeric criteria. Changes are incorporated into the state criteria during the triennial review process. Criteria are reviewed to determine effectiveness of statewide approach versus regionalization.

5. Quality Assurance

The division is committed to ensuring the scientific quality of its monitoring and laboratory activities.

The division developed and implemented a document entitled *Quality Systems Standard Operating Procedures for Macroinvertebrate Surveys* (including collections, habitat assessments and laboratory analyses) in 2002. This manual will be reviewed annually and updated if needed. The SOP was last revised in 2017. Staff are trained on protocols during the annual statewide meeting or during the biologist workshop.

The division developed and implemented a document entitled *Quality Systems Standard Operating Procedures for Chemical and Bacteriological Sampling of Surface Waters* in 2003. This manual is reviewed annually and updated as needed. The manual was last revised in 2018. Staff are trained on protocols annually during the DWR statewide meeting or during the biologist workshop**.**

The division has developed a document entitled *Quality Standard Operating Procedures for Periphyton Stream Surveys* in 2010. This manual will be reviewed annually and updated if needed. Staff are trained on protocols during the annual statewide meeting or during the biologist workshops**.**

The division has developed written tutorials for completing electronic sample request (SPERT) and biological field forms (BSERT) and uploading to the division's database. A method's document for waterbody assessment and listing (CALM, 2018), has also been developed.

The division uses the state laboratory for chemical, bacteriological and biological analyses. The division also uses contract laboratories. The state laboratory has developed standard operating procedures that meet the division's needs and are in accordance with EPA policy. EPA routinely inspects the state laboratory. Contract laboratories are required to follow approved EPA methods and QC practices. The division has a policy to maintain chain of custody on all samples.

Duplicate collections are completed at 10% of biological and chemical monitoring stations. Field blanks and equipment blanks are collected at 10% of stations. Trip blanks are collected at 10% of trips.

The division developed and implemented their first *Quality Assurance Project Plan* in 2009. This manual is reviewed annually and submitted to EPA. The last update was in November 2017 and is pending EPA approval. Staff are trained on protocols during the annual statewide meeting or biologist workshop.

6. Data Management

The division uses electronic formats to store data and assessment information.

The state water quality database is reviewed continuously and updated as needed to increase comprehensiveness and ease of use.

- New updates for STORET/WQX, ADB/ATTAINS and GIS are incorporated as they become available and time allows with the states IT divisions assistance.
- The division is working with the state and contract laboratories to develop the ability to electronically transfer data.
- The online assessment database is updated regularly to provide current public access to water quality information. Surface water chemical and bacteriological results may be viewed at http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34510

7. Reporting

The division uses feedback from EPA, other state and federal agencies as well as the private and public sectors to improve and enhance the reporting process whenever possible. Data are uploaded to WQX.

K. Support and Infrastructure Planning and Resource Needs

An organizational chart for the Division of Water Resources is illustrated in Figure 6. The division has nine Central Office Sections, eight Environmental Field Offices (EFOs) and the Mining Section (MS) with statewide responsibility.

In 2012 the department created the Division of Water Resources, combining Water Pollution Control, Water Supply and Ground Water Protection.

The division currently has 315 full-time staff. There are also 12 members of the Water Quality, Oil and Gas Board. Division staff is divided by activities associated with Clean Water Act, Safe Drinking Water Act and various state program efforts including Safe Dams, Oil and Gas Well Drilling, Abandoned Mine Reclamations, Water Well driller regulation, Underground Waste Disposal, Operator Certifications and Training, and the activities associated with the State Revolving Loan Fund.

The division's full-time central office staff process permits, develop water quality planning documents and water quality standards, develop standard operating procedures, oversee quality assurance programs, prepare special recovery plans called Total Maximum Daily Loads (TMDLs), track compliance and prepare enforcement documents as needed, manage data, review plans and manage administrative needs of the division.

Water quality monitoring, especially fixed-station and compliance, is generally performed by EFO staff. Data management and review take place both in the central office and in the EFOs. Water quality assessment is also a collaborative effort.

Tennessee has upgraded its accounting and personnel management software to a data system called EDISON.   This has improved the state's personnel, fiscal, travel, training, property and inventory into a single integrated system and allows more accurate and consistent tracking of program expenditures.

Program accomplishments are tracked by each field office and most sections in the division with data entry through the Water Pollution Control Information Management System (WATERLOG). These data are used by the state's performance based budgeting measurements and for the division's reports to the Water Quality, Oil and Gas Board, Bureau of Environment, and to EPA.

Performance-based measures of the department are summarized quarterly for each environmental division and reported to the Department of Finance and Administration.

A summary annual report is produced prior to development of the next year's budget by the governor. It is available for review by the state's General Assembly when the budget is acted upon. Additional management use of data is important to the division to support expenditure state appropriation revenue and fee collections.

1. Current Funding

The cost of a full time technical employee including benefits will be about $90,000 for the year, with indirect costs approximately $21,700.

In 1991, the state legislature passed a law creating the Environmental Protection Fund (EPF) which requires the division to charge fees for certain services such as the annual maintenance of NPDES permits, plans and specs reviews, issuance of aquatic resource alteration permits (ARAP), and gravel dredging permits. Money collected from civil penalties and damages assessments are added to this fund as well. EPF funds have been used to add staff and upgrade the salaries of existing staff. The collection for EPF in state Fiscal Year 2018 (July1, 2017– June 30, 2018) was $10,142,753 for the regulatory program areas for water pollution control.

The division matched only the required amount for our Clean Water Act §106 grant money for the federal FY18 grant. The State of Tennessee uses a performance partnership grant (PPG) that includes the water pollution effort under CWA§106 as part of the PPG. The state continues to use substantial effort funded with state dollars to address water quality assessments and regulation for water pollution control within Tennessee. State funds that are not explicitly reflected in the grant application will not be tracked with the PPG, but these funds are still available for Division of Water Resources state program efforts.

Special projects such as probabilistic monitoring, Southeast Monitoring Network, and electronic data migration are generally funded by 106 supplemental grants. The division has partnered with Alabama a, Kentucky and Georgia for an N-STEPS grant to aid in periphyton index development as part of its nutrient criteria development plan.

2. Salary Ranges

The division has been historically plagued by two problems generally associated with low salaries: the difficulty to retain trained staff and to recruit well-qualified replacements. On April 24, 2012 the Governor signed into law the Tennessee Excellence in Accountability Management Act. It effectively established a new hiring system that requires agencies to define minimum qualifications and to identify specific knowledge, skills, abilities, and competencies required for each position. It also overhauled the state's performance evaluation system to provide performance standards and goals. Job classifications have been revised to reflect the move toward allowing career tracks for both technical staff as well as management positions. Table 7 reflects the current FY salary information and position class titles for 2019.

Table 7. Salary Grades for Positions in TDEC DWR (updated 7/13/2018)

Class Title	Min. Monthly Salary	Max. Monthly Salary
TDEC-ENV CONSULTANT 1	$4,091.00	$6,545.00
TDEC-ENV CONSULTANT 2	$4,295.00	$6,873.00
TDEC-ENV CONSULTANT 3	$4,736.00	$7,576.00
TDEC-ENV CONSULTANT 4	$5,222.00	$8,354.00
TDEC-ENV PROTECTION SPEC 1*	$3,205.00	$5,129.00
TDEC-ENV PROTECTION SPEC 2*	$3,896.00	$6,234.00
TDEC-ENV PROTECTION SPEC 3	$4,295.00	$6,873.00
TDEC-ENVIRONMENTAL FELLOW	$6,087.00	$10,957.00
TDEC-ENVIRONMENTAL MANAGER 1	$4,091.00	$6,545.00
TDEC-ENVIRONMENTAL MANAGER 2	$4,295.00	$6,873.00
TDEC-ENVIRONMENTAL MANAGER 3	$4,736.00	$7,576.00
TDEC-ENVIRONMENTAL MANAGER 4	$5,222.00	$8,354.00
TDEC-ENVIRONMENTAL SCIENTIST 3	$3,896.00	$6,234.00
TDEC-ENVIRONMENTAL SCIENTIST1*	$3,205.00	$5,129.00
TDEC-ENVIRONMENTAL SCIENTIST2*	$3,533.00	$5,655.00
ENVIRONMENTAL PROGRAM DIRECTOR	$6,087.00	$10,957.00
ENVIRONMENTAL PROGRAM ADMINISTRATOR	$6,711.00	$12,081.00

* Flex position that will re-classify to a more advanced working position after completion of probationary period.

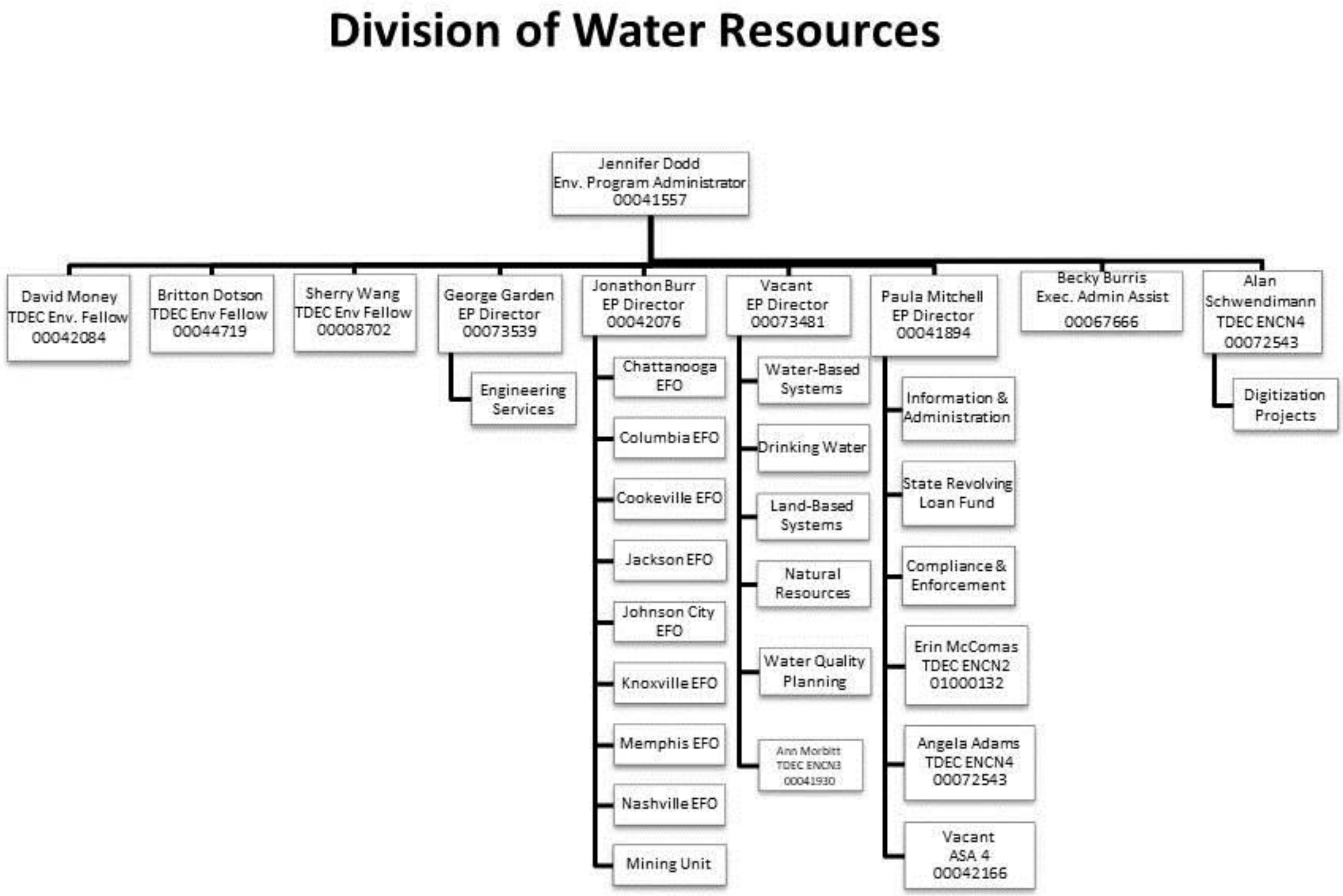


Figure 6: Division of Water Resources Organizational Chart (7/13/2018)

3. Future Planning and Needs Assessment for Tennessee's Water Monitoring and Assessment Program

Tennessee has traditionally had a strong water quality monitoring and assessment program. In the last 20 years, water quality chemical and bacteriological monitoring have increased six fold and biological monitoring has more than doubled (Table 8). New procedures such as continuous monitoring, rapid periphyton surveys and probabilistic monitoring have been used to supplement targeted biological and chemical monitoring.

It is evident that Tennessee already spends a great deal of time, effort and money on water quality monitoring. However, a significant funding gap does exist if EPA requirements and guidance are to be met. Without a steady source of federal funding in addition to current funding, it is not likely that program activities will expand or that any significant increase in the percentage of waterbodies monitored and assessed will be feasible. Additional staffing and funding must be permanent and not in the form of competitive or temporary grants to expand programs. Tennessee is not expecting additional funding from other sources for these activities over the next ten years. Therefore, federal funding increases would be vital to implementation of all or part of the following water quality monitoring goals (Table 9).

Section 106 grant project activities in Tennessee are funded by state appropriation and EPA grant dollars. An estimated $1,685,400 is obligated for employee salaries and benefits in support of this program in the state in FY2017-2018. Another $361,700 is allocated to travel, printing, utility, communication, maintenance, professional service, rent, insurance, vehicle, and equipment expenses. Indirect charges are estimated at $391,200.

The grant money for Clean Water Act §106 is now part of a performance partnership grant and is no longer a stand-alone grant. Activities for the Water Quality Management Planning under Clean Water Act §604(b) are discussed as a separate work plan.

Table 8. Water Quality Monitoring From 1999 to 2017

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chemical & Bacteriological Sample Collections	705	1386	2805	2758	2615	2921	3540	3205	3302	3981	3600	4000	3600	3700	4482	4146	4876	3072	3199	5940
Quality Assurance Sample Collections	76	66	196	159	339	325	628	585	763	941	900	713	776	930	618	637	429	354	314	785
Rapid Biological Stations (Biorecon)	86	394	602	672	318	365	183	162	285	248	338	318	223	288	157	433	335	225	126	131
Intensive Biological Stations (SQSH)	150	100	222	176	94	330	113	256	226	267	332	353	367	257	247	274	192	377	347	*
Habitat Assessments	236	494	824	848	412	695	504	386	462	497	612	597	512	525	361	674	530	673	475*	*
Periphyton Stations	0	0	94	14	80	154	121	0	2	120	60	72	22	55	10	39	54	39	*	*
Antidegradation Surveys	2	5	11	5	5	49	33	17	97	81	2	59	51	18	12	16	7	19	26	20
Probabilistic Monitoring Stations	0	0	50	50	75	95	313	2	0	90	0	0	90	0	0	0	0	0	0	0

*Pending - not all data analyzed or uploaded.

Table 9. Projected Funds Necessary to Increase Wadeable Stream Assessment by 5% Annually

Year	Approximate number of assessed stream miles reassessed annually if plan is funded	Additional stream miles to achieve 5% increase from previous year	Additional stations added (based on average 1 station per 11 stream miles)	Additional staff needed (Personnel Costs)	Indirect Costs (Based on 0.23%)	Additional laboratory analysis including QC	Cumulative federal dollars needed above existing funding
2006	6,059	303	28	2 Field = $154,800	$35,604	$38,000	$223,510
2007	6,362	318	29	2 CO (1 PAS, 1 TMDL) = $154,800	$35,604	$43,000	$430,740
2008	6,680	334	30			$44,000	$475,020
2009	7,014	351	32	2 Field = $154,800	$35,604	$46,000	$684,970
2010	7,365	368	33			$47,000	$731,970
2011	7,733	387	35			$53,000	$784,970
2012	8,120	406	37	2 Field and 2 CO (1 PAS, 1 TMDL) = $309,600	$71,208	$55,000	$1,189,709
2013	8,256	426	39			$57,000	$1,246,709
2014	8,952	448	41			$60,000	$1,306,709
2015	9,400	470	43	2 Field = $154,800	$35,604	$62,000	$1,511,659
2016	9,870	493	45			$68,000	$1,579,659
2017	10,363	518	47			$70,000	$1,649,659
2018	10,881	544	49	2 Field = $154,800	$35,604	$72,000	$1,885,619
2019	11,425	571	52			$75,000	$1,960,619
2020	11,996	600	54			$78,000	$2,038,619

II. STREAM, RIVER, RESERVOIR, LAKE, AND WETLAND MONITORING

The division maintains a statewide monitoring system consisting of approximately 7,600 stations. In addition, new stations are created every year to increase the number of assessed streams. Approximately 670 stations will be monitored in FY 2018 - 2019. Stations are sampled monthly, quarterly, and semi-annually, depending on the requirements of the project. Within each watershed cycle, monitoring stations are coordinated between the central office and staff in the eight regional Environmental Field Offices (EFOs) and the Mining Unit based on the following priorities. A list of these stations is located in Appendix A. Additional streams may be added for sampling as the monitoring year progresses. Most large streams have at least one station. A list of parameters to be sampled is provided in Table 11.

After determining the watersheds to be monitored in a given year, monitoring resources are prioritized as follows: Details of monitoring priorities is found in Section I D.

1. Antidegradation Monitoring
2. Posted Streams
3. Ecoregion Reference Streams/Ambient Monitoring Stations/SEMN
4. 303(d) Listed Segments Monitoring
5. Sampling downstream Major Dischargers and CAFO's
6. TMDL Development Monitoring
7. Special Project Monitoring
8. Watershed Monitoring
   a. Previously Assessed Streams
   b. Sites downstream large scale or dense ARAP activities
   c. Unassessed Stream Reaches
   d. Pre-restoration or BMP installation monitoring.

A. Monitoring Frequency

1. Antidegradation Monitoring Frequency

Since permit requests generally cannot be anticipated, antidegradation surveys are conducted as needed. Streams are evaluated for antidegradation status based on a standardized evaluation process, which includes information on specialized recreation uses, scenic values, federally-listed threatened or endangered aquatic species, critical habitat, ecological consideration, biological integrity and water quality.

2. Posted Waters Monitoring Frequency

Waterbodies posted for pathogens advisories are sampled monthly for *E. coli* with at least one geomean (5 samples in 30 days). Streams posted for water contact must be monitored at a minimum every five years. If another responsible party will be monitoring the stream, then the EFO does not need to sample the stream. The failure of another party to sample the stream places the burden back on the EFO to monitor the stream. There is no acceptable reason for failure to monitor a stream posted for water contact.

3. Ecoregion Reference Stream, Ambient and SEMN Monitoring

Ecoregion and First Order (FECO) Reference streams within the watershed group are sampled quarterly for physical, chemical and pathogen. Macroinvertebrates are collected spring and fall and periphyton are collected once. Ecoregion and FECO reference streams located in the Group 3 Watersheds in FY 2018-2019 are in Appendix A.

Physical, chemical and pathogen (*E. coli*) samples are collected at all long term monitoring or ambient stations quarterly regardless of watershed group. Ambient stations are included in Appendix A.

All Southeastern Regional Network Monitoring Stations (SEMN) regardless of watershed are monitored every year. See Section F for the monitoring plan and stations list.

4. Monitoring Frequency for 303(d) Listed Waters

Streams, rivers or reservoirs that have one or more properties that violate water quality standards and thus do not meet the designated uses are included in the 303(d) List. Impaired waters are monitored, at a minimum, every five years coinciding with the watershed cycle.

Monitoring impaired waters provides a great deal of information:

- Documentation of current conditions, which may change from year to year. This documentation can provide a rationale for "delisting" a stream from the 303(d) List or may just confirm the water's impairment status.
- Sampling can provide data for pre or post TMDL evaluation. Data can be used for model calibration.
- Surveys can document the need for enforcement actions.
- Data can assist in the evaluation of the effectiveness of BMPs or help target BMP installation for maximum effectiveness.
- Results over time can provide insight into historical water quality trends.
- Conditions may represent a human health threat.

For these reasons, the monitoring of impaired waters is identified as a high priority for division field staff. The division's intended goal is to collect new data on these waters, unless there is a compelling reason for not doing so. Streams impacted due to flow or habitat alteration due to upstream impoundments, channelization, culverting, or hard armoring do not require new data be collected each cycle if the alteration is still present. (A habitat assessment might be recommended in some situations.)

Waters that do not support fish and aquatic life are sampled once for macroinvertebrates (semi-quantitative sample preferred) and monthly for the listed pollutant(s). Streams with multiple listed segments should be sampled monthly for the listed pollutant for each segment. Streams that scored either 20 or less (or 12 or less in Ecoregion 73a) on a SQSH, or a 5 or less on a biorecon in the previous assessment cycle can be assessed as "Not Supporting Based On Factors Other Than Recent Data" provided that it is the consensus judgement of assessment staff that the (1) conditions in these streams have not changed and (2) that it is not possible the previous low scores were due to natural conditions such as prolonged dryness, or beaver activity. Stream assessed under this category can miss having data collected for one assessment cycle, but not for two.

Streams with impacted recreational uses, such as those impaired due to pathogens are sampled monthly for *E. coli.* Another acceptable sampling strategy for *E. coli* is an approach in which an initial geometric mean is collected (5 samples within a 30-day period) in the first quarter. If the geomean is well over the existing water quality criterion of 126 colony forming units, the waterbody remains impaired with no additional *E. coli* sampling need. If results meet the water quality criterion, staff will continue with monthly samples during the remainder of the monitoring cycle. If the geomean is not substantially over the criterion, field staff may at their discretion continue monthly monitoring in the hope that additional samples will indicate that the criterion is met.

Resource limitations or data results may sometimes justify fewer sample collections. For example, there are cases where pollutants are at high enough levels that sampling frequency may be reduced while still providing a statistically sound basis for assessments. In some other cases, monitoring may be appropriately bypassed during a monitoring cycle.

a. 303(d) Listed sites requiring no additional monitoring

All impaired streams in targeted watersheds must be accounted for in the annual monitoring workplan. If a field office is proposing to bypass monitoring of an impaired stream, an appropriate rationale must be provided and included in the workplan.

It is recommended that the EFO verify the condition of the stream at least every other cycle. Streams impacted by poor biology, habitat alterations, or siltation due to habitat alterations must still be monitored at least once (habitat assessment, plus SQSH or biorecon). Streams posted for water contact must be monitored every cycle.

There are individual sites where conditions may justify retaining the impaired status of the stream without additional sampling during an assessment cycle. The reasons may include, but are not limited to, the following:

- ♦ Data have been collected by the division or another agency <u>within</u> the last five years and water quality is thought to be unchanged. If another division or agency has collected stream samples the EFO should follow up with that division or agency to retrieve the data and forward it to PAS.

- ♦ Another agency or a discharger has accepted responsibility for monitoring the stream and will provide the data to the division. During the planning process for each watershed cycle, field staff should recommend to the permitting section those streams where it would be appropriate for monitoring to be performed by a discharger. Where permits are up for renewal, such conditions could be added.

- ♦ The stream is known to be dry or without flow during the majority of the year that sampling is being scheduled. Should an impaired stream be dry during two consecutive cycles, consideration should be given to requesting the stream be delisted on the basis of low flow.

- ♦ Impounded streams impacted by flow or habitat alteration, channelization, culverting, or hard armoring with no change in management of hydrology.

b. Impaired streams where additional sampling may be limited or discontinued

There are individual sites where initial results may justify a discontinuation of sampling. The reasons are limited to the following:

- ♦ Where emergency resource constraints may require that sampling be restricted after a monitoring cycle is initiated, but before it is completed. Discontinuation of monitoring on this basis must be approved in advance by the Deputy Director. Before requesting a halting of sampling in impaired streams, assistance from the Department of Health's Aquatic Biology section should be considered. Such requests should be coordinated through the Planning and Standards Unit.

- ♦ Initial stream sampling documents elevated levels of pollutants indicating, with appropriately high statistical confidence, that the applicable water quality criteria are still being violated. (Note – rain event sampling is inappropriate for this purpose.)

- ♦ The levels of pollutants that indicate continued water quality standards violations with statistical confidence are provided in Table 10. For example, if three samples are collected and all three values exceed the levels in the far right hand column, then sampling for that parameter may be halted, as there is a very high probability that criteria would be exceeded in future sampling. If all three samples do not exceed the level provided in the table, then at least four more samples must be collected. If all seven samples exceed the levels in the middle column of the table, then sampling may cease. If all seven samples do not exceed the value in the table, then all sampling must be completed.

Important notes about this process:

- ♦ This process only applies to chemical parameters or bacteriological results. Streams impacted by poor biology, habitat alterations, or siltation due to habitat alterations must still be monitored at least once (habitat assessment, plus SQSH or biorecon), flow permitting.

- ♦ Rain event samples cannot be used to justify a reduction in sampling frequency.

- ♦ The division is not establishing new criteria with Table 10 and the numbers in the table should not be used independently to assess streams. These numbers, which are based on the actual criteria, simply indicated the statistical probability that the criteria have been exceeded by a dataset when the numbers of observations are considered.

- ♦ Where streams are impacted by multiple pollutants, all parameters must exceed the values in Table 10 before sampling can be halted.

Table 10. Sampling Frequency Guidance for Parameters Associated with Impaired Streams

Nutrient Sampling

Nitrite-Nitrate	**Number of Samples**		
	10	7	3
73a	< 0.49	0.49 - 0.68	>0.68
74a, 65j, 68a	< 0.28	0.28 - 0.40	>0.40
74b	< 1.49	1.49 - 2.08	>2.08
65a, 65b, 65e, 65i	< 0.43	0.43 - 0.60	>0.60
71e	< 4.35	4.35 - 6.09	>6.09
71f	< 0.32	0.32 - 0.56	>0.56
71g, 71h, 71i	< 1.15	1.15 - 1.61	>1.61
68b	< 0.54	0.54 - 0.75	>0.75
69d	< 0.34	0.34 - 0.47	> 0.47
67f, 67g, 67h, 67i	< 1.53	1.53 - 2.14	>2.14
66d	< 0.63	0.63 - 0.88	>0.88
66e, 66f, 66g, 68c	<0.38	0.38 - 0.54	>0.54
Total Phosphate	**Number of Samples**		
	10	7	3
73a	<0.25	0.25 - 0.44	>0.44
74a	<0.12	0.12 - 0.21	>0.21
74b	<0.10	0.1 - 0.18	>0.18
65a, 65b, 65e, 65i, 65j, 71e, 68b, 67f, 67h, 67i	<0.04	0.04 - 0.07	>0.07
71f, 71g	<0.03	0.03 - 0.053	>0.053
71h. 71i	<0.18	0.18 - 0.32	>0.32
68a, 68c, 69d, 66f	<0.02	0.02 - 0.035	>0.035
67g	<0.09	0.09 - 0.16	>0.16
66d, 66e, 66g	<0.01	0.01 - 0.018	>0.018

Pathogen Sampling

E Coli	Number of Samples		
	10	7	3
Statewide	<941	941 - 1647	>1647

Total Suspended Solids Sampling

TSS	Number of Samples		
	10	7	3
65a, 67i, 73a	<64	64 - 112	>112
65e, 65i, 74b	<29	29 - 51	>51
65b, 67g, 68c, 71e, 71g, 71i, 74a	<13	13 - 23	>23
65j, 66d, 66e, 66f, 66g, 67f, 67h, 68a, 68b, 69d, 71f, 71h	<10	10 - 18	>18

Metals Sampling

Metals	Number of Samples		
	10	7	3
Chromium (hexavalent)	<11	11 - 19.5	>19.5
Mercury	<0.77	0.77 - 1.35	>1.35
Aluminum	<338	338 - 592	>592
Iron	<1218	1218 - 2132	>2132
Manganese	<185	185 - 325	>325
Copper* 65e, 65j, 66d, 66e, 66g, 68a, 74b	<1.25	1.25 - 2.19	>2.19
Copper* 66f, 71f	<4.44	4.44 - 7.77	>7.77
Copper* 67f, 67h, 67i, 68b, 68c, 71g, 71h, 73a	<11.6	11.6 - 20.3	>20.3
Copper* 67g, 71e, 74a	<18.0	18.0 - 31.5	>31.5
Lead* 65e, 65j, 66d, 66e, 66g, 68a, 74b	<0.19	0.19 - 0.33	>0.33
Lead* 66f, 71f	<1.02	1.02 - 1.79	>1.79
Lead* 67f, 67h, 67i, 68b, 68c, 71g, 71h, 73a	<3.51	3.15 - 6.14	>6.14
Lead* 67g, 71e, 74a	<6.07	6.07 - 10.6	>10.6
Zinc* 65e, 65j, 66d, 66e, 66g, 68a, 74b	<16.8	16.8 - 29.4	>29.4
Zinc* 66f, 71f	<58.9	58.9 - 103	>103
Zinc* 67f, 67h, 67i, 68b, 68c, 71g, 71h, 73a	<153	153 - 268	>268
Zinc* 67g, 71e, 74a	<237	237 - 415	>415

* Dependent on Hardness

5. Sampling Downstream of Major Discharges and CAFO’s

Water quality information is needed downstream of Major Facilities with NPDES permits and CAFO’s. Parameters sampled should include those being discharged (including nutrients if WWTP) and SQSH. If the facility has in-stream monitoring requirements in their permits their data may be used. (Note: stations may not be required for dischargers into very large waterways such as the Mississippi River or large reservoirs.)

Stations should also be established downstream of CAFOs with an emphasis on monitoring biointegrity (SQSH survey if the stream is wadeable) and monthly nutrient and pathogen monitoring.

6. TMDL Development Monitoring

Waterbody monitoring is required to develop TMDLs. The frequency and parameters monitored for TMDL monitoring depends on the specific TMDL and is coordinated with the Watershed Management Unit.

7. Special Projects

Except for the Southeast Monitoring Network stations, most special project monitoring activities will be contracted to TDH State Lab.

8. Watershed Stream Monitoring

a. In addition to the previous priorities, each EFO should monitor additional stations to confirm continued support of designated uses and to increase the number of assessed waterbodies. Macroinvertebrate biorecons, habitat assessments, and field measurements of DO, specific conductance, pH and temperature are conducted at the majority of these sites. These priorities include:

- Previously assessed segments, particularly large ones, that would likely revert to Category 3 unassessed status. (Note that a single site per assessed segment is generally adequate if assessment was supporting and no changes are evident).

- Sites below ARAP activities or extensive nonpoint source impacts in wadeable streams where biological impairment is suspected. Examples might be unpermitted activities, violations of permit conditions, failure to install or maintain BMPs, large-scale development, clusters of stormwater permits, or a dramatic increase in impervious surfaces.

- Unassessed reaches especially in third order or larger streams or in disturbed headwaters.

- Pre-restoration or BMP monitoring. In most cases this sampling would be to document improvements, but might also be needed to confirm that the stream is a good candidate for such a project. This protects against the possibility that a supporting stream could be harmed by unnecessary restoration.

Group 3 watershed streams will be monitored by EFOs in FY 2018-2019 (Appendix A).

Table 11 provides the parameters list for each project for sampling. The *QSSOP for Chemical and Bacteriological Sampling of Surface Water* (TDEC, 2018, draft) describes chemical and bacteriological sampling, field parameter readings, and flow measurement procedures. The *QSSOP for Macroinvertebrate Stream Surveys* (TDEC, 2017) describes protocols for collection of benthic macroinvertebrate samples and habitat assessment. The *QSSOP for Periphyton Stream Surveys* (TDEC, 2010) describes protocols for collection of periphyton sampling.

b. Watershed Monitoring Projects 319(h) and 106 Grant Funds

Selected watershed sites will be monitored as part of a watershed strategy integrating point and non-point sources of pollution. These sites and strategies are described more completely in specific 319(h) and 106 grant applications. TDEC's partnership with the Non-point Source Program at the Tennessee Department of Agriculture has resulted in several contracts being awarded to TDEC involving watershed monitoring.

Table 11. Parameter List for the Water Column

Parameter	TMDLs				Ref. Sites ECO & FECO	303(d)*	Long Term Trend Stations	Water-shed Sites	Trip and Field Blanks
	Metals† /pH	DO	Nutrients	Pathogens					
Acidity, Total	X (pH)							O	
Alkalinity, Total	X (pH)				X	O	X	O	
Aluminum, Al	X†					O	X	O	
Ammonia Nitrogen as N		X	X		X	O	X	O	
Arsenic, As	X†				X	O	X	O	O
Cadmium, Cd	X†				X	O	X	O	O
Chromium, Cr	X†				X	O	X	O	O
$CBOD_5$		X				O		O	
Color, Apparent					X		X		
Color, True					X		X		
Conductivity (field)	X	X	X	X	X	X	X	X	
Copper, Cu	X†				X	O	X	O	
Dissolved Oxygen (field)	X	X	X	X	X	X	X	X	
Diurnal DO		X	X						
E. Coli				X	O	O	X	O	
Flow	O	O	O	O	O	O	O	O	
Iron, Fe	X†				X	O	X	O	O
Lead, Pb	X†				X	O	X	O	O
Manganese, Mn	X†				X	O	X	O	O
Mercury, Hg	X†					O	O	O	O
Nickel, Ni	X†					O	X	O	O
Nitrogen NO_3 & NO_2		X	X		X	O	X	O	O
pH (field)	X	X	X	X	X	X	X	X	
Residue, Dissolved					X	O	X	O	
Residue, Settleable						O	O	O	
Residue, Suspended	X		X	X	X	O	X	O	
Residue, Total						O	X	O	
Selenium, Se	X				X	O	X	O	O
Sulfates					X (68a & 69de)	O	X (68a & 69de)	O	O
Temperature (field)	X	X	X	X	X	X	X	X	
Hardness ($CaCO_3$) by calculation	X				X	O	X	O	O
Total Kjeldahl Nitrogen		X	X		X	O	X	O	O
Total Organic Carbon	X		X		X	O	X	O	O
Total Phosphorus (Total Phosphate)		X	X		X	O	X	O	O
Turbidity (field or lab)			X	X	X	O	X	O	O
Zinc, Zn	X†				X	O	X	O	O
Biorecon					X			X (or SQSH)	
SQSH			X (or biorecon)		X	X (or biorecon) unless listed for pathogens			
Habitat Assessment					X	X		X	
Chlorophyll *a* (Non-wadeable)		R	X			R for nutrient in non-wadeable			
Periphyton (Wadeable)		R	X		X	R for nutrients in wadeable			

Optional (O) – Not collected unless the waterbody has been previously assessed as impacted by that substance or if there are known or probable sources of the substance.
R – Recommended if time allows.
† – Sample for pollutant on 303(d) List.
* - Minimally sample parameters for which stream is 303(d) listed.

QC samples (trip and field blank) are only collected for parameters requested at other sites in the same sample trip.

The following parameters are never requested unless there is specific reason to do so: **antimony, barium, beryllium, calcium, magnesium, potassium, silver, sodium, boron, silica, total coliform, fecal coliform, enterococcus, fecal strep, cyanide, Nitrogen Nitrate, Nitrogen Nitrite, ortho-phosphorus and $CBOD_5$**

B. Monitoring Activities

1. Macroinvertebrate Surveys

There are several levels of stream surveys undertaken by the division to fulfill various information needs. These surveys are a very important source of information for the 305(b) report, toxics monitoring, compliance and enforcement activities, and other division information needs.

The division utilizes standardized stream survey methodologies. The surveys performed rely heavily on biological data instead of chemical data. The *QSSOP for Macroinvertebrate Stream Surveys* (TDEC, 2017) describes protocols for collection of benthic macroinvertebrate samples and habitat assessment. The Planning and Standards Section is responsible for the coordination of survey activities. Macroinvertebrate sampling is listed in Appendix A.

A biological reconnaissance (Biorecon) is often performed when a brief visit to a stream is appropriate. The biorecon is a field-based assessment that yields relatively small amounts of data in a short amount of time. These surveys can be used for a water quality assessment in which the presence or absence of clean water indicator organisms reflects the degree of support of designated uses.

A more intensive survey, collecting a Semi-Quantitative Single Habitat Bank (SQBANK) or Semi-Quantitative Single Habitat Kick (SQKICK), is used when a quantifiable assessment of the benthic community is needed. Biometrics using relative abundance can be calculated. This method can be compared to the division's numeric translators for biocriteria. Both biorecon and intensive surveys are valuable when information beyond long-term trend monitoring is needed concerning a specific location.

2. Fish Tissue Monitoring

Fish tissue samples are often the best way to document chronic low levels of persistent contaminants. In the mid-1980's, sites were selected that had shown significant problems in the past and would benefit from regularly scheduled monitoring, one to five year cycle. A list of fish tissue stations to be sampled in 2018-19 appears in Table 12. Parameters to be sampled are listed in Table 13. TDEC DWR, TVA, TWRA and DOE regularly discuss fish monitoring surveys in the state. Data from these surveys help the division assess water quality and determine the issuance of fishing advisories.

Table 12. 2018 – 2019 Fish Tissue Sampling Sites

STATION ID	RESERVOIR NAME/STREAM NAME	LOCATION	PARAMETER	TARGET SPECIES	Agency
BBIGB015.1MY	Big Bigby Creek	Stay downstream of Cytec discharge	106 metals and organics plus dioxin on cat	Bass + Catfish	TDEC/ TDH
BEECH000.5WE	Beech Creek Embayment KY Reservoir	Beech Creek Embayment KY Reservoir	Mercury, Selenium, PCBs	Largemouth Bass +/- other bass species, Catfish	TDEC/ TDH
BEECH004.3WE	Beech Creek	Dall Conway Road Deadend at Creek (work upstream)	Mercury, Selenium, PCBs	Largemouth Bass +/- other bass species, Catfish	TDEC/ TDH
BEECH036.0HE	Beech Reservoir	D/S Confluence Black Bottom Branch	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
BSAND004.0HN	Big Sandy River	Big Sandy Embayment Of Kentucky Lake U/S Sulpher Branch	Mercury, Selenium	Largemouth Bass, Black Crappie, White Crappie, Redear Sunfish	TDEC/ TDH
BSAND011.0BN	Big Sandy River	Upstream Confluence with West Sandy Creek	Mercury, Selenium	Largemouth Bass, Black Crappie, White Crappie, Redear Sunfish	TDEC/ TDH
CYPRE000.3SH	Cypress Creek	U/S Levee Rd	Metals and Organics plus dioxin on cat	Game/Rough/ Cat	TDEC/ TDH
EFSTO011.3RU	East Fork Stones River	Upstream Walter Hill Dam	PFAS, Metals and Organics	Largemouth Bass +/or Smallmouth Bass, Channel Catfish	TDEC/ TDH
HOLST055.0GR	Cherokee Reservoir	Near Dam	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
HOLST076.0HA	Cherokee Reservoir	U/S HWY 25E	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
HRM 118.7	Holston River	U/S Cox Island Near Surgoinsville	Mercury, PCB, DDT	Smallmouth Bass, Channel Catfish	TVA
LSEQU001.3MI	Little Sequatchie River	Hwy 28 Bridge	Mercury, Selenium	Largemouth Bass +/- other bass species	TDEC/ TDH
MISSI724.6SH	Mississippi River	Memphis South Plant	Metals and Organics plus dioxin on catfish	Game/Rough/ Catfish	TDEC/ TDH

STATION ID	RESERVOIR NAME/STREAM NAME	LOCATION	PARAMETER	TARGET SPECIES	Agency
MISSI735.0SH	Mississippi River	Near I-40	Metals and Organics plus dioxin on catfish	Game/Rough/ Catfish	TDEC/ TDH
MISSI754.0SH	Mississippi River	Meeman Shelby State Park	Metals and Organics plus dioxin on catfish	Game/Rough/ Cat	TDEC/ TDH
NFHOL004.6SU	North Fork Holston River	Bridge at Cloud Ford on Carter Valley Road (SR346)	Mercury, PCB, DDT	Smallmouth Bass, Channel Catfish	TVA
NOLIC020.9GE	Nolichucky River	U/S Conway Bridge (work upstream)	Mercury, Selenium	Smallmouth Bass +/- other bass species + Channel Cat	TDEC/ TDH
NOLIC047.3GE	Davy Crockett Reservoir	Davy Crockett Reservoir Richland Creek Embayment	Mercury, Selenium	Smallmouth Bass +/- other bass species + Channel Cat	TDEC/ TDH
NOLIC068.0GE	Nolichucky River	Davy Crockett Birthplace State Park D/S Big Limestone Creek	Mercury, Selenium	Smallmouth Bass +/- other bass species + Channel Cat	TDEC/ TDH
NOLIC083.9WN	Nolichucky River	Off Charlie Carson Road (working to about 0.5 mile upstream - stay downstream of Jonesborough STP at rm 84.5)	Mercury, Selenium	Smallmouth Bass +/- other bass species + Channel Catfish + (Walleye if found)	TDEC/ TDH
NOLIC097.5UC	Nolichucky River	Chestoa Bridge	Mercury, Selenium	Smallmouth Bass +/- other bass species + Channel Catfish + (Walleye if found)	TDEC/ TDH
PIGEO007.6CO	Pigeon River	Tannery Island U/S of Newport	Mercury, Selenium, PCBs	Smallmouth Bass + Catfish + Walleye	TDEC/ TDH
PIGEO016.5CO	Pigeon River	At Bridge At Denton Greasy Cove Road	Mercury, Selenium, PCBs	Smallmouth Bass + Catfish + Walleye	TDEC/ TDH
PIGEO024.7CO	Pigeon River	Interchange Br 1.2 Mi D/S From Waterville Powerhouse (Waterville Bridge)	Mercury, Selenium, PCBs	Smallmouth Bass + Catfish + Walleye	TDEC/ TDH
SEQUA007.1MI	Sequatchie River	Nickletown	Mercury, Selenium	Largemouth Bass	TDEC/ TDH

STATION ID	RESERVOIR NAME/STREAM NAME	LOCATION	PARAMETER	TARGET SPECIES	Agency
SFHOL001.1SU	South Fork Holston River	Ridgefields Bridge in Kingsport (U/S North Fork D/S Meade)	Metals and Organics plus dioxin on cat	Largemouth Bass +/or Smallmouth Bass, Channel Cat	TDEC/ TDH
SFHOL003.9SU	South Fork Holston River	Hwy 126 Bridge Near Kingsport (upstream to rm 5.0 near Eastmans outfall)	Metals and Organics plus dioxin on cat	Largemouth Bass +/or Smallmouth Bass, Channel Cat	TDEC/ TDH
SFHOL050.0SU	South Holston Lake	Near dam	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
SFHOL062.7SU	South Holston Lake	TN/VA line	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
TENNE425.5MI	Nickajack Reservoir	Near Dam	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
TENNE469.0HM	Nickajack Reservoir	Nickajack Reservoir at Dupont Hwy	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
WATAU036.6CT	Watauga Lake	At Dam	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
WATAU045.6JO	Watauga Lake	Near Elk River Embayment	Mercury, PCB, DDT	Largemouth Bass, Channel Catfish	TVA
WOLF001.8SH	Wolf River	Hwy 51 Bridge Near Mouth	Metals and Organics plus dioxin on cat	Game/Rough/ Cat	TDEC/ TDH
WSAND002.5HN	West Sandy Creek	Downstream West Sandy Dike	Mercury, Selenium	Largemouth Bass, Black Crappie, White Crappie, Redear Sunfish	TDEC/ TDH
WSAND004.4HN	West Sandy Creek	Elkhorn Road dewatering area (Fish Station extends downstream to dike	Mercury, Selenium	Largemouth Bass, Black Crappie, White Crappie, Redear Sunfish	TDEC/ TDH

Table 13. Analyses for Fish Tissue

Weight (Pounds)		Chlordane, total		Selenium
Length (Inches)		CIS Chlordane		Zinc
Lipid Content (Percent)		Trans Chlordane		Methoxychlor
PCBs		CIS Nonachlor		Dioxins
Aldrin		Trans Nonachlor		Furans
Dieldrin		Alpha BHC		PFAS (limited)
DDT, total		Gamma BHC		
O, P - DDE		Hexachlorobenzene		
P, P - DDE		Arsenic		
O, P - DDD		Cadmium		
P, P - DDD		Chromium		
O, P - DDT		Copper		
P, P - DDT		Mercury		
Endrin		Lead		

* Fish Tissue results reported in mg/kg, wet weight except for dioxins which are reported in ng/kg. Metals are analyzed by Tennessee Department of Health (TDH), Laboratory Services and organics by a contract laboratories.

C. Stream and Reservoir Posting

The TDEC Commissioner is identified in the Tennessee Water Quality Control Act as having the authority to post bodies of water based on public health concerns. The Commissioner has delegated authority to the Director of the Division of Water Resources. This authority is carried out with assistance from TWRA and TVA. Bacteriological contamination is the major reason for posting a stream against water contact recreation. The major reason for posting a stream against the consumption of fish is bioaccumulation of carcinogens. The most current list of posted streams can be found in on
http://tn.gov/assets/entities/environment/attachments/water_fish-advisories.pdf

D. Sediment Sampling

The division collected a considerable number of sediment samples from 1984 - 1994. However, analysis of the data has been handicapped by a lack of sediment criteria. When criteria become available, analysis of sediment samples will be a more widely used component of long-term trend monitoring. During FY 2018-2019, sediment samples will be collected on an as-needed basis.

E. Wetlands Monitoring

Tennessee has approximately 787,000 acres of wetlands. The division has identified 54,811 impacted wetland acres. Historically, the largest single cause of impacts to existing wetlands was loss of hydrologic function due to channelization and leveeing. Presently development such as roads, subdivisions and commercial centers are impacting wetlands more than other activities.

Tennessee received a grant from EPA to develop a protocol for wetland assessment. Tennessee has completed its development of a rapid assessment methodology for wetlands. The Tennessee Rapid Assessment Methodology (TRAM) is based on models developed as part of the Hydrogeomorphic (HGM) approach for assessing wetland function. Tennessee has now developed rapid assessment forms for depressional, riverine, flat and slope wetlands.

The TRAM serves as a method to quickly assess existing wetland resource value which will aid in assessing the ecological consequences of §401 and ARAP permitting decisions. The Division of Water Resources Waterlog database will enable the permitting program to track compliance and provide a source of wetland impact and mitigation data for use by agencies involved in wetland's monitoring and research.

Tennessee Tech University was awarded an EPA grant to assess wetland mitigation in Tennessee and update their previous study from the late 1990's.

In 2013, 2016 and 2018, TDEC was awarded EPA Wetland Program Development Grants to continue to build a sustainable and focused wetland program for the state of Tennessee. A key component of the 2013 grant is to develop a Wetland Program Plan built on the EPA's Core Elements Framework. This plan will outline the major provisions of the grant and the steps TDEC will take to accomplish them. In addition, the Division has contracted with NatureServe and Austin Peay State University to develop and maintain a database for data collected at wetland reference sites representing the diversity of wetland types and plant communities across the state. These data will contribute to the improvement of wetland assessment methods and mitigation targets in Tennessee.

F. Southeast Monitoring Network Sites in Tennessee
FY 2019 106 Supplemental Monitoring Initiatives

During the Southeastern Water Pollution Biologist Association (SWPBA) annual meeting, in November 2011, the potential for stream community changes resulting from variations in hydrology and termperature as a result of changing climate was a focus of the Southeastern Water Pollution Biologist Association (SWPBA). The result was the creation of an interagency workgroup consisting of freshwater biologists from the eight EPA region IV states and the Tennessee Valley Authority (TVA) interested in developing a joint reference stream monitoring network. Staff from EPA, USFS and USGS are also on the committee to provide technical support and advise. Although two goals of the group are to assess existing responses to climate change and identify climate-sensitive indicators, it was agreed that a reference network with consistent sampling methodology would be useful for establishing regional reference conditions and consistency in assessments of shared watersheds and ecoregions.

Each of the EPA region IV states and TVA agreed to target and monitor reference streams beginning in 2013 and continue annual monitoring indefinitely. Existing monitoring programs will be adjusted at key reference sites to include additional parameters so that monitoring will be consistent for all sites in the network. At a minimum, sampling will include macroinvertebrates, habitat assessments, field parameters, flow and continuous temperature monitoring. Some agencies, including TDEC alos collect periphyton, water quality, channel profiles and continuous flow. TVA has agreed to sample fish at sites draining into the Tennessee River.

Protocols and selection of vulnerable streams were based on studies done by the Northeast Regional Monitoring Network. Existing data will be mined where available.

The goal is to establish a minimum of 30 reference sites in protected watersheds where land-use is not expected to change significantly for at least 20 years. Tennessee has agreed to monitor 10 sites in ecoregions 66, 67, 68 and 71 (Table 14). Ten sites will enable some statistical determinations using sate data in addition to analysis of grouped data.

1. Project Objectives

a. Establish annual monitoring at 10 reference streams consistent with protocols agreed upon by Southeast Monitoring Network.

b. Develop a formal interagency partnership to develop a monitoring program that is done consistently, long-term and can withstand changes in staff.

c. Combine data with other SE states for statistical interpretation of current reference condition and changes over time in undisturbed systems.

d. Determine whether stream communities are being affected by variables such as changes in hydrology, temperature or riparian vegetation species.

e. Distinguish natural variation from other stressors.

f. Isolate biometrics/taxa that would be related to extreme weather events.

g. Detect changes early in a way that informs management strategies such as restoration and adaption.

2. Methodology

a. Develop a joint inter-agency monitoring plan.

b. Select 10 established reference sites based on agreed upon reference criteria in ecoregions 66, 67, 68 and 71.

c. Deploy two continuous monitoring temperature and water level (barometric pressure) probes at each site (both water and air).

d. Monitor each site in April and September for macroinvertebrates and periphyton in April. Conduct habitat assessments concurrent with biological monitoring (Table 14).

e. Analyze biological data to species level.

f. Monitor each site four times annually (January, April, July, September) for standard TDEC-DWR ecoregion reference water quality parameters as well as any additional parameters specified by SE monitoring group.

g. Measure flow and field parameters quarterly at each site.

h. Download continuous monitoring data from both air and water probes quarterly.

All field sampling and sample collection will be conducted by trained Environmental Scientists with Tennessee Department of Environment and Conservation (TDEC), Division of Water Resources. Macroinvertebrate analyses to species level will be contracted to Aquatic Resources Center through the Aquatic Biology Section, Tennessee Department of Health (TDH). Periphyton analysis will be contracted through the Aquatic Biology Section. Chemical analysis will be completed by the Inorganic Chemistry Section, TDH or by contracted lab. Data will be maintained and publicly available in a joint database with data from other agencies in the monitoring network.

Table 14. Southeast Monitoring Network Sites – Tennessee

Station	Stream	EFO	Latitude	Longitude	HUC	ECOIV	Drainage sq mi.	% Forest	Protected Drainage
ECO66E09	Clark Creek	JC	36.15077	-85.5291	TN06010108	66E	9.2	96	Sampson Mtn. Wilderness Cherokee NF
ECO66G05	Little River	K	35.65333	-83.5773	TN06010201	66G	34.9	100	Great Smoky Mtns. NP
ECO66G12	Sheeds Creek	CH	35.00305	-84.6122	TN03150101	66G	5.7	99	Big Frog Wilderness Cherokee NF
ECO66G20	Rough Creek	CH	35.05386	-84.48031	TN06020003	66G	6.04		
ECO6702	Fisher Creek	JC	36.4900	-82.9403	TN06010104	67F	11.6		
ECO67F06	Clear Creek	K	36.21361	-84.0597	TN06010207	67F	4.59		
ECO67F13	White Creek	K	36.34361	-83.89166	TN06010205	67F	3.1	91	Chuck Swann Wildlife Management Area
ECO68A03	Laurel Fork Station Camp Creek	MS	36.51611	-84.6981	TN05130104	68A	5.9	90	Big South Fork NRRA
ECO68C20	Crow Creek	CH	35.1155	-85.9111	TN06030001	68C	18.4	95	Carter State Natural Area
ECO71F19	Brush Creek	CL	35.4217	-87.5355	TN06040004	71F	13.3		
ECO71H17	Clear Fork Creek	CK	35928651	-85.992117	TN05130108	71H	14.3		
MYATT005.1CU	Myatt Creek	CK	36.1299	-84.9827	TN06010208	68A	5.1		

III. WASTE LOAD ALLOCATION/TMDL DEVELOPMENT

A. Waste load Allocations/TMDL Development – (State Appropriations, 106 Funds, and 319(h) Funds)

Wasteload Allocations. Prior to issuance of NPDES permits, the limits for specific chemical constituents of the effluent must be determined. In those cases where there is a TMDL in place, NPDES permit limits cannot exceed the limits set by the TMDL.

A Total Maximum Daily Load (TMDL) is a study that 1) identifies the sources of pollutants in a water body, 2) quantifies the amount of the pollutants, and (3) recommends regulatory or other actions that may need to be taken in order for the stream to no longer be polluted. Following are actions that might be recommended:

- Re-allocate limits on the sources of pollutants documented as impacting streams. It might be necessary to lower the amount of pollutants being discharged under NPDES permits or to require the installation of other control measures, if necessary, to insure that standards will be met.

- For sources, the Division does not have regulatory authority over, such as ordinary agricultural and forestry activities, provide information and technical assistance to other state and federal agencies that work directly with these groups to install appropriate BMPs.

Even for impaired waters, TMDL development is not considered appropriate for all bodies of water. Additionally, in cases involving pollution sources in other states, the recommendation may be that another state or EPA develops the TMDL.

319(h) Funds. The Tennessee Department of Agriculture administers the 319(h) grant program.

IV. COMPLAINTS, FISH KILLS, WASTE SPILLS AND OTHER EMERGENCIES

A. Complaints

The division investigates and attempts to resolve over 2200 complaints each year. Most of these are filed by private citizens who wish to convey information concerning suspected pollution events. As such, these complaint investigations are an important source of information. The division places a high priority on the investigation of these reports. Staff are assigned to this activity for the investigation to be accomplished in a timely and efficient manner. Due to its sporadic nature, complaint investigations are difficult to plan and often divert staff from other program needs.

On occasion, a formal 118(a) complaint is filed with the Commissioner's office. When the complaint involves water pollution, a formal process coordinated by the Enforcement and Compliance Section is begun. The division investigates the complaint and develops a formal response, which is then approved by the Commissioner's office.

B. Fish Kills, Waste Spills, and other Emergencies

The Federal Emergency Management Agency (FEMA) requires that each state have an Emergency Management Plan (EMP). Employees of the State are required to serve under emergency situations. The State has instituted the Tennessee Emergency Management Agency (TEMA) program for coordinating emergency response to spills of materials that may adversely affect Tennessee's waters. The main responsibilities are to respond in all emergency situations including, but not limited to:

1. Disasters, including natural and accidental; for example, truck wrecks or train derailment, structural or mechanical failure, fish kills due to spills or bypassing from wastewater treatment plants, etc.
2. War-related emergency (conventional or nuclear)
3. Resource crises (for example, shortage of water treatment plant chemicals)

When a fish kill is reported to the division, the ensuing investigation is often a joint effort between the division and the Tennessee Wildlife Resources Agency (TWRA). When arriving on-site, a preliminary attempt is made to determine whether the fish kill is due to natural conditions or human causes. If the fish kill appears related to pollution, division staff members collect samples, take photographs, and inspect nearby facilities for potential pollutant sources. The TWRA officer counts and identifies the dead fish, and calculates a monetary value of the damage to the fishery. An enforcement package is prepared if a source can be identified and turned over to the Enforcement and Compliance Section of DWR. A detailed list of waste spills and fish kills will be kept for environmental indicator purposes.

Organizational changes in TDEC have resulted in the creation within each EFO of an Emergency Response Team (ERT). If a waste spill has occurred, the ERT responds to major emergencies; teams usually have a DWR staff member and staff from other divisions. Moderate emergencies may be handled by DWR or the ERT, depending on the ERT’s decision. Minor emergencies are handled by DWR. As soon as the major emergency is over, the ERT turns over the follow-up activities and remediation efforts to DWR or Solid Waste Management (SWM) as appropriate. DWR may recommend containment and mitigation efforts on-site.

VI. LITERATURE CITED

Arnwine, D.H., J.I. Broach, L.K. Cartwright and G.M. Denton. 2000. *Tennessee Ecoregion Project.* Tennessee Department of Environment and Conservation, Division of Water Pollution Control. Nashville, Tennessee.

Arnwine, D.H., K.J. Sparks, and R.R. James. 2006. *Probabilistic Monitoring of Streams Below Small Impoundments in Tennessee.* Tennessee Department of Environment and Conservation, Division of Water Pollution Control. Nashville, Tennessee.

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers*. EPA 841-B-99-002. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

Denton, G.M., D.H. Arnwine and S.H. Wang. 2001. *Development of Regionally-Based Interpretations of Tennessee's Narrative Nutrient Criterion*. Tennessee Department of Environment and Conservation, Division of Water Pollution Control. Nashville, Tennessee.

Tennessee Department of Environment and Conservation. 2001. *Monitoring to Support TMDL Development*. Division of Water Pollution Control, Watershed Management Section. Nashville, TN.

_____. 2007. *Tennessee's Plan for Nutrient Criteria Development.* Division of Water Pollution Control. Nashville, Tennessee.

_____. 2010 . *Quality System Standard Operating Procedure for Periphyton Stream Surveys.* Division of Water Pollution Control. Nashville, Tennessee

_____. 2013 Tennessee Department of Environment and Conservation Water Quality Control Board. *Rules of the Tennessee Department of Environment and Conservation Division of Water Pollution, Chapter 0400-40-04, Use Classification for Surface Waters*, Division of Water Resources. Nashville, Tennessee.

_____. 2013. *Rules of the Tennessee Department of Environment and Conservation Division of Water Pollution Control, Chapter 0400-40-03, General Water Quality Criteria*, Division of Water Resources. Nashville, Tennessee.

_____. 2017. Quality Assurance Project Plan for 106 Monitoring in the Division of Water Pollution Control. Volume I. Version 10. Division of Water Resources. Nashville, Tennessee.

_____. 2017 Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys. Division of Water Resources. Nashville, Tennessee.

_____. 2017. *Final 2016 303(d) List*. Division of Water Resources. Nashville. Tennessee.

_____.2018. *Proposed Final 2018 List of Impaired and Threatened Waters in Tennessee.* Division of Water Resources. Nashville. Tennessee.

_____. 2018. Draft Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water. Division of Water Pollution Control. Nashville, Tennessee.

_____. 2018. *Tennessee's Consolidated Assessment and Listing Methodology (CALM).*Division of Water Resources. Nashville. Tennessee.

Tennessee Secretary of State. 1994. *The Tennessee Water Quality Control Act of 1977 including the 1994 Amendments.* Planning and Standards Section, Division of Water Pollution Control. Nashville, Tennessee.

U.S. Congress. 2002. *Federal Water Pollution Control Act as Amended Through P.L. 107-303. 33 U.S.C.* 1251 et. seq. Washington, D.C.

U.S. Department of Army, Charleston District, Corps of Engineers, 2002.*Regulatory Division Standard Operating Procedure*. Charleston, SC.

U.S. Environmental Protection Agency. 2003. *Elements of a State Water Monitoring and Assessment Program.* EPA 841-B-03-003. Office of Water. Office of Wetlands, Oceans and Watersheds. Assessment and Watershed Protection Division. Washington, D.C.

_____. 2003. *Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act*. Office of Water. Office of Wetlands, Oceans and Watersheds. Assessment and Watershed Protection Division. Watershed Branch. Washington, D.C.

APPENDIX A:

MONITORING STATIONS SCHEDULED TO BE SAMPLED BETWEEN JULY 2018 AND JUNE 2019

Projected Monitoring Stations for 2018-2019

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
ECO66G12	Sheeds Creek	SEMN	TN03150101012_0510	CHEFO		4		2	2	1	2	
SAVAG006.3SE	Savage Creek	303d	TN05130107016_0150	CHEFO	12	12		1			1	
MILL001.1GY	Mill Creek	Watershed	TN05130107016_0300	CHEFO			1				1	
FALLXXX.XGY	Fall Creek	Watershed	TN05130107016_0600	CHEFO			1				1	
RANGE003.0GY	Ranger Creek	Watershed	TN05130107016_0710	CHEFO			1				1	
FIRES002.1GY	Firescald Creek	Watershed	TN05130107016_0730	CHEFO			1				1	
PINEY001.8GY	Piney Creek	Watershed	TN05130107016_0731	CHEFO			1				1	
BIG007.2GY	Big Creek	Watershed	TN05130107016_0750	CHEFO			1				1	
TAYLO000.2GY	Taylor Creek	303d	TN05130107016_0800	CHEFO	12	12	1				1	
COLLI062.5GY	Collins River	303d	TN05130107016_2000	CHEFO	12	12	1				1	
PINEY005.0RH	Piney River	Ambient	TN06010201041_1000	CHEFO	4	4						
TENNE444.0MI	Tennessee River	Ambient	TN06020001001_1000	CHEFO	4	4						
TENNE469.0HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE468.0HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE462.6HM-LMC	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE460.6HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE459.7HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE457.2HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE454.0HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE453.4HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE448.0MI	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE445.0HM	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE444.0MI	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						
TENNE440.0MI	Tennessee River	Watershed	TN06020001001_1000	CHEFO		7*						

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
SCHIC000.4HM	South Chickamauga Creek	Ambient	TN06020001007_1000	CHEFO	4	4						
TENNE503.3RH	Tennessee River	Ambient	TN06020001020_1000	CHEFO	4	4						
TENNE477.0HM	Tennessee River	Ambient	TN06020001020_1000	CHEFO	4	4						
TENNE529.5RH	Tennessee River	Ambient	TN06020001020_1000	CHEFO	4	4						
RATTA002.2RH	Rattan Creek	303d	TN06020001020T_0100	CHEFO	12	12	1				1	
GRASS001.0RH	Grassy Branch	303d	TN06020001020T_0200	CHEFO	12	12	1				1	
WATTS003.0ME	Watts Creek	Watershed	TN06020001020T_0300	CHEFO			1				1	
LICK001.5ME	Lick Branch	303d	TN06020001020T_0400	CHEFO	12	12	1				1	
DRY2.8T0.6HM	Unnamed Trib to Dry Branch	303d	TN06020001020T_0510	CHEFO	12	12	-	1			1	
PENNY001.0HM	Penny Branch	303d	TN06020001020T_0600	CHEFO	12	12	1				1	
THATC000.1HM	Thatch Branch	Watershed	TN06020001020T_0700	CHEFO			1				1	
FROGL000.8HM	Frog Level Branch	Watershed	TN06020001020T_0800	CHEFO			1				1	
WOLFE000.4HM	Wolfe Branch	303d	TN06020001029_0100	CHEFO	12	12		1			1	
SAVAN6.4T0.4HM	Unnamed Trib to Savannah Creek	303d	TN06020001029_0200	CHEFO	12	12	1				1	
RSPRI000.1HM	Runyon Spring Branch	Watershed	TN06020001029_0300	CHEFO			1				1	
LEWIS000.3HM	Lewis Branch	303d	TN06020001029_0400	CHEFO	12	12		1			1	
FECO67H01	Taliaferro Branch	FECO	TN06020001029_0500	CHEFO		4	2	2		1	2	
SAVAN005.0HM	Savannah Creek	303d	TN06020001029_1000	CHEFO	12	12	1				1	
HARDI000.4ME	Hardin Creek	303d	TN06020001038_0100	CHEFO	12	12	1				1	
GOODF002.4ME	Goodfield Creek	303d	TN06020001038_0200	CHEFO	12	12	1				1	
COLDW000.5ME	Coldwater Branch	303d	TN06020001038_0210	CHEFO	12	12	1				1	
DECAT000.4ME	Decatur Creek	303d	TN06020001038_1000	CHEFO	12	12	1				1	
TMILE002.6ME	Ten Mile Creek	303d	TN06020001041_0100	CHEFO	12	12	-	1			1	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
HURRI001.0ME	Hurricane Creek	303d	TN06020001041_0110	CHEFO	12	12	1				1	
DFORK000.4ME	Dry Fork	Watershed	TN06020001041_0200	CHEFO			1				1	
LSEWE000.8ME	Little Sewee Creek	303d	TN06020001041_0500	CHEFO	12	12		1			1	
BIVIN000.6MM	Bivins Branch	303d	TN06020001041_0520	CHEFO	12	12	1				1	
SFLSE001.7MM	South Fork Little Sewee Creek	303d	TN06020001041_0530	CHEFO	12	12	1				1	
COLLI000.1MM	Collins Branch	303d	TN06020001041_0532	CHEFO	12	12	1				1	
DAVIS000.4ME	Davis Creek	303d	TN06020001041_0600	CHEFO	12	12		1			1	
BANKL000.5ME	Black Ankle Creek	303d	TN06020001041_0700	CHEFO	12	12	1				1	
DFORK000.5ME	Dry Fork	303d	TN06020001041_0800	CHEFO	12	12		1			1	
HUSTE000.3ME	Hutsel Branch	303d	TN06020001041_0810	CHEFO	12	12	1				1	
SEWEE006.1ME	Sewee Creek	303d	TN06020001041_1000	CHEFO	12	12	1				1	
BSEWE004.9ME	Big Sewee Creek	303d	TN06020001041_2000	CHEFO	12	12	1				1	
CLEAR3.3RH	Clear Creek	Watershed	TN06020001047_1000	CHEFO			1				1	
MORGA001.4RH	Morgan Creek	303d	TN06020001048_0100	CHEFO			1				1	
POLEB005.1BL	Polebridge Creek	303d	TN06020001048_0200	CHEFO			1				1	
HENDE006.6RH	Henderson Creek	Watershed	TN06020001048_0300	CHEFO			1				1	
LAURE005.5RH	Laurel Creek	303d	TN06020001048_0450	CHEFO			1				1	
RICHL004.8RH	Richland Creek	Watershed	TN06020001048_1000	CHEFO	12	12	1				1	
LRICH001.6RH	Little Richland Creek	303d	TN06020001049_1000	CHEFO	12	12	1				1	
MCGIL000.1RH	McGill Creek	Watershed	TN06020001057_0100	CHEFO			1				1	
ROARI000.9RH	Roaring Creek	Watershed	TN06020001057_0200	CHEFO			1				1	
CUPPXXX.XBL	Cupp Creek	Watershed	TN06020001057_0210	CHEFO			1				1	
BRUSH001.1RH	Brush Creek	Watershed	TN06020001057_0220	CHEFO	12	12		1			1	
ROAR002.3RH	Roaring Creek	Watershed	TN06020001057_0250	CHEFO	12	12	1				1	
FECO68C13	Gilbreath Creek	FECO	TN06020001057_0400	CHEFO		4	2	2		1	2	
SALE007.7HM	Sale Creek	Watershed	TN06020001057_1000	CHEFO	12	12	1				1	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
LAURE000.6BL	Laurel Branch	303d	TN06020001060_0200	CHEFO	12	12		1			1	
HORN000.5BL	Horn Creek	Watershed	TN06020001060_0300	CHEFO			1				1	
HALL004.8BL	Hall Creek	Watershed	TN06020001060_0400	CHEFO			1				1	
ROCK000.8HM	Rock Creek	Watershed	TN06020001060_1000	CHEFO			1				1	
BPOSS000.1HM	Big Possum Creek	Watershed	TN06020001062_0100	CHEFO	12	12		1			1	
LPOSS000.1HM	Little Possum Creek	303d	TN06020001062_0200	CHEFO	12	12		1			1	
POSSU6.5T0.5T0.1HM	Unnamed Trib to Possum Creek	303d	TN06020001062_0300	CHEFO	12	12	1				1	
POSSU006.0HM	Possum Creek	303d	TN06020001062_1000	CHEFO	12	12		1			1	
DEEP000.1HM	Deep Creek	Watershed	TN06020001064_0100	CHEFO			1				1	
WOLF000.1HM	Wolf Creek	Watershed	TN06020001064_0110	CHEFO			1				1	
GRAY006.7SE	Gray Creek	Watershed	TN06020001064_0200	CHEFO			1				1	
SAWMI003.7HM	Sawmill Creek	303d	TN06020001064_0210	CHEFO	12	12		1			1	
BCAMP000.1HM	Board Camp Creek	Watershed	TN06020001064_0400	CHEFO			1				1	
SODDY005.9HM	Soddy Creek	Watershed	TN06020001064_1000	CHEFO	12	12	1				1	
SODDY012.5BL	Soddy Creek	303d	TN06020001064_2000	CHEFO	12	12		1			1	
GRASS002.9HM	Grasshopper Creek	303d	TN06020001086_1000	CHEFO	12	12	1				1	
LSODD001.3HM	Little Soddy Creek	Watershed	TN06020001107_1000	CHEFO			1				1	
CHATT000.9HM	Chattanooga Creek	Ambient	TN060200011244_1000	CHEFO	4	4						
YELLO002.5RH	Yellow Creek	303d	TN06020001717_1000	CHEFO	12	12	1				1	
ROGER000.9HM	Rogers Branch	303d	TN06020001880_1000	CHEFO	12	12	1				1	
LWOLF000.5HM	Little Wolftever Creek	303d	TN06020001889_0100	CHEFO	12	12	1				1	
LOOLT000.4HM	Little Ooltewah Creek	Watershed	TN06020001889_0110	CHEFO			1				1	
CHESN000.3HM	Chesnutt Creek	Watershed	TN06020001889_0200	CHEFO	12	12	1				1	
WILKE000.3HM	Wilkerson Branch	303d	TN06020001889_0300	CHEFO	12	12	1				1	
HUNTE000.5HM	Hunter Creek	303d	TN06020001889_0400	CHEFO			1				1	
WOLFT010.8HM	Wolftever Creek	303d	TN06020001889_1000	CHEFO	12	12	1				1	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
WOLFT017.3HM	Wolftever Creek	Watershed	TN06020001889_2000	CHEFO			1				1	
HIWAS013.4MM	Hiwassee River	Ambient	TN06020002008_1000	CHEFO	4	4						
CANE001.5MM	Cane Creek	Ambient	TN06020002081_0100	CHEFO	4	4						
OOSTA028.4MM	Oostanaula Creek	Ambient	TN06020002083_3000	CHEFO	4	4						
OCOEE001.0PO	Ocoee River	Ambient	TN06020003001_1000	CHEFO	4	4						
ECO66G20	Rough Creek	SEMN	TN06020003013.55_0400	CHEFO		4		2	2	1	2	
OCOEE019.6PO	Ocoee River	Ambient	TN06020003013_1000	CHEFO	4	4						
SEQUA006.3MI	Sequatchie River	Ambient	TN06020004001_1000	CHEFO	4	4						
TENNE416.5MI	Tennessee River	Ambient	TN06030001055_1000	CHEFO	4	4						
ECO68C20	Crow Creek	SEMN	TN06030001067_1000	CHEFO		4		2	2	1	2	
CUMBE381.1CY	Cumberland River	Ambient	TN05130103001_1000	CKEFO	4	4						
OBEY002.1CY	Obey River	Ambient	TN05130105001_1000	CKEFO	4	4						
RAMS000.6WA	Rams Creek	Watershed	TN05130107001_0200	CKEFO			1				1	
MARTI000.4WA	Martin Creek	Watershed	TN05130107001_0300	CKEFO	12	12	1				1	
DRY001.2WA	Dry Branch	Watershed	TN05130107001_0400	CKEFO	12			1			1	
COLLI025.8WA or 39.2Wa	Collins River	Watershed	TN05130107001_1000	CKEFO	12		1				1	
MOUNT001.0WA	Mountain Creek	303d	TN05130107002_1000	CKEFO	12	12		1			1	
MOUNT015.2WA 6.8WA	Mountain Creek	303d	TN05130107002_2000	CKEFO	12	12		1			1	
BSPRI000.1WA	Bluff Spring(s) Brunch	Watershed	TN05130107002-0400	CKEFO				1			1	
HGROV000.8WA	Hickory Grove Branch	Watershed	TN05130107004_0100	CKEFO	12		1				1	
CHARL001.0WA	Charles Creek	Watershed	TN05130107004_1000	CKEFO	12		1				1	
CANEY000.9WA	Caney Branch	Watershed	TN05130107006_0200	CKEFO	12	12		1			1	
SPBAR000.2WA	South Prong Barren Fork	Watershed	TN05130107006_0300	CKEFO			1				1	
MUD001.3CN	Mud Creek	Watershed	TN05130107006_0310	CKEFO				1			1	
LIBER001.6CE	Liberty Creek	Watershed	TN05130107006_0320	CKEFO			1				1	
MCMAH001.0CN	McMahan Creek	Watershed	TN05130107006_0322	CKEFO			1				1	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
WITTY000.8WA	Witty Creek	Watershed	TN05130107006_0330	CKEFO				1			1	
DUKE000.2CN	Duke Creek	Watershed	TN05130107006_0331	CKEFO				1			1	
NPBAR002.1WA	North Prong Barren Fork	Watershed	TN05130107006_0400	CKEFO			1				1	
DOG000.4WA	Dog Branch	Watershed	TN05130107006_0500	CKEFO				**1**			1	
OAKLA001.2WA	Oakland Branch	303d	TN05130107006_0700	CKEFO	12	12		1			1	
BARRE004.4WA	Barren Fork	Watershed	TN05130107006_1000	CKEFO	12	12		1			1	
BARRE004.5WA	Barren Fork	Watershed	TN05130107006_1000	CKEFO	12	12		1			1	
BARRE017.2WA	Barren Fork	Watershed	TN05130107006_2000	CKEFO	12	12		1			1	
BARRE018.3WA	Barren Fork	Watershed	TN05130107006_2000	CKEFO	12	12		1			1	
GARNE000.3WA	Garner Branch	Watershed	TN05130107006-0100	CKEFO	12			1			1	
BULLP000.3WA	Bullpen Creek	Watershed	TN05130107006-0420	CKEFO			1				1	
LOCKE000.3WA	Locke Branch	303d	TN05130107012_0100	CKEFO	12	12		1			1	
FULTZ001.3WA	Fultz Creek	303d	TN05130107012_0200	CKEFO	12	12		1			1	
LHICK000.3WA	Little Hickory Creek	303d	TN05130107012_0300	CKEFO	12	12		1			1	
WFHIC002.3WA	West Fork Hickory Creek	303d	TN05130107012_0400	CKEFO	12	12		1			1	
MEADO001.3CE	Meadow Branch	303d	TN05130107012_0410	CKEFO	12	12		1			1	
CROWF002.9WA	Crow Foot Branch	Watershed	TN05130107012_0500	CKEFO			1				1	
HICKO001.1WA or 13.4	Hickory Creek	Watershed	TN05130107012_1000	CKEFO	12		1				1	
Taylor Creek	TAYLO000.2GY	303d	TN05130107016_0800	CKEFO	12	12		1			1	
Savage Cove Creek	SCOVE000.8GY	Watershed	TN05130107016_0900	CKEFO				1			1	
COLLI new station	Collins River	Watershed	TN05130107016_1000	CKEFO	12		1					
SCOTT001.8WA	Scott Creek	Watershed	TN05130107016_1100	CKEFO			1				1	
DRY002.1WA	Dry Creek	303d	TN05130107023_0200	CKEFO	12	12		1			1	
HILLS001.8WA	Hills Creek	Watershed	TN05130107023_1000	CKEFO	12		1				1	
CFORK011.2SM	CANEY FORK RIVER	Ambient	TN05130108001_1000	CKEFO	4	4						
ECO71H17	Clear Fork Creek	SEMN	TN05130108004_0220	CKEFO		4		2	2	1	2	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
MYATT005.1CU	Myatt Creek	SEMN	TN06010208008_0100	CKEFO		4		2	2	1	2	
ELK133.0FR	Elk River	Ambient	TN06030003015_1000	CLEFO	4	4						
SHOAL032.2LW	Shoal Creek	Ambient	TN06030005078_1000	CLEFO	4	4						
ROAN001.1PE	Roan Creek	Watershed	TN060400011020_1000	CLEFO			1				1	
TOMS002.3PE	Toms Creek	Watershed	TN060400011035_1000	CLEFO			1				1	
NFLIC002.0PE	North Fork Lick Creek	Watershed	TN060400011066_0100	CLEFO			1				1	
LICK004.6PE	Lick Creek	Watershed	TN060400011066_1000	CLEFO			1				1	
CYPRE002.5PE	Cypress Creek	Watershed	TN060400011090_1000	CLEFO			1				1	
LBEEC001.6T0.3WE	Unnamed Trib to Little Beech Creek	303d	TN060400011163_0110	CLEFO				1			1	
BEECH004.3WE	Beech Creek	303d	TN060400011163_1000	CLEFO				1			1	
BEECH005.8WE	Beech Creek	303d	TN060400011163_2000	CLEFO				1			1	
BEECH0010.8WE	Beech Creek	303d	TN060400011163_3000	CLEFO				1			1	
EAGLE000.8WE	Eagle Creek	Watershed	TN060400011219_0100	CLEFO			1				1	
HARDI013.9WE	Hardin Creek	Watershed	TN060400011219_2000	CLEFO			1				1	
WEATH000.3WE	Weatherford Creek	Watershed	TN060400011303_0900	CLEFO			1				1	
INDIA026.3WE	Indian Creek	Watershed	TN060400011303_2000	CLEFO			1				1	
DUCK248.0BE	Duck River	Ambient	TN06040002030_1000	CLEFO	4	4						
DUCK31.2T0.7HI	Unnamed Trib to Duck River	303d	TN06040003005_0600	CLEFO				1			1	
DUCK032.2HI	Duck River	Watershed	TN06040003005_2000	CLEFO				1			1	
BEAVE002.7HI	Beaverdam Creek	Watershed	TN06040003007_1000	CLEFO			1				1	
INDIA000.6HI	Indian Creek	Watershed	TN06040003009_0900	CLEFO			1				1	
DUCK064.0HI	Duck River	Watershed	TN06040003009_1000	CLEFO	12	12		1			1	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
ECO71F28	Little Swan Creek	Ecoregion	TN06040003010_0800	CLEFO			2	2		1	2	
BSWAN003.7HI	Big Swan Creek	Watershed	TN06040003010_1000	CLEFO			1				1	
FECO71F01	UNT Little Swan Creek	Ecoregion	TN06040003010_1110	CLEFO			2	2		1	2	
BSWAN019.8LS	Big Swan Creek	Watershed	TN06040003010_2000	CLEFO			1				1	
DUCK088.9HI	Duck River	Watershed	TN06040003016_1000	CLEFO				1			1	
PATTE000.1MY	Patterson Creek	303d	TN06040003019_0200	CLEFO				1			1	
BBIGB12.9T0.5MY	Unnamed Trib to Big Bigby Creek	303d	TN06040003019_0300	CLEFO				1			1	
DOG000.1MY	Dog Branch	303d	TN06040003019_0700	CLEFO	12	12		1			1	
BBIG000.3MY	Big Bigby Creek	Watershed	TN06040003019_1000	CLEFO				1			1	
BBIGB004.7MY	Big Bigby Creek	303d	TN06040003019_2000	CLEFO	12	12		1			1	
BBIGB008.5MY	Big Bigby Creek	Ambient	TN06040003019_2000	CLEFO	4	4						
BBIGB011.1MY	Big Bigby Creek	303d	TN06040003019_3000	CLEFO	12	12		1			1	
BBIGB017.8MY	Big Bigby Creek	Watershed	TN06040003019_4000	CLEFO				1			1	
QUALI000.1MY	Quality Creek	303d	TN06040003023_0100	CLEFO	12	12		1			1	
SUGAR000.1MY	Sugar Creek	303d	TN06040003023_0200	CLEFO	12	12		1			1	
SUGAR5.1T0.2MY	Unnamed Trib to Sugar Creek	303d	TN06040003023_0210	CLEFO	12	12		1			1	
SUGAR002.1MY	Sugar Creek	303d	TN06040003023_0250	CLEFO	12	12		1			1	
SUGAR005.3MY	Sugar Creek	Watershed	TN06040003023_0255	CLEFO				1			1	
SUGAR001.3MY	Sugar Fork	303d	TN06040003023_1000	CLEFO	12	12		1			1	
SUGAR002.4MY	Sugar Fork	303d	TN06040003023_2000	CLEFO	12	12		1			1	
GREEN002.1MY	Greenlick Creek	Watershed	TN06040003024_0200	CLEFO			1				1	
DUCK113.9MY	Duck River	303d	TN06040003024_1000	CLEFO	12	12		1			1	
DUCK113.9MY	Duck River	Ambient	TN06040003024_1000	CLEFO	4	4						
DUCK122.0MY	Duck River	303d	TN06040003026_1000	CLEFO	12	12		1			1	
DUCK130.5MY	Duck River	Watershed	TN06040003026_2000	CLEFO				1			1	
LBIGB4.1T0.1MY	Unnamed trib to Little Bigby Creek	303d	TN06040003027_0100	CLEFO				1			1	

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LBIGB002.0MY	Little Bigby Creek	Watershed	TN06040003027_1000	CLEFO			1				1	
LYTLE2.5T0.1MY	Unnamed Trib to Lytle Creek	303d	TN06040003030_0100	CLEFO				1			1	
LYTLE000.6MY	Lytle Creek	303d	TN06040003030_1000	CLEFO				1			1	
COLEM000.1MY	Coleman Branch	303d	TN06040003034_0260	CLEFO				1			1	
MCCUT000.9MY	McCutcheon Creek	303d	TN06040003034_0300	CLEFO				1			1	
GRASS001.4WI	Grassy Branch	303d	TN06040003034_0410	CLEFO				1			1	
CROOK000.2MY	Crooked Creek	303d	TN06040003034_0700	CLEFO				1			1	
RUTHE001.6MY	Rutherford Creek	Watershed	TN06040003034_1000	CLEFO	12	12		1			1	
RUTHE006.2MY	Rutherford Creek	303d	TN06040003034_2000	CLEFO	12	12		1			1	
RUTHE019.3MY	Rutherford Creek	Watershed	TN06040003034_3000	CLEFO	12	12		1			1	
POTTS000.1MY	Potts Branch	303d	TN06040003041_0800	CLEFO	12	12		1			1	
POTTS0.3T0.1MY	Unnamed Trib to Potts Branch	303d	TN06040003041_0810	CLEFO	12	12		1			1	
LUNNS000.2HI	Lunns Branch	303d	TN06040003041_0900	CLEFO	12	12		1			1	
LICK009.5HI	Lick Creek	Watershed	TN06040003041_1000	CLEFO				1			1	
DOG001.2HI	Dog Creek	303d	TN06040003041_1100	CLEFO	12	12		1			1	
BEAVE002.7HI	Beaver Creek	Watershed	TN06040003050_0200	CLEFO			1				1	
GARNE000.5HI	Garner Creek	Watershed	TN06040003050_0300	CLEFO			1				1	
BSPRI000.4HI	Big Spring Creek	Watershed	TN06040003050_0800	CLEFO			1				1	
PINEY004.0HI	Piney River	Watershed	TN06040003050_1000	CLEFO				1			1	
MILL001.9HI	Mill Creek	Watershed	TN06040003050_1200	CLEFO			1				1	
PINEY011.4HI	Piney River	Watershed	TN06040003050_2000	CLEFO				1			1	
PINEY017.9HI	Piney River	Watershed	TN06040003050_3000	CLEFO				1			1	
SUGAR001.0HI	Sugar Creek	Watershed	TN06040003059_1000	CLEFO			1				1	
MARRS000.1PE	Marrs Branch	303d	TN06040004001_0700	CLEFO				1			1	
BUFFA041.0PE	Buffalo River	Watershed	TN06040004002_1000	CLEFO				1			1	
BUFFA073.1WE	Buffalo River	Ambient	TN06040004002_1000	CLEFO	4	4						

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GREEN002.4WE	Green River	Watershed	TN06040004007_1000	CLEFO				1			1	
GREEN011.7WE	Green River	Watershed	TN06040004007_2000	CLEFO				1			1	
GREEN012.3WE	Green River	Watershed	TN06040004007_3000	CLEFO				1			1	
BUFFA073.1WE	Buffalo River	Watershed	TN06040004008_1000	CLEFO				1			1	
FORTY010.2WE	Fortyeight Creek	Watershed	TN06040004009_1000	CLEFO			1				1	
DRY001.1LW	Dry Branch	303d	TN06040004013_0400	CLEFO	12	12		1			1	
ECO71F19	Brush Creek	SEMN	TN06040004013_0400	CLEFO			2	2	2	1	2	
FECO71F02	Wolfpen Branch	Ecoregion	TN06040004013_0999	CLEFO			2	2		1	2	
BUFFA098.1LS	Buffalo River	Watershed	TN06040004019_1000	CLEFO				1			1	
GRIND000.1LS	Grinders Creek	Watershed	TN06040004024_1000	CLEFO				1			1	
ROCKH001.1LS	Rockhouse Creek	Watershed	TN06040004025_1000	CLEFO			1				1	
ROCKH008.2LS	Rockhouse Creek	303d	TN06040004025_2000	CLEFO	12	12		1			1	
WFBUF003.0LW	West Fork Buffalo River	Watershed	TN06040004028_0600	CLEFO			1				1	
BRUSH000.8PE	Brush Creek	Watershed	TN06040004030_1000	CLEFO			1				1	
EFCAN000.6LS	East Fork Cane Creek	Watershed	TN06040004031_0400	CLEFO			1				1	
SFCAN000.6LS	South Fork Cane Creek	Watershed	TN06040004031_0500	CLEFO			1				1	
ROCKH001.1LS	Rockhouse Creek	Watershed	TN06040004059_1000	CLEFO			1				1	
SENSA000.2HS	Sensabaugh Branch	Watershed	TN06010101001_0100	JCEFO			1				1	
NFHOL004.6SU	North Fork Holston River	Ambient	TN06010101001_1000	JCEFO	4	4		1			1	
MADD001.2SU	Madd Branch	303d	TN06010102001_0100	JCEFO	10	10		1			1	
SFHOL001.1SU	South Fork Holston River	Ambient	TN06010102001_1000	JCEFO	4	10						
SFHOL001.4SU	South Fork Holston River	303d	TN06010102001_1000	JCEFO	10	10		1			1	
SFHOL005.6SU	South Fork Holston River	303d	TN06010102001_1000	JCEFO	10	10						
SFHOL006.7SU	South Fork Holston River	303d	TN06010102001_2000	JCEFO		10						1
MILL000.2SU	Mill Creek	303d	TN06010102003_0100	JCEFO				1			1	
HORSE9.1T0.6SU	Horse Creek Unnamed Tributary	303d	TN06010102003_0200	JCEFO	10		1				1	

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FALL000.6WN	Fall Branch	303d	TN06010102003_0300	JCEFO	5	10		1			1	
WALKE000.1SU	Walker Fork	303d	TN06010102003_0400	JCEFO	10	10		1			1	
LYNCH000.2SU	Lynch Branch	303d	TN06010102003_0410	JCEFO	10		1				1	
BGAP000.0SU	Blair Gap Branch	303d	TN06010102003_0498	JCEFO	5			1			1	
BEAR000.2SU	Bear Creek	303d	TN06010102003_0500	JCEFO	5		1				1	
DOLAN001.3SU	Dolan Branch	Watershed	TN06010102003_0610	JCEFO	10		1					
HORSE000.3SU	Horse Creek	303d	TN06010102003_1000	JCEFO	10			1			1	
HORSE007.3SU	Horse Creek	303d	TN06010102003_2000	JCEFO	10		1				1	
HORSE010.7SU	Horse Creek	303d	TN06010102003_3000	JCEFO	5		1				1	
LHORS000.3SU	Little Horse Creek	303d	TN060101020030_600	JCEFO	10			1			1	
SFHOL16.8T1.3SU	South Fork Holston River Unnamed Tributary	Watershed	TN06010102004T_0200	JCEFO			1				1	
RUSSE000.8SU	Russell Creek	303d	TN06010102004T_100	JCEFO	10			1			1	
BEAVE001.0SU	Beaver Creek	Ambient	TN06010102042_1000	JCEFO	4	4						
BEAVE015.3SU	Beaver Creek	Ambient	TN06010102042_2000	JCEFO	4	4						
FALL000.7SU	Fall Creek	303d	TN06010102045_1000	JCEFO	10		1				1	
FALL003.6SU	Fall Creek	303d	TN06010102045_2000	JCEFO	10	10		1			1	
TRANB000.4SU	Tranbarger Branch	303d	TN06010102046_0100	JCEFO	10	10		1			1	
GRAVE000.3SU	Gravelly Branch	303d	TN06010102046_0200	JCEFO	10	10		1			1	
REEDY2.9T0.3SU	Reedy Creek UT/ Rocksprings Branch	Watershed	TN06010102046_0300	JCEFO			1				1	
MILLE000.4SU	Miller Branch	303d	TN06010102046_0400	JCEFO	10	10		1			1	
REEDY4.4T0.2SU	Reedy Creek Unnamed Tributary	303d	TN06010102046_0500	JCEFO	5			1			1	
REEDY6.5T0.2SU	Reedy Creek Unnamed Tributary	303d	TN06010102046_0600	JCEFO	10	10	1				1	
CLARK000.4SU	Clark Branch	303d	TN06010102046_0700	JCEFO	5		1				1	
GAINE000.3SU	Gaines Branch	303d	TN06010102046_0800	JCEFO	10	10	1				1	
TIMBE000.1SU	Timbertree Branch	303d	TN06010102046_0900	JCEFO			1				1	

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TIMBE000.3SU	Timbertree Branch	303d	TN06010102046_0900	JCEFO	10	10						
REEDY000.1SU	Reedy Creek	303d	TN06010102046_1000	JCEFO	10	10		1			1	
BOOZY000.1SU	Boozy Creek	Watershed	TN06010102046_1100	JCEFO				1			1	
REEDY14.8T1.8SU	Reedy Creek Unnamed Tributary	303d	TN06010102046_1200	JCEFO								1
HICKS000.2SU	Hicks Creek	Watershed	TN06010102046_2000	JCEFO				1			1	
REEDY008.0SU	Reedy Creek	303d	TN06010102046_2000	JCEFO	10	10		1			1	
REEDY015.5SU	Reedy Creek	303d	TN06010102046_3000	JCEFO	10	10		1			1	
FORD000.6WN	Ford Creek	303d	TN06010102047_0100	JCEFO	5	10		1			1	
RED000.2WN	Red River	303d	TN06010102047_0200	JCEFO	10		1				1	
SINKI001.0SU	Sinking Creek	Watershed	TN06010102047_1000	JCEFO			1				1	
SINKI005.0WN	Sinking Creek	Watershed	TN06010102047_1000	JCEFO			1				1	
KENDR5.8T0.7SU	Kendrick Creek Unnamed Tributary	303d	TN06010102057_0100	JCEFO	5		1				1	
STRAI000.4SU	Straight Branch	Watershed	TN06010102057_0200	JCEFO			1				1	
KENDR000.2SU	Kendrick Creek	303d	TN06010102057_1000	JCEFO	10	10		1			1	
POSSU001.3WN	Possum Creek	303d	TN06010102702_0100	JCEFO	10	0		1			1	
CEDAR002.1WN	Cedar Creek	303d	TN06010102702_1000	JCEFO	10	10		1			1	
RSPRI000.4SU	Rock Springs Branch	303d	TN06010102729_1000	JCEFO	10			1			1	
WATAU025.1CT	Watauga River	303d	TN06010103008_2000	JCEFO	4	4						
DOE001.1CT	Doe River	Ambient	TN06010103013_1000	JCEFO	4	4						
HOLST131.5HS	Holston River	Ambient	TN06010104011_2000	JCEFO	4	4						
HOLST142.0SU	Holston River	Watershed	TN06010104011_2000	JCEFO				1			1	
ECO6702	Fisher Creek	SEMN	TN06010104015_0100	JCEFO		4		2	2	1	2	
ECO6701	Big Creek	Ecoregion	TN06010104015_2000	JCEFO	4	4	2	2		1	2	
NOLIC020.8GE	Nolichucky River	Ambient	TN06010108001_3000	JCEFO	4	4						
NOLIC097.5UC	Nolichucky River	Ambient	TN06010108001_3000	JCEFO	4	4						
ECO66E09	Clark Creek	SEMN	TN06010108010_3200	JCEFO				2	2	1	2	

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BLIME000.5GE	Big Limestone Creek	Ambient	TN06010108030_1000	JCEFO	4	4						
LICK0001.0GE	Lick Creek	Ambient	TN06010108035_1000	JCEFO	4	4						
SINKI000.5GE	Sinking Creek	Ambient	TN06010108064_1000	JCEFO	4	4						
RICHL001.3GE	Richland Creek	Ambient	TN06010108102_1000	JCEFO	4	4						
LLIME007.0WN	LittleLimestone Creek	Ambient	TN06010108510_2000	JCEFO	4	4						
ECO67F17	Big War Creek	Ecoregion	TN06010205014_1000	JCEFO	4	4	2	2		1	2	
CLINC189.8HK	Clinch River	Ambient	TN06010205016_1000	JCEFO	4	4						
POWEL103.3HK	Powell River	Ambient	TN06010206007_2000	JCEFO	4	4						
EPDOE001.8DE	East Prong Doe Creek	303d	TN06040001041_0200	JEFO	5		1				1	
WPDOE001.4HD	West Prong Doe Creek	Watershed	TN06040001041-0100	JEFO			1				1	
CHALK001.3HD	Chalk Creek	303d	TN06040001043_0100	JEFO							1	
MUD000.6HD	Mud Creek	303d	TN06040001043_0200	JEFO							1	
SFMUD000.6HD	South Fork Mud Creek	303d	TN06040001043_0210	JEFO							1	
NFMUD000.7HD	North Fork Mud Creek	Watershed	TN06040001043_0220	JEFO			1				1	
TBD	Little White Oak Creek	Watershed	TN06040001043_0500	JEFO			1				1	
MIDDL002.1HD	Middleton Creek	Watershed	TN06040001043_0600	JEFO			1				1	
TBD	Big Hurricane Creek	Watershed	TN06040001043_0640	JEFO			1				1	
HURRI007.4HE	Hurricane Creek	303d	TN06040001043_0700	JEFO		12		1			1	
FLATS000.4HD	Flats Creek	Watershed	TN06040001043_0800	JEFO			1				1	
WOAK001.7HD	White Oak Creek	303d	TN06040001043_1000	JEFO								
TBD	White Oak Creek	Watershed	TN06040001043_2000	JEFO			1				1	
OWL004.2HD	Owl Creek	303d	TN06040001054_0200	JEFO	5		1				1	
CLEAR002.7MC	Clear Creek	Watershed	TN06040001054_0400	JEFO			1				1	
LICK002.0MC	Lick Creek	Watershed	TN06040001054_0900	JEFO				1			1	
SNAKE001.8HD	Snake Creek	303d	TN06040001054_1000	JEFO	5		1				1	
SNAKE007.7MC	Snake Creek	303d	TN06040001054_1000	JEFO	12	12		1			1	
SNAKE009.4MC	Snake Creek	Watershed	TN06040001054_2000	JEFO	12	12		1			1	

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LICK002.1HD	Lick Creek	Watershed	TN06040001058_1000	JEFO			1				1	
WARDL002.6MC	Wardlow Creek	Watershed	TN06040001060_0300	JEFO			1				1	
WARDL004.8MC	Wardlow Creek	Watershed	TN06040001060_0300	JEFO			1				1	
DSPRI0.8T0.2MC	Wardlow Creek	Watershed	TN06040001060_0310	JEFO			1				1	
CHAMB006.2HD	Chambers Creek	Watershed	TN06040001060_1000	JEFO			1				1	
CHAMB017.1MC	Chambers Creek	303d	TN06040001060_2000	JEFO							1	
TURKE009.0HD	Turkey Creek	Watershed	TN06040001064_0200	JEFO			1				1	
STEEL004.3HD	Steele Creek	303d	TN06040001064_0220	JEFO				1			1	
TBD	Boon Creek	Watershed	TN06040001064_0230	JEFO			1				1	
ENGLI002.3HD	English Creek	Watershed	TN06040001064_0260	JEFO			1				1	
KERR000.4HD	Kerr Branch	303d	TN06040001064_0400	JEFO	12	12		1			1	
FECO65J02	Horse Creek Unnamed Tributary	FECO	TN06040001064_0700	JEFO	4	4	2	2		1	2	
ROGER001.6HD	Rogers Creek	Watershed	TN06040001064_0900	JEFO			1				1	
ECO65J06	Right Fork Whites Creek	ECO	TN06040001064_0910	JEFO	4	4	2	2		1	2	
HORSE008.3HD	Horse Creek	Watershed	TN06040001064_1000	JEFO	12	12	1				1	
HORSE005.2HD	Horse Creek	Watershed	TN06040001064_1000	JEFO	12	12						
HOLLA003.0HD	Holland Creek	303d	TN06040001064_1400	JEFO			1				1	
HARDI004.6HD	Hardin Creek	Watershed	TN060400011219_1000	JEFO			1				1	
INDIA019.0HD	Indian Creek	Watershed	TN060400011303_1000	JEFO			1				1	
SMITH003.5HD	Smith Fork	Watershed	TN060400011303_1200	JEFO			1				1	
MUD004.4HD	Mud Creek	303d	TN06040001149_1000	JEFO							1	
STEWM005.4DE	Stewman Creek	Watershed	TN060400012176_1000	JEFO			1				1	
EAGLE004.1BN	Eagle Creek	Watershed	TN06040001364_1000	JEFO			1				1	
SFCUB004.0DE	Sulphur Fork Cub Creek	303d	TN06040001643_0200	JEFO				1			1	
FECO65E04	Cub Creek Unnamed Tributary	FECO	TN06040001643_0300	JEFO	4	4	2	2		1	2	

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CUB004.2DE	Cub Creek	Watershed	TN06040001643_1000	JEFO			1				1	
GOODI001.1DE	Goodin Branch	303d	TN06040001651_1000	JEFO			1				1	
LICK003.8DE	Lick Creek	Watershed	TN06040001665_1000	JEFO			1				1	
TURKE001.1DE	Turkey Creek	303d	TN06040001802_0100	JEFO			1				1	
FLAT001.6HE	Flat Creek	303d	TN06040001802_0300	JEFO							1	
CANE001.1HE	Cane Creek	303d	TN06040001802_0400	JEFO			1				1	
PINEY000.5HE	Piney Creek	Watershed	TN06040001802_0600	JEFO			1				1	
BRAZI000.6HE	BRAZIL BRANCH	Watershed	TN06040001802_0800	JEFO			1				1	
BEECH010.0DE	BEECH RIVER	Ambient	TN06040001802_1000	JEFO	4	4						
ONEMI000.7HE	Onemile Branch	303d	TN06040001802_1100	JEFO							1	
HARMO000.8HE	Harmon Creek	Watershed	TN06040001802_1400	JEFO			1				1	
HALEY000.7HE	Haley Creek	Watershed	TN06040001802_1500	JEFO			1				1	
BROWN001.4HE	Browns Creek	303d	TN06040001802_1600	JEFO								1
BROWN004.7HE	Browns Creek	303d	TN06040001802_1600	JEFO								1
BROWN008.7HE	Browns Creek	303d	TN06040001802_1650	JEFO								1
BIG001.8HE	Big Creek	Watershed	TN06040001802_1800	JEFO			1				1	
ARMS000.8DE	Arms Creek	Watershed	TN06040001802_1900	JEFO			1				1	
BEECH025.4HE	Beech River	Watershed	TN06040001802_2000	JEFO	12	12	1				1	
BEECH029.9HE	Beech River	Watershed	TN06040001802_2000	JEFO	12	12						
RUSH005.4DE	Rushing Creek	NPDES	TN06040001809_1000	JEFO								
RUSHI005.6DE	Rushing Creek	Watershed	TN06040001809_1000	JEFO				1			1	
WHITE005.4DE	Whites Creek	Watershed	TN06040001840_1000	JEFO			1				1	
TURNB005.6DE	Turnbo Creek	Watershed	TN06040001906_1000	JEFO			1				1	
BEECH036.0HE	Beech Lake	303d	TN06040001BEECHLK_1000	JEFO								
RABBI000.6HN	Rabbit Creek	303d	TN06040005019_0100	JEFO							1	
SFBLO000.8HN	South Fork Blood River	303d	TN06040005019_0200	JEFO							1	

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
NFBLO003.3HN	North Fork Blood River	Watershed	TN06040005019_0300	JEFO			1				1	
BLOOD015.5HN	Blood River	303d	TN06040005019_1000	JEFO			1				1	
TENNE066.3HN	TENNESSEE RIVER	Ambient	TN06040005020-1000	JEFO	4	4						
FORD0.1T1.6T0.1BN	Ford Creek Unnamed Tributary To Unnamed Tributary	303d	TN06040005020T_0510	JEFO								1
SPRIN001.5HN	Spring Creek	Watershed	TN06040005023_0300	JEFO			1				1	
CLIFT002.3HN	Clifty Creek	303d	TN06040005023_0500	JEFO	12	12		1			1	
TBD	Bailey Fork Creek	Watershed	TN06040005024_0100	JEFO				1			1	
TOWN000.2HN	Town Creek	303d	TN06040005024_0110	JEFO							1	
TOWN0.5T0.8HN	Town Creek Unnamed Tributary	303d	TN06040005024_0111	JEFO								1
THREE000.1HN	Threemile Branch	303d	TN06040005024_0114	JEFO			1				1	
BRUSH000.6HN	Brushy Branch	303d	TN06040005024_0600	JEFO							1	
BEAVE002.2HN	Beaverdam Creek	Watershed	TN06040005024_0700	JEFO			1				1	
HFORK004.0HN	Holly Fork Creek	Watershed	TN06040005024_1000	JEFO			1				1	
RAMBL001.0BN	Ramble Creek	Watershed	TN06040005027_0100	JEFO			1				1	
RUSHI001.5BN	Rushing Creek	Watershed	TN06040005027_0200	JEFO			1				1	
DRY000.7BN	Dry Creek	Watershed	TN06040005027_0300	JEFO			1				1	
DRY004.1BN	Dry Creek	303d	TN06040005027_0350	JEFO								1
ECO65E04	Blunt Creek	Ecoregion	TN06040005027_0900	JEFO	4	4	2	2		1	2	
SFBLU002.0CR	South Fork Blunt Creek	Watershed	TN06040005027_0920	JEFO			1				1	
TBD	Big Sandy River	303d	TN06040005027_1000	JEFO			1				1	
HROCK002.4CR	Hollow Rock Branch	303d	TN06040005027_1310	JEFO							1	
MARTI002.5CR	Martin Creek	Watershed	TN06040005027_1500	JEFO			1				1	
BEAR003.0HN	Bear Creek	Watershed	TN06040005027_1600	JEFO			1				1	
PANTH000.6HN	Panther Creek	303d	TN06040005027_1610	JEFO							1	

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BSAND015.3BN	BIG SANDY RIVER - EMBAYMENT	Ambient	TN06040005027-1000	JEFO	4	4						
MAPLE000.6CR	Maple Creek	Watershed	TN06040005032_0100	JEFO			1				1	
MAPLE003.8CR	Maple Creek	303d	TN06040005032_0150	JEFO								1
MORRI000.5CR	Morris Creek	303d	TN06040005032_0300	JEFO							1	
FECO65E03	Dabbs Creek Unnamed Tributary To Unnamed Tributary	FECO	TN06040005032_0410	JEFO	4	4	2	2		1	2	
SCARC001.0HE	Scarce Creek	Watershed	TN06040005032_0500	JEFO			1				1	
OLIVE001.5HE	Olive Branch	303d	TN06040005032_0600	JEFO							1	
BBEAV000.8HE	Big Beaver Creek	303d	TN06040005032_0700	JEFO			1				1	
LBEAV001.3HE	Little Beaver Creek	303d	TN06040005032_0720	JEFO	12	12		1			1	
MUD003.9CR	Mud Creek	303d	TN06040005032_0900	JEFO	12	12		1			1	
BSAND043.4CR	Big Sandy River	303d	TN06040005032_1000	JEFO	12	12		1			1	
ROAN002.7CR	Roan Creek	Watershed	TN06040005032_1100	JEFO			1				1	
BACON000.9CR	Bacon Creek	Watershed	TN06040005032_1200	JEFO			1				1	
BSAND051.2HE	Big Sandy River	303d	TN06040005032_2000	JEFO	12	12		1			1	
WOLF001.5BN	Wolf Creek	NPDES	TN06040005047_0500	JEFO			1				1	
SYCAM001.4BN	Sycamore Creek	Watershed	TN06040005047_0600	JEFO			1				1	
BIRDS012.3BN	Birdsong Creek	Watershed	TN06040005047_1000	JEFO			1				1	
AMMON000.5BN	Ammon Creek	Watershed	TN06040005047_1100	JEFO				1			1	
CANE000.1BN	Cane Creek	303d	TN06040005870_0210	JEFO			1				1	
CANE000.5BN	Cane Creek	Watershed	TN06040005870_0400	JEFO			1				1	
CHARL000.0BN	Charlie Creek	Watershed	TN06040005870_0410	JEFO			1				1	
CHARL003.4BN	Charlie Creek	303d	TN06040005870_0415	JEFO								1
CYPRE011.2BN	Cypress Creek	NPDES	TN06040005870_1000	JEFO								
CYPRE012.8BN	Cypress Creek	Watershed	TN06040005870_1000	JEFO				1			1	
TBD	South Fork Harmon Creek	Watershed	TN06040005913_0100	JEFO			1				1	

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NFHAR001.2BN	North Fork Harmon Creek	Watershed	TN06040005913_0200	JEFO			1				1	
TBD	Harmon Creek	Watershed	TN06040005913_1000	JEFO			1				1	
SULPH004.3BN	Sulphur Creek	Watershed	TN06040005932_1000	JEFO				1			1	
TBD	East Fork Clarks River	303d	TN06040006014_1000	JEFO			1				1	
NFOBI005.9OB	NORTH FORK OBION RIVER	Ambient	TN08010202009_1000	JEFO	4	4						
NFOBI010.7OB	NORTH FORK OBION RIVER	Ambient	TN08010202009_1000	JEFO	4	4						
SFOBI005.8OB	SOUTH FORK OBION RIVER	Ambient	TN08010203001_1000	JEFO	4	4						
MFOBI004.5WY	MIDDLE FORK OBION RIVER	Ambient	TN08010203015_1000	JEFO	4	4						
NFFDE005.3DY	NORTH FORK FORKED DEER RIVER	Ambient	TN08010204001_1000	JEFO	4	4						
SFFDE027.7HY	SOUTH FORK FORKED DEER RIVER	Ambient	TN08010205010_1000	JEFO	4	4						
HATCH126.9HR	HATCHIE RIVER	Ambient	TN08010208001-3000	JEFO	4	4						
INDIA004.7HR	Indian Creek	Watershed	TN08010210019_1000	JEFO				1			1	
FBROA095.9CO	French Broad River	Ambient	TN06010105001_4000	KEFO	4	4						
FBROA003.8KN	French Broad River	Ambient	TN06010107001-1000	KEFO	4	4						
TENNE643.3KN	Tennessee River	Ambient	TN06010201020-1000	KEFO	4	4						
ECO66G05	Little River	SEMN	TN06010201032_3000	KEFO		4		2	2	1	2	
	Tellico Reservoir	Watershed	TN06010204001_1000	KEFO		4						
FORK004.6MO	Fork Creek	303d	TN06010204002_1000	KEFO	12	12		1			1	
FORK007.6MO	Fork Creek	303d	TN06010204002_1000	KEFO	12	12		1			1	
BAT17.6T0.8T0.1MO	Bat Creek	303d	TN06010204004_0100	KEFO	12	12		1			1	

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BAT17.6T0.8T0.8MO	Bat Creek	303d	TN06010204004_0110	KEFO	12	12		1			1	
BAT008.1MO	Bat Creek	303d	TN06010204004_1000	KEFO	5			1				
BAT015.3MO	Bat Creek	303d	TN06010204004_2000	KEFO	12	12		1			1	
BALL004.0MO	Ballplay Creek	Watershed	TN06010204015_1000	KEFO			1				1	
CITIC005.2MO	Citico Creek	Watershed	TN06010204018_1000	KEFO				1			1	
LTENN032.8BT	Little Tennessee River	303d	TN06010204020_1000	KEFO								1
ABRAM008.6BT	Abrams Creek	Watershed	TN06010204039_1000	KEFO			1				1	
ECO66F06	Abrams Creek	Ecoregion	TN06010204039_2000	KEFO	4	4	2	2		1	2	
CENTE000.3BT	Centenary Creek	303d	TN06010204042_0100	KEFO	12	12		1			1	
LNINE000.5BT	Little Ninemile Creek	Watershed	TN06010204042_0200	KEFO				1			1	
SIXMI001.6BT	Sixmile Creek	303d	TN06010204042_0300	KEFO	5							
SIXMI005.1BT	Sixmile Creek	Watershed	TN06010204042_0300	KEFO				1			1	
	Unnamed Trib to Big Springs Branch	303d	TN06010204042_0311	KEFO								1
NINEM004.8BT	Ninemile Creek	303d	TN06010204042_1000	KEFO	5			1			1	
BAKER020.8T0.2BT	Binfield Branch (Baker Creek Unnamed Tributary)	303d	TN06010204043_0200	KEFO	5							
LBAKE000.5BT	Little Baker Creek	303d	TN06010204043_0400	KEFO	5			1			1	
BAKER008.9LO	Baker Creek	303d	TN06010204043_1000	KEFO	5			1			1	
BAKER017.5BT	Baker Creek	303d	TN06010204043_2000	KEFO	5			1			1	
CANE000.5MO	Cane Creek	303d	TN06010204044_0100	KEFO	12	12		1			1	
TBD	Turkey Creek	Watershed	TN06010204044_0400	KEFO			1				1	
ECO66G09	North River	Ecoregion	TN06010204044_0500	KEFO	4	4	2	2		1	2	

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FECO66G01	Indian Branch	FECO	TN06010204044_0500	KEFO	4	4	2	2		1	2	
TELLI022.0MO	Tellico River	Watershed	TN06010204044_1000	KEFO				1			1	
TELLI028.5MO	Tellico River	Watershed	TN06010204044_1000	KEFO			1				1	
SINKH002.0MO	Sinkhole Creek	303d	TN06010204044_1300	KEFO	12	12		1			1	
NOTCH006.3MO	Notchy Creek	303d	TN06010204045_1000	KEFO	12	12		1			1	
ECO67H06	Laurel Creek	Ecoregion	TN06010204056_0100	KEFO	4	4	2	2		1	2	
LAURE003.4MO	Laurel Creek	303d	TN06010204056_0150	KEFO								1
BIG000.7MO	Big Creek	303d	TN06010204056_1000	KEFO	5			1			1	
FOURM002.0BT	Fourmile Creek	Watershed	TN06010204062_1000	KEFO			1				1	
ISLAN003.2MO	Island Creek	303d	TN06010204065_1000	KEFO	12	12		1			1	
ECO67F13	White Creek	SEMN	TN06010205001T_0300	KEFO		4		2	2	1	2	
CLINC010.0RO	Clinch River	Ambient	TN06010207001-1000	KEFO	4	4						
GRABL000.4KN	Grable Branch	303d	TN06010207004_0100	KEFO	12	12		1			1	
TBD	Hickory Creek	Watershed	TN06010207004_1000	KEFO				1			1	
HICKO003.4KN	Hickory Creek	Watershed	TN06010207004_1000	KEFO				1			1	
SCARB000.1AN	Scarboro Creek	303d	TN06010207006T_0900	KEFO	5							
TBD	Ernies Creek	303d	TN06010207006T_1100	KEFO	5							
WILLO000.6KN	Willow Fork	303d	TN06010207011_0200	KEFO	13	13		1			1	
MILL000.1KN	Mill Branch	303d	TN06010207011_0200	KEFO	13	13		1			1	
HINES000.2KN	Hines Branch	303d	TN06010207011_0500	KEFO	5		1				1	
KNOB000.8KN	Knob Fork	303d	TN06010207011_0600	KEFO	12	12		1			1	
GRASS000.3KN	Grassy Creek	303d	TN06010207011_0700	KEFO	5							
GRASS000.9KN	Grassy Creek	303d	TN06010207011_0700	KEFO			1				1	
MEADO000.2KN	Meadow Creek	303d	TN06010207011_0800	KEFO	5							
PLUMB000.3KN	Plumb Creek	303d	TN06010207011_0900	KEFO	5							
BEAVE003.5KN	Beaver Creek	303d	TN06010207011_1000	KEFO	12	12		1			1	

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BEAVE023.5KN	Beaver Creek	303d	TN06010207011_2000	KEFO	12	12						
BEAVE023.6KN	Beaver Creek	303d	TN06010207011_2000	KEFO	12	12						
BEAVE024.7KN	Beaver Creek	303d	TN06010207011_2000	KEFO				1			1	
BEAVE040.1KN	Beaver Creek	303d	TN06010207011_3000	KEFO	5							
BEAVE041.3KN	Beaver Creek	303d	TN06010207011_3000	KEFO				1			1	
NFBUL000.1UN	North Fork Bullrun Creek	303d	TN06010207014_0400	KEFO	12	12		1			1	
BULLR005.2AN	Bullrun Creek	303d	TN06010207014_1000	KEFO	5			1			1	
BULLR016.2KN	Bullrun Creek	303d	TN06010207014_2000	KEFO	5			1			1	
BULLR031.1UN	Bullrun Creek	303d	TN06010207014_3000	KEFO	5			1			1	
BUFFA000.3AN	Buffalo Creek	303d	TN06010207016_0100	KEFO	12	12		1			1	
TBD	Buffalo Creek	303d	TN06010207016_0100	KEFO				1			1	
TBD	Buffalo Creek	303d	TN06010207016_0100	KEFO				1			1	
BYRAM000.4AN	Byrams Fork	303d	TN06010207016_0200	KEFO	5							
BYRAM000.4AN	Byrams Fork	Watershed	TN06010207016_0200	KEFO			1				1	
HINDS000.7AN	Hinds Creek	303d	TN06010207016_1000	KEFO	5			1			1	
HINDS006.8AN	Hinds Creek	303d	TN06010207016_2000	KEFO	5			1			1	
HINDS014.1AN	Hinds Creek	303d	TN06010207016_3000	KEFO	5			1			1	
ECO67F06	Clear Creek	SEMN	TN06010207019_0200	KEFO	4	4	2	2	2	1	2	
	Clinch River	303d	TN06010207019_1000	KEFO								
	Clinch River	303d	TN06010207019_2000	KEFO								
INDIA002.4AN	Indian Creek	Watershed	TN06010207020_0400	KEFO				1			1	
COW001.4AN	Cow Creek	303d	TN06010207020_0500	KEFO				1			1	
POPLA006.7RO	Poplar Creek	303d	TN06010207020_1000	KEFO	12	12		1			1	
POPLA015.3RO	Poplar Creek	303d	TN06010207020_1000	KEFO	12	12						
POPLA015.8RO	Poplar Creek	303d	TN06010207020_1000	KEFO	12	12						
POPLA019.8AN	Poplar Creek	303d	TN06010207020_1000	KEFO	12	12						

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BRUSH000.1AN	Brushy Fork	Watershed	TN06010207020_1200	KEFO				1			1	
	Mitchell Branch	303d	TN06010207020_1300	KEFO								
FECO67I12	Mill Branch	FECO	TN06010207026_0300	KEFO	4	4	2	2		1	2	
EFPOP001.7RO	East Fork Poplar Creek	303d	TN06010207026_1000	KEFO	12	12						
EFPOP004.7RO	East Fork Poplar Creek	303d	TN06010207026_1000	KEFO				1			1	
EFPOP007.3RO	East Fork Poplar Creek	303d	TN06010207026_1000	KEFO	12	12		1		1	1	
EFPOP008.4AN	East Fork Poplar Creek	303d	TN06010207026_2000	KEFO	12	12						
EFPOP008.6AN	East Fork Poplar Creek	303d	TN06010207026_2000	KEFO				1			1	
FECO67F02	Mill Creek	FECO	TN06010207028_0100	KEFO	4	4	2	2		1	2	
CANEY001.3RO	Caney Creek	Watershed	TN06010207028_1000	KEFO				1			1	
COAL001.2AN	Coal Creek	303d	TN06010207029_1000	KEFO	12			1			1	
COAL005.4AN	Coal Creek	303d	TN06010207029_1000	KEFO				1			1	
COAL010.6AN	Coal Creek	303d	TN06010207029_2000	KEFO	5			1			1	
TBD	Conner Creek	Watershed	TN06010207455_1000	KEFO				1			1	
LOOSA005.0SH	Loosahatchie	Ambient	TN08010209001_1000	MEFO	4	4						
LOOSA1C28.6SH	Loosahatchie	Ambient	TN08010209004_1000	MEFO	4	4						
LOOSA1C53.6FA	Loosahatchie	Ambient	TN08010209011_2000	MEFO	4	4						
WOLF072.6FA	Wolf River	Ambient	TN0801021000	MEFO	4	4						
HARRI001.8SH	Harrington Creek	303d	TN08010210001_0100	MEFO	12	12		1			1	
HARRI000.5SH	Harrison Creek	303d	TN08010210001_0200	MEFO	12	12		1			1	
WORKH000.3SH	Workhouse Bayou	303d	TN08010210001_0300	MEFO	12	12		1			1	
WOLF000.7SH	Wolf River	303d	TN08010210001_1000	MEFO	12	12						

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	Sweetbriar Creek	303d	TN08010210002_0100	MEFO								1
No station	White Station Creek	303d	TN08010210002_0200	MEFO								1
WOLF42.3T1.2SH	Un. Trib. To Wolf River (Sanders Creek)	Watershed	TN08010210002_0999	MEFO	12	12	1				1	
WOLF018.9SH	Wolf River	303d	TN08010210002_1000	MEFO	12	12		1			1	
WOLF015.3SH	Wolf River	303d	TN08010210002_2000	MEFO	12							1
JOHNS002.9SH	Johnsons Creek	303d	TN08010210003_0100	MEFO	12			1			1	
WOLF031.4SH	Wolf River	Ambient	TN08010210003_1000	MEFO	4	4						
WOLF023.4SH	Wolf River	Watershed	TN08010210003_1000	MEFO	12	12		1			1	
HURRI001.1FA	Hurricane Creek	Watershed	TN08010210004_0100	MEFO				1			1	
WOLF45.6T1.6FA	Un. Trib. To Wolf River	303d	TN08010210004_0400	MEFO	12			1			1	
WOLF45.6T0.4T0.9FA	Un. Trib. To Wolf River	303d	TN08010210004_0410	MEFO			1				1	
RUSSE001.5FA	Russell Creek	303d	TN08010210004_0500	MEFO	12			1			1	
WOLF044.4FA	Wolf River	Watershed	TN08010210004_1000	MEFO	12			1			1	
TEAGU001.4FA	Teague Branch	303d	TN08010210005_0100	MEFO	12			1			1	
STOUT001.2FA	Stout Creek	303d	TN08010210005_0200	MEFO	12			1			1	
GRISS002.7FA	Grissum Creek	303d	TN08010210005_1000	MEFO	12							1
MTENA001.5FA	Mount Tena	Watershed	TN08010210009_0200	MEFO	12		1				1	
EGROVE001.6FA	Early Grove Creek	Watershed	TN08010210009_0300	MEFO				1			1	
CLEAR001.6FA	Clear Creek	Watershed	TN08010210009_0400	MEFO	12			1			1	
GOLDE000.7FA	Golden Creek	Watershed	TN08010210009_0500	MEFO				1			1	
WOLF057.5FA	Wolf River	Watershed	TN08010210009_1000	MEFO	12							
ECO74B12	Wolf River	ECO	TN08010210009_1000	MEFO	4	4	2	2		1	2	
WOLF072.6FA	Wolf River	Ambient	TN08010210009_2000	MEFO	12	12						
	Moody Creek	303d	TN08010210019_0300	MEFO								1
HARGI003.7FA	Hargis Creek	Watershed	TN08010210020_0100	MEFO				1			1	
WATKI002.6FA	Watkins Creek	Watershed	TN08010210020_0200	MEFO				1			1	

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FECO74B01	UNT to North Fork Wolf	FECO	TN08010210020_0300	MEFO	4	4	2	2		1	2	
MCKIN000.5FA	Mckinnie Creek	Watershed	TN08010210020_0400	MEFO			1				1	
MAY001.4FA	May Creek	303d	TN08010210020_0410	MEFO	12	12		1			1	
NFORK004.4FA	North Fork Creek	303d	TN08010210020_0500	MEFO	12	12		1			1	
New	Beasley Creek	Watershed	TN08010210020_0600	MEFO			1				1	
NFWOL002.4FA	North Fork Wolf River	Watershed	TN08010210020_1000	MEFO	12	12		1			1	
ALEXA000.8FA	Alexander Creek	303d	TN08010210021_0100	MEFO	12	12		1			1	
SHAWS007.2FA	Shaws Creek	303d	TN08010210021_1000	MEFO	12	12						
MARYS001.0SH	Marys Creek	303d	TN08010210022_0300	MEFO	12	12		1				
MARYS005.8SH	Marys Creek	303d	TN08010210022_0350	MEFO	12			1			1	1
GRAYS001.7SH	Grays Creek	303d	TN08010210022_1000	MEFO	12	12		1			1	1
GRAYS008.6SH	Grays Creek	303d	TN08010210022_1000	MEFO	12							
FLETC4.4T0.2SH	Un. Trib. To Fletcher	303d	TN08010210023_0100	MEFO	12	12		1			1	1
FLETC2.8T0.4SH	Un. Trib. To Fletcher	303d	TN08010210023_0200	MEFO	12	12		1			1	
FLETC001.4SH	Fletcher Creek	303d	TN08010210023_1000	MEFO	12	12		1			1	1
CYPRE001.2SH	Cypress Creek	303d	TN08010210032_1000	MEFO	17	12						
CYPRE001.82SH	Cypress Creek	303d	TN08010210032_1000	MEFO	17	12						
CYPRE006.2SH	Cypress Creek	303d	TN08010210032_2000	MEFO	17	12						
NONCO001.8SH	Nonconnah	Ambient	TN0801021100711_1000	MEFO	4	4						
ROSE000.1CA	Rose Creek	Surface Mining	TN05130101015_0300	MS		4						
TRACY000.2CL	Tracy Branch	Surface Mining	TN05130101015_0500	MS		4						
VALLE000.1CL	Valley Creek	Surface Mining	TN05130101015_0600	MS		4						
STRAI000.1CL	Straight Creek	Surface Mining	TN05130101015_0700	MS		4						
TACKE000.5CA	Tackett Creek	Surface Mining	TN05130101015_0800	MS		4						

DWR Station ID	Waterbody name	Project Name	Waterbody ID	EFO	Bacti. Freq.	Chem Freq.	Biorecon Freq.	SQSH Freq.	Ind. Hab Freq.	Diatom Freq.	Habitat Freq.	Aerial
CLEAR030.5CA	Clear Fork (Of The Cumberland River)	Surface Mining	TN05130101015_2000	MS		4						
CLEAR037.3CL	Clear Fork (Of The Cumberland River)	Surface Mining	TN05130101015_3000	MS		4						
ECO68A03	Laurel Fork Of Station Camp Creek	SEMN	TN05130104016_0100	MS		4		2	2	1	2	
PROCK001.0SC	Paint Rock Creek	Surface Mining	TN05130104037_0300	MS		4						
MONTG000.5SC	Montgomery Fork	Surface Mining	TN05130104037_0400	MS		4						
FECO69D04	Wheeler Creek Unnamed Tributary	Ecoregion	TN05130104037_0411	MS		1	1	1			1	
BEECH000.2CA	Beech Fork	Surface Mining	TN05130104037_0600	MS		4						
LIGIA000.5AN	Ligias Fork	Surface Mining	TN05130104037_0700	MS		4						
NEW008.8SC	New River	Surface Mining	TN05130104037_1000	MS		4						
FECO69D01	New River 1 Unnamed Tributary	Surface Mining	TN05130104037_1300	MS		4						
INDIA001.0AN	Indian Fork	Surface Mining	TN05130104037_1600	MS		4						
SMOKY000.8SC	Smoky Creek	Surface Mining	TN05130104037_1800	MS		4						
NEW045.0AN	New River	Surface Mining	TN05130104037_2000	MS		4						
STRAI001.9SC	Straight Fork	Surface Mining	TN05130104044_0500	MS		4						
BUFFA000.1CL	Buffalo Creek	Surface Mining	TN05130104044_1000	MS		4						
BUFFA004.2SC	Buffalo Creek	Surface Mining	TN05130104044_1000	MS		4						
FECO69E01	Titus Creek Unnamed Tributary	Ecoregion	TN06010205305_0210	MS		1	1	1			1	
CUMBE262.9WS	Cumberland River	Ambient	TN05130201001_1000	NEFO	4	4						
CUMBE158.2CH	Cheatham Reservoir	Watershed	TN05130202001_1000	NEFO	2							
CUMBE174.5DA	Cheatham Reservoir	Ambient	TN05130202001_2000	NEFO	4	4						
CUMBE189.0DA	Cheatham Reservoir	303d	TN05130202001_3000	NEFO	2							

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CUMBE191.0DA	Cheatham Reservoir	Watershed	TN05130202001_4000	NEFO	2							
CUMBE215.7DA	Cheatham Reservoir	Watershed	TN05130202001_5000	NEFO	2							
STONE003.9DA	Stones River	Ambient	TN05130203001_1000	NEFO	4	4						
WFSTO006.2RU	West Fork Stones River	Ambient	TN05130203018_1000	NEFO	4	4						
HARPE040.5CH	Harpeth River	Ambient	TN05130204009_1000	NEFO	4	4						
CUMBE075.0ST	Barkley Reservoir	303d	TN05130205015_1000	NEFO	2							
CUMBE124.8MT	Barkley Reservoir	Watershed	TN05130205015_2000	NEFO	2							
RED025.5MT	Red River	Ambient	TN05130206002_3000	NEFO	4	4						
SULPH000.1RN	Sulphur Fork	Ambient	TN05130206003_1000	NEFO	4	4		1			1	
HARMO002.7HU	Harmon Creek	Watershed	TN06040003001_0100	NEFO				1			1	
DUCK24.6T0.7HU	UT to Duck River	Watershed	TN06040003001_0400	NEFO				1			1	
DUCK015.7HU	Duck River	303d	TN06040003001_2000	NEFO	12	12		1			1	
DUCK31.2T0.7HI	Unnamed Trib to Duck River	303d	TN06040003005_0600	NEFO				1			1	
No station currently exists on segment	Duck River	303d	TN06040003005_1000	NEFO	12			1			1	
DUCK032.2HI	Duck River	Watershed	TN06040003005_2000	NEFO				1			1	
CARTE000.5MY	Carters Creek	Watershed	TN06040003034_0200	NEFO				1			1	
MCCUT000.9MY	McCutcheon Creek	303d	TN06040003034_0300	NEFO				1			1	
GRASS001.4WI	Grassy Branch	303d	TN06040003034_0410	NEFO				1			1	
RUTHE019.3MY	Rutherford Creek	Watershed	TN06040003034_3000	NEFO				1			1	
LOCUS001.0HI	Locust Fork	Watershed	TN06040003041_0410	NEFO				1			1	
YOUNG000.1HI	Younger Creek	Watershed	TN06040003041_0413	NEFO				1			1	
SFLIC000.1WI	South Fork Lick Creek	Watershed	TN06040003041_0700	NEFO				1			1	
WPINE001.2DI	West Piney River	Watershed	TN06040003050_0500	NEFO	12	12		1			1	
EPINE000.2DI	East Piney River	Watershed	TN06040003050_0600	NEFO	12	12		1			1	
GRAB001.4DI	Grab Creek	303d	TN06040003050_0620	NEFO	12	12		1			1	
BEAR000.4HI	Bear Creek	Watershed	TN06040003050_0700	NEFO				1			1	

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TURKE000.1HI	Turkey Creek	Watershed	TN06040003050_0710	NEFO				1			1	
BAPTI000.2HU	Baptist Branch	Watershed	TN06040003060_0200	NEFO				1			1	
No station. Headwaters of Tumbling Creek.. Combine segments?	Miller Branch	Watershed	TN06040003060_0400	NEFO				1			1	
FECO71F03	Ethridge Hollow	Ecoregion	TN06040003060_0610	NEFO		4	2	2		1	2	
EGYPT_G2.3HU	Egypt Hollow Creek	303d	TN06040003060_0700	NEFO								1
TUMBL002.0HU	Tumbling Creek	Watershed	TN06040003060_1000	NEFO				1			1	
LHURR000.2HU	Little Hurricane Creek	Watershed	TN06040003061_0400	NEFO				1			1	
ECO71F29	Hurricane Creek	Ecoregion	TN06040003061_1000	NEFO		4	2	2		1	2	
LBLUE000.2HU	Little Blue Creek	Watershed	TN06040003062_0400	NEFO				1			1	
PUMPK000.4HU	Pumpkin Creek	Watershed	TN06040003062_0500	NEFO				1			1	
BLUE001.4HU	Blue Creek	Watershed	TN06040003062_1000	NEFO				1			1	
BLUE012.9HU	Blue Creek	303d	TN06040003062_3000	NEFO	12	12		1			1	
BLACK001.0HU	Black Branch	303d	TN06040004001_0200	NEFO								1
BUFFA004.0HU	Buffalo River	303d	TN06040004001_1000	NEFO	12			1			1	
CONLE000.1HU	Conley Branch	303d	TN06040005050_0100	NEFO	12			1			1	
TRACE004.4HU	Trace Creek	303d	TN06040005050_1000	NEFO	12	12		1			1	
TRACE016.0HU	Trace Creek	Watershed	TN06040005050_3000	NEFO	12	12		1			1	
LRICH002.3HU	Little Richland Creek	Watershed	TN06040005054_1000	NEFO				1			1	
HALLS000.2HU	Halls Creek	Watershed	TN06040005056_0100	NEFO				1			1	
BRICH005.9HU	Big Richland Creek	Watershed	TN06040005056_1000	NEFO	12	12		1			1	
PINHO000.4HU	Pinhook Branch	303d	TN06040005059_0500	NEFO				1			1	
WHITE003.8HO	Whiteoak Creek	Watershed	TN06040005059_1000	NEFO				1			1	
WHITE017.1HU	Whiteoak Creek	Watershed	TN06040005059_2000	NEFO				1			1	
CANE002.5HO	Cane Creek	Watershed	TN06040005061_1000	NEFO				1			1	
SFHUR003.6HO	S. Fork Hurricane Creek	303d	TN06040005063_0250	NEFO								1

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HURRI002.7HO	Hurricane Creek	Watershed	TN06040005063_1000	NEFO				1			1	
SROCK002.5ST	Standing Rock Creek	Watershed	TN06040005065_1000	NEFO				1			1	
TURKE003.0HU	Turkey Creek	Watershed	TN06040005075_1000	NEFO				1			1	
PANTH003.6ST	Panther Creek	Watershed	TN06040005504_1000	NEFO				1			1	

APPENDIX B:

COMPLIANCE MONITORING FACILITY INSPECTION SCHEDULE