TENNESSEE
DIVISION OF WATER RESOURCES

FISCAL YEAR 2017-2018
SURFACE WATER
MONITORING AND ASSESSMENT
PROGRAM PLAN

September 2017

Tennessee Department of Environment and Conservation
Division of Water Resources
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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. The division agrees that improvements can be made on some aspects of its program; particularly when addressing large rivers, lakes, reservoirs and wetlands.

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 http://tn.gov/environment/article/wr-wq-water-quality-reports-publications .

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 prior to a potential impact or as a reference stream for downstream uses or other sites within the same ecoregion and/or watershed.
- Assess water quality improvements based on site remediation, implementation of 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. A third cycle was completed in 2011. The fourth cycle was completed in 2016. The fifth 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 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 1,400 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 http://tn.gov/environment/topic/wr-ws-basin-watersheds-by-basin

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.

2. Identify problem areas with parameter values that violate Tennessee numerical or narrative water quality standards.

3. Identify causes and sources of water quality problems.

4. Document areas with potential human health threats from fish tissue contamination or elevated bacteria levels.

5. Establish trends in water quality.

6. Gauge compliance with NPDES permit limits.

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

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

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

11. 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 a monitoring strategy that results 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 http://tn.gov/environment/article/wr-ws-watershed-management-approach

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.

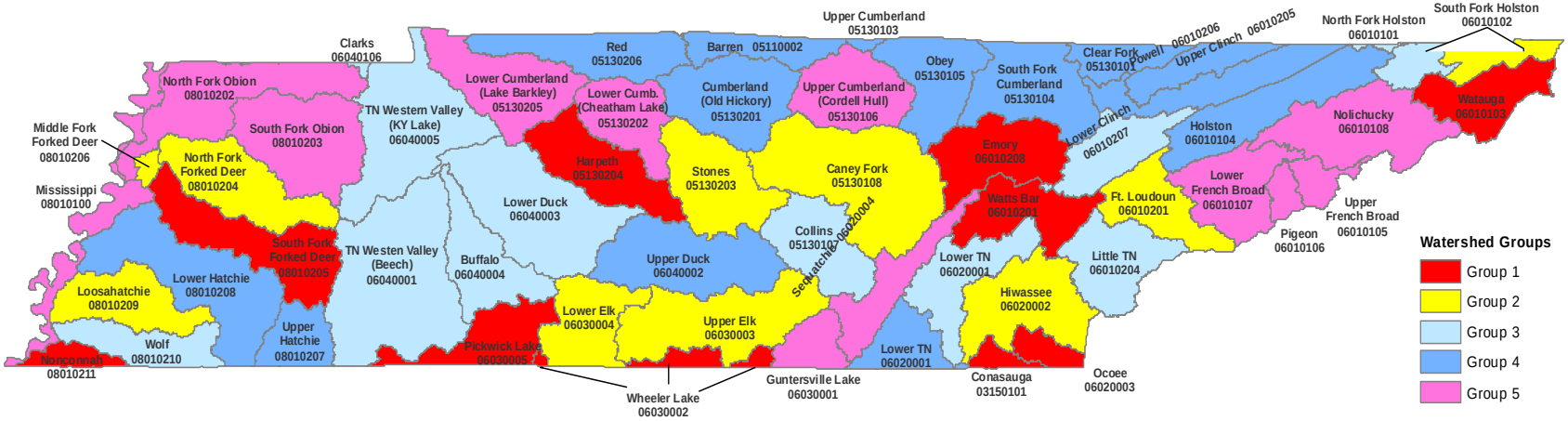


Figure 2: Tennessee Watershed Management Groups

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:

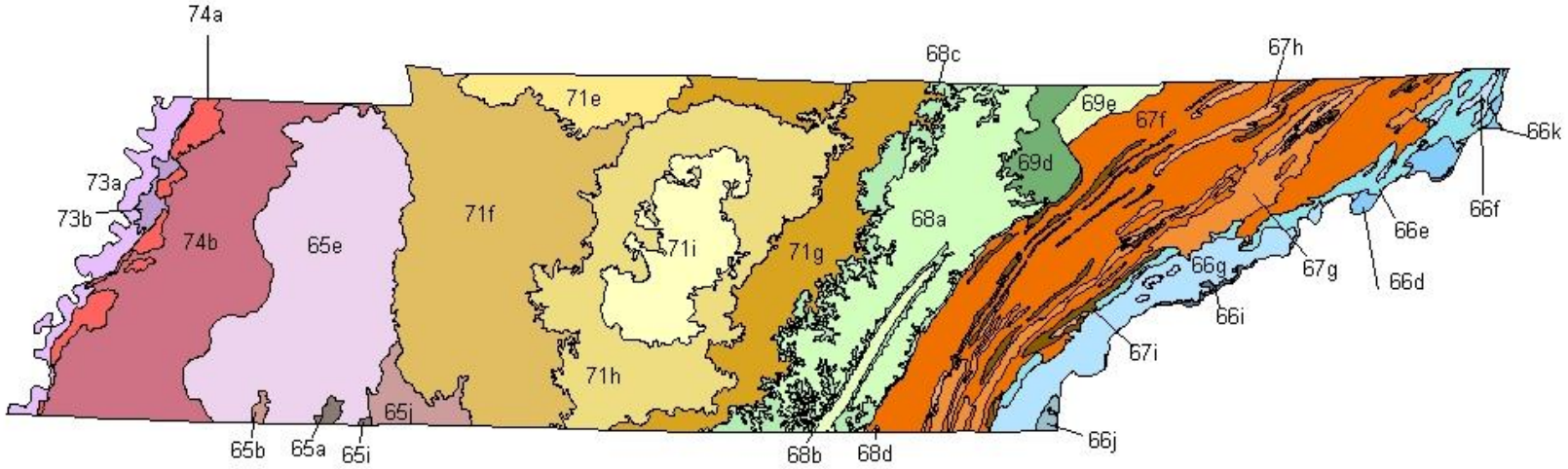
CH	Chattanooga	J	Jackson	M	Memphis
CK	Cookeville	JC	Johnson City	N	Nashville
CL	Columbia	K	Knoxville		

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 currently approximately 190 active and candidate reference sites being monitored. 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 7,500 stations (Figure 4). In addition, new stations are created every year to increase the number of assessed streams. Approximately 725stations will be monitored in FY 17-18 (Figure 5 and Appendix A). Stations are sampled monthly, quarterly, bimonthly, semi-annually, or annually depending on the objectives of the project. Within each watershed cycle, 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.

Prior to developing workplans, field staff should fully coordinate with other monitoring agencies within the watershed in order to maximize resources and avoid duplication of efforts.

1. **Antidegradation Monitoring:** Before the Division can authorize degradation in Tennessee waterbodies, the appropriate category under the Antidegradation Policy must be determined. These categories are (1) Available or (2) Unavailable Parameters, (3) Exceptional Tennessee Waters, or (4) Outstanding National Resource Waters (ORNLs). ORNLs can only be established by promulgation by the Tennessee Board of Water Quality, Oil and Gas. The other three categories must be established by division field or permitting staff. Complicating matters further, waterbodies can be in more than one category at a time, due to the parameter-specific nature of categories 1 and 2 above.

   If the waterbody that needs to have its antidegradation categories determined does not have recent water quality data from the last five years , these 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 it is 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 as needed in response to requests for new or expanded National Pollutant Discharge Elimination System (NPDES) and Aquatic Resource Alteration Permit (ARAP) permits, including ARAP water withdrawal applications. 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 a minimum of one geo mean sample (5 in 30) must be scheduled and accomplished. 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. 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 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: Like ambient stations, SEMN stations within each field office area must be sampled according to the project plan and grant for this project, regardless of watershed cycle.

4. **303(d) Listed segments:** The 303(d) List is a compilation of the waterbodies in Tennessee that are "water quality limited" and need a TMDL. Water quality limited streams are those that have one or more properties that violate water quality standards. They are considered impaired by pollution and not fully meeting designated uses.

   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 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.

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 cases, monitoring may be appropriately bypassed 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 violate 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. 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 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:** Waterbody monitoring is required to develop TMDLs. Monitoring for scheduled 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 2015), 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.

   - 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 good stream could be harmed by unnecessary restoration.

9. 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.

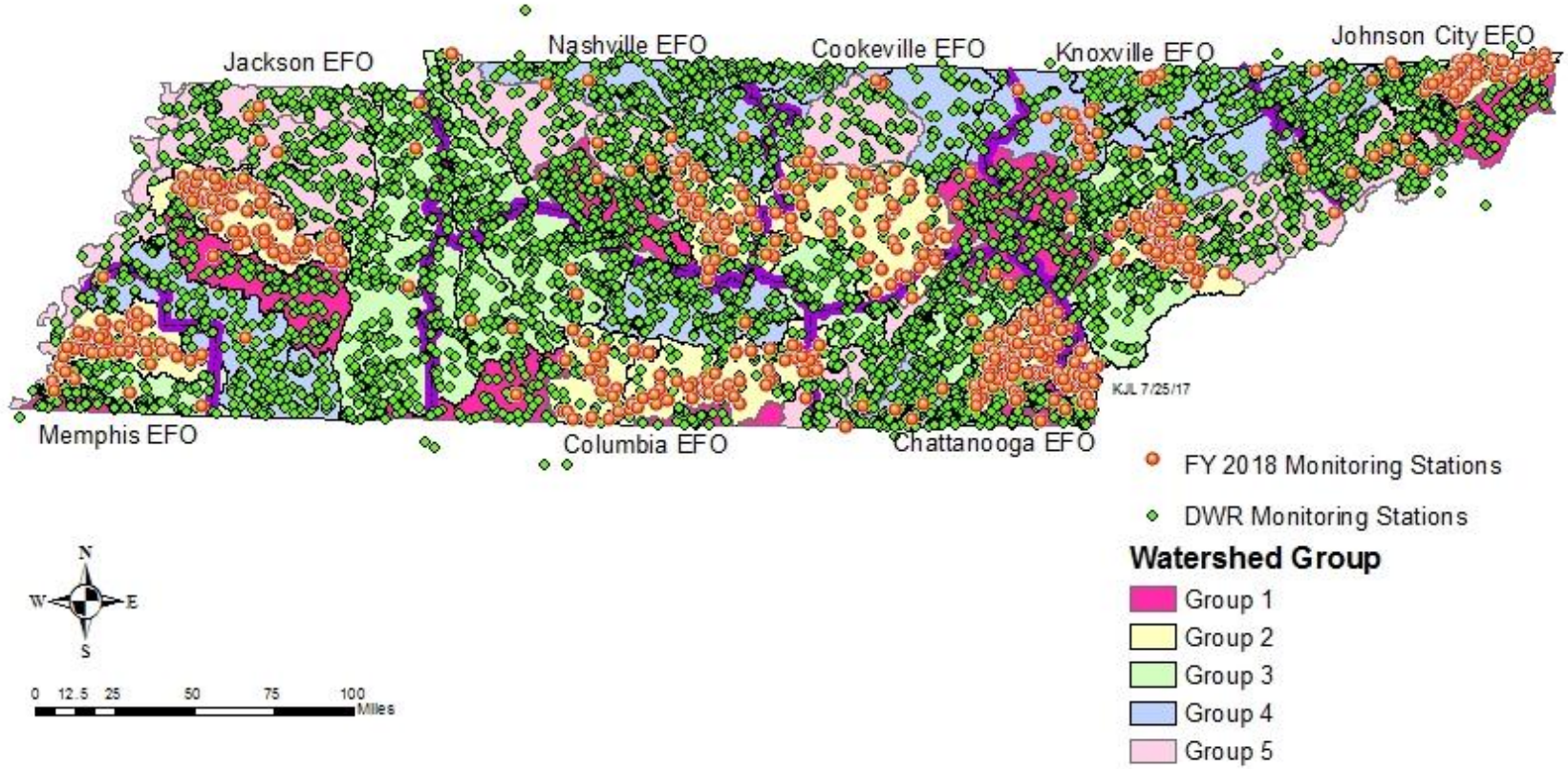


Figure 4: Water Quality Monitoring Stations in Tennessee.
(Includes biological, chemical and bacteriological stations.)

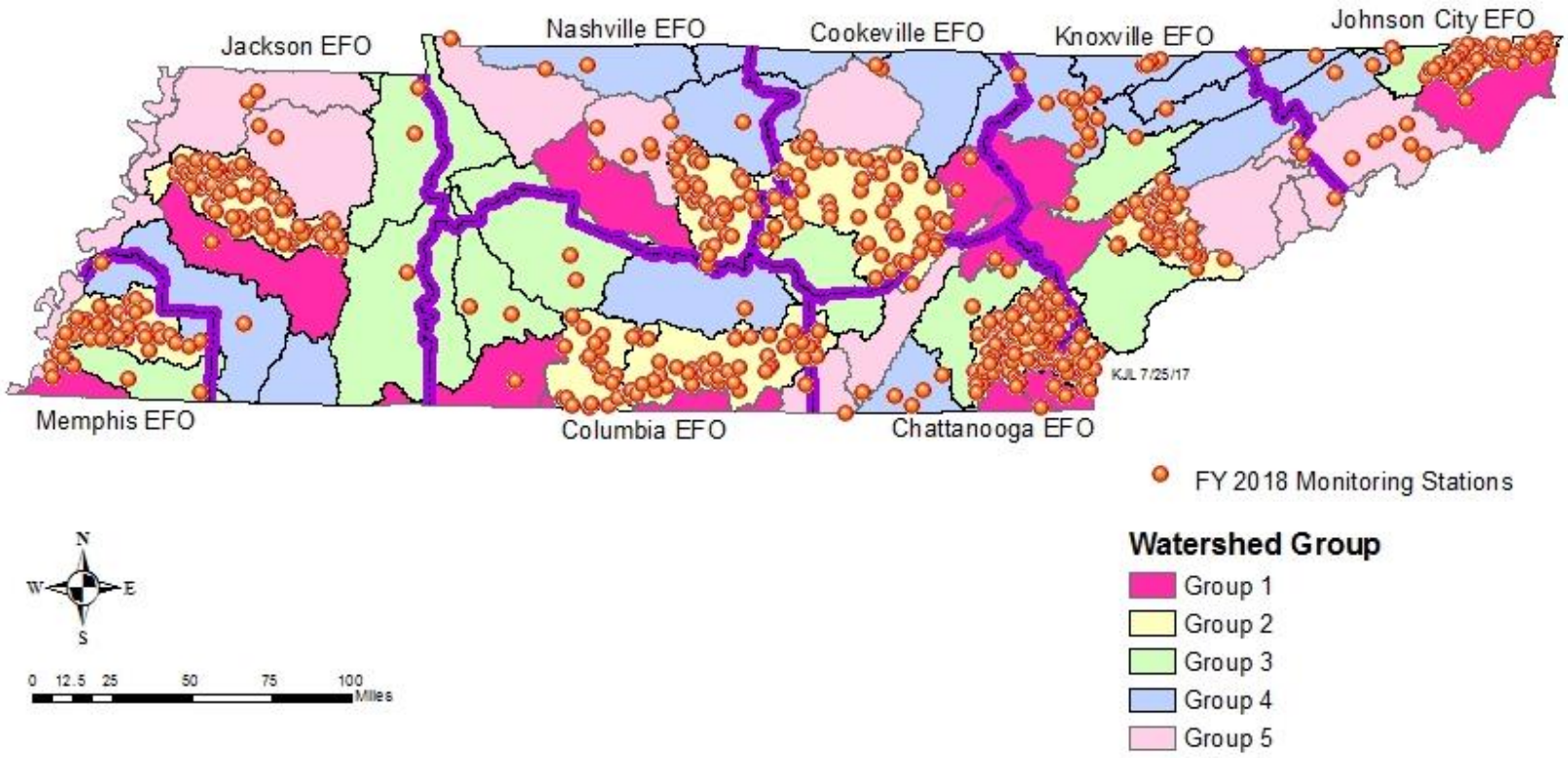


Figure 5: **Monitoring Stations Scheduled to be Sampled Between July 2017 and June 2018**
(Includes biological, chemical and bacteriological stations.)

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	In 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 1,302 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
3. Intolerant Taxa Richness

In bioregion 73, the three biorecon metrics are:

1. Taxa Richness
2. ETO Richness
3. CRMOL Richness

b. Secondary Biological

- Fish IBI
- Periphyton (has been added to reference monitoring and may become critical 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 and June 2011 (TDEC, 2011). 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 2016). 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 are 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 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.

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 2011 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 and include daily post-calibrations (at the beginning and end of the trip for overnight sampling). Duplicate 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

The division uses EPA's Assessment Database (ADB) to store assessment information. The ADB currently holds information on approximately 5,700 waterbody segments, which represent the state's streams, rivers, lakes and reservoirs.

The public has access to assessment information through an 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 The department also partners with EME Environmental Solutions to power a Stream and Watershed Information Management GIS mapping tool to reflect previous, current and potential stream mitigation projects across the state. The information for both maps is updated regularly.

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 http://www.epa.gov/storet/dw_home.html.

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. Subsequently, Tennessee Department of Health (TDH) state laboratory and contract labs submit chemical, bacteriological and fish tissue data electronically to TDEC-DWR. DWR uploads the chemical and bacteriological data to the web application to WQX. Approximately 130,000 chemical and bacteriological records have been uploaded to EPA WQX WEB through the web portal. All fish tissue data submitted to the state since 1984 and chemical data submitted to EPA after 2009 may be found at http://www.epa.gov/storet/wqx/.

Flow, macroinvertebrate, periphyton, fish tissue and habitat data collected from stations specified in the workplan are stored in the division's Access water quality database which includes data collected from 1996 to the present. The database also includes detailed station information for approximately 7,300 monitoring stations.

The amount of data has outgrown the capabilities of the current Access Database. Therefore DWR is in the process of migrating data from the Access Database platform to an Oracle platform. EPA requires states to enter all monitoring data collected using 106 funds (including chemical, biological, fish, habitat, tissue, toxicity, physical and sediment chemistry) into STOrage and RETrieval (STORET) data warehouse using the Water Quality Exchange (WQX) network.

In order to meet EPA reporting requirements to upload of all surface water data to WQX TDEC has developed the following plan, which has been adjusted over the years. Tennessee has uploaded chemical, bacteriological and fish tissue data to STORET using the WQX web application

In 2012 Tennessee was awarded a 106 supplemental grant (I-95494911) for development of an electronic data transfer system. A portion of that money was used to test the feasibility of using the EQuiS software for monitoring program needs, electronic data transfer from the state laboratory and upload to WQX. The software proved insufficient to meet these goals.

Additionally funding was used for research the state of Kentucky's database (K-WADE). Tennessee requested that FY 2015-2016 supplemental funds be used to complete modifications of the Kentucky database to meet Tennessee program needs, initiate electronic transfer of biological data from laboratory and upload chemical, macroinvertebrate, periphyton, habitat, tissue, physical and sediment data to WQX. The software was incompatible with Tennessee work flows and objectives.

DWR approached the developer of Waterlog, the integrated data management system for DWR, to develop a system in Waterlog to upload all surface water data. After data are uploaded to a development – QC area, the data are uploaded to the production Waterlog program for all DWR staff to view.

Goals:

1. Adapt Waterlog to accept Tennessee chemical, macroinvertebrate, fish tissue, periphyton and habitat data.
2. Develop QC checks in Waterlog for all Data Types.
3. Develop reporting functions for all data types.
4. Develop electronic data deliverables (EDDs) for laboratory reporting of all data types. Develop electronic field forms and reporting capability.
5. Successfully export all data-types to WQX-STORET.

Milestones:

1. Chemical data since 2004 and all electronic fish tissue data have been transferred to Waterlog. Tables have been built to receive most biological data types.
2. QC Checks have been built for chemical and fish tissue data. Progress is being made on Biological Data.

3. Reports have been developed for chemical and fish tissue data.
4. Labs are reporting inorganic chemical and bacteriological data using electronic format. Progress is being made on other data types.
5. Electronic field forms have been developed for all data types except periphyton and are being used by field staff to upload data to Waterlog.
6. Chemical, bacteriological and fish tissue data are being uploaded to WQX. Over the next year, habitat, invertebrate and periphyton data will be transferred to Waterlog and uploaded to WQX.

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 95-217, are stream use classifications, water quality criteria and the antidegradation statement.

Classification + Criteria + Antidegradation = Standards

In September 2009 the Water Quality Control Board (WQCB) voted to initiate the rulemaking process for the triennial review of water quality standards. This process was initiated when the division filed a notice for the Tennessee Administrative Register with the Secretary of State's Office in November 2009. At the same time, a set of proposed revisions to the regulations were posted on the department's webpage.

Following public hearings in December 2009 -January 2010 and a public comment period, a proposed final set of revisions were presented to the WQCB. After the WQCB approved the water quality standards the Attorney General's Office certifies the rules. The rules were then filed with the Secretary of State for the required 75-day waiting period and were submitted to EPA for formal review. In November, 2011, at the request of the Water Quality Control Board, the previously revised water quality standards were again put on public notice and an additional review period was undertaken in the winter of 2011 and early spring of 2012. The standards were approved by EPA in January 2015.

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, 2000).

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. 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 between 5 and 11 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 remains 6.5 - 9.0. 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, wildlife, and recreation in and on the water, that quality will be maintained and protected unless the state 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 2010 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 (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.

c. **Exceptional Tennessee Waters (ETW)** are waters that are in any one of the following categories:

   - 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, Little Pigeon River, West Prong Little Pigeon River, Big South Fork Cumberland River and Reelfoot Lake.

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. 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 nearly 2,000 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 7,500 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

The division continues to submit quarterly reports describing monitoring activities to EPA. Waterbodies will continue to be monitored to fulfill data needs for water quality standards, TMDLs, 303(d), 305(b), and special projects.

The Mid-Year Review and End-of-Year Review processes will be utilized by EPA Region 4 as the primary mechanism for evaluating performance and progress in implementing workplan commitments. To comply with EPA Region 4's semi-annual progress reporting requirement, EPA's Mid-Year Review Report will serve as the first of the two semi-annual reports required. TDEC will prepare the second report and submit by December 31, 2017.

The 305(b) report details the status of Tennessee waters as well as sources and causes of pollution. The 2014 305(b) Report was finalized in December 2014. The report and assessment database were supplied to EPA Region 4 staff for inclusion in the 305(a) Report to Congress. The report, as well as an interactive database, is provided to the public through the TDEC website http://tn.gov/assets/entities/environment/attachments/wr_wq_report-305b-2014.pdf

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 Final 2014 303(d) list was approved by EPA in May 2016 and may be found on TDEC's website. http://tn.gov/assets/entities/environment/attachments/wr_wq_303d-2014-final.pdf. The Proposed Final 2016 303(d) List was submitted to EPA in May 2017 and may be viewed at http://tn.gov/assets/entities/environment/attachments/wr_wq_proposed_final_2016__303d_list.pdf

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 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 ADB 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.
e.

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 manual was last revised in 2017. Staff are trained on protocols during the annual statewide meeting or during the biologists workshops.

The division developed and implemented a document entitled *Quality Systems Standard Operating Procedures for Chemical and Bacteriological Sampling of Surface Waters* in 2011. This manual will be reviewed annually and updated if needed. Staff are trained on protocols during the annual statewide meeting or during the biologists workshops**.**

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 biologists workshops**.**

As time and staff allows the division will develop SOPs for Habitat Streams Surveys, antidegradation policy implementation, water quality assessments and data management. The division uses the state laboratory for chemical, bacteriological and biological analyses. The division also used 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 a document entitled *Quality Assurance Project Plan* in 2015. This manual will be reviewed annually and updated if needed. Staff are trained on protocols during the annual statewide meeting or biologists 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 laboratory 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 326 full-time staff. There are also 12 members of the Water Quality, Oil and Gas Board. Division staff are 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 will improve the state's personnel, fiscal, travel, training, property and inventory into a single integrated system and should allow better 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 damage assessments, natural resource damage 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 (July1, 2016 – June 30, 2017) was $$8,100,000 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 FY'15 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 intends to apply for an N-STEPS grant to aid in periphyton index development.

2. Salary Ranges

The division has been historically plagued by two problems generally associated with low salaries: the inability to retain trained staff and the inability to recruit well-qualified replacements. Salary adjustments in the past have come from "across the board" raises as outlined by legislative action on the state budget. A salary increase has been put in place for employees that have less than $50,000 in the base position class annual salary. In addition, the job classifications are revised to reflect the TDEC move toward allowing career tracks for both technical staff as well as supervisory/management positions. Table 7 reflects the current FY salary information and new position classes that the division technical personnel are being transitioned into for 2018.

Table 7. Salary Grades for Positions in TDEC DWR (updated 6/30/2017)

Class Title	Min. Monthly Salary	Max. Monthly Salary
TDEC CHF DPTY DIR WATER RES	$6,392.00	$11,506.00
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
TDEC-PROGRAM ADMINISTRATOR 1	$5,797.00	$10,435.00
TDEC-PROGRAM MANAGER	$4,120.00	$7,416.00

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

Division of Water Resources

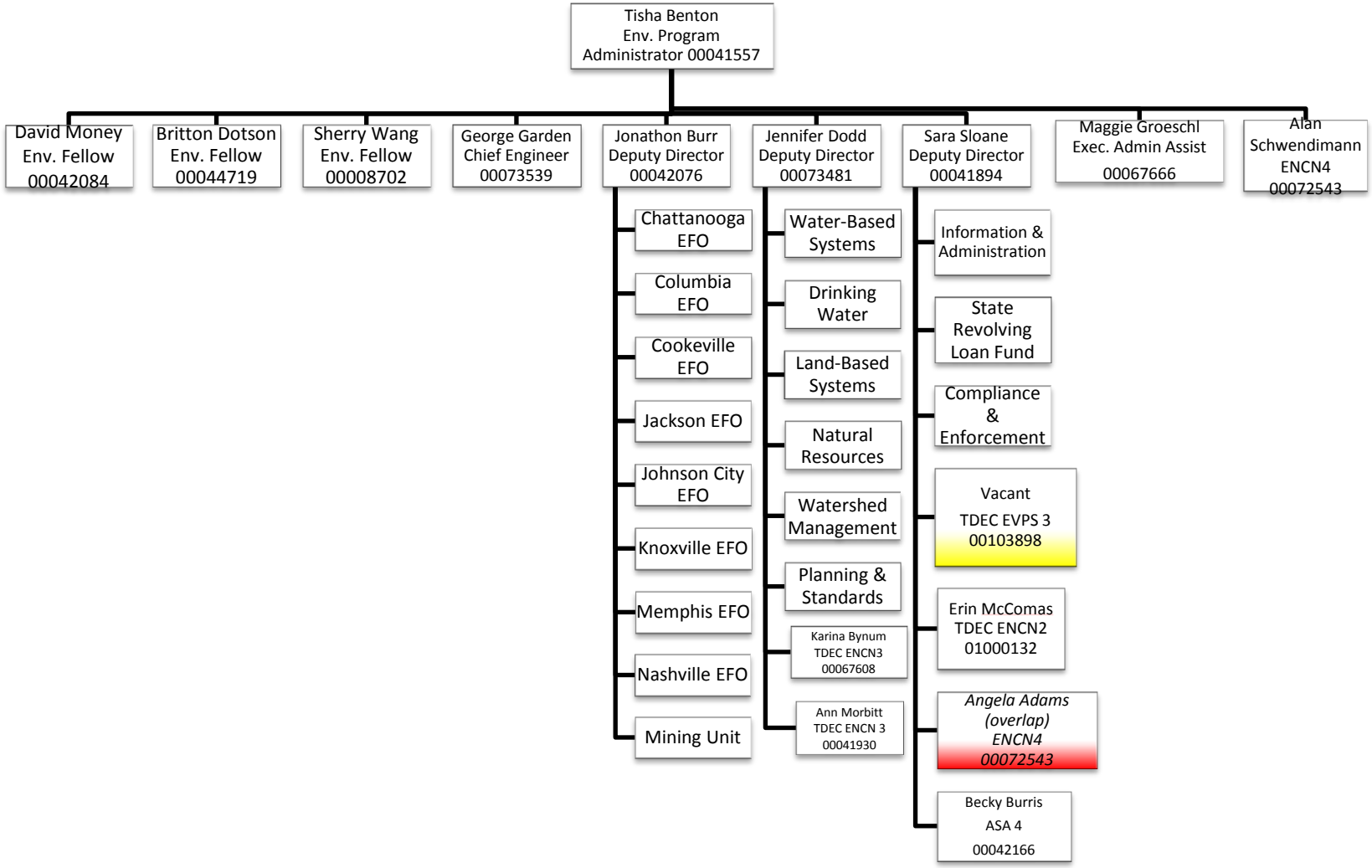


Figure 6: Division of Water Resources Organizational Chart (7/19/2017)

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 16 years, water quality chemical and bacteriological monitoring have increased six fold and biological monitoring has over 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 obligated for employee salaries and benefits in support of this program in the state in FY20017-2018. Another $361,700is 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 1998 to 2016

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014	2015	2016
Chemical & Bacteriological Sample Collections	705	1386	2805	2758	2615	2921	3540	3205	3302	3981	3600	4000	3600	3700	4482	>3392	4876	3072	3199
Quality Assurance Sample Collections	76	66	196	159	339	325	628	585	763	941	900	713	776	930	618	>423	429	354	314
Rapid Biological Stations (Biorecon)	86	394	602	672	318	365	183	162	285	248	338	318	223	288	157	>323	335	225	108
Intensive Biological Stations (SQSH)	150	100	222	176	94	330	113	256	226	267	332	353	367	257	247	>190	192	377	*
Habitat Assessments	236	494	824	848	412	695	504	386	462	497	612	597	512	525	361	>446	530	673	*
Periphyton Stations	0	0	94	14	80	154	121	0	2	120	60	72	22	55	10	>27	54	39	*
Antidegradation Surveys	2	5	11	5	5	49	33	17	97	81	2	59	51	18	12	>15	7	19	26
Probabilistic Monitoring Stations	0	0	50	50	75	95	313	2	0	90	0	0	90	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. RIVER, STREAM, RESERVOIR, LAKE, AND WETLAND MONITORING

The division maintains a statewide monitoring system consisting of approximately 7,500 stations. In addition, new stations are created every year to increase the number of assessed streams. Approximately 725stations will be monitored in FY 17-18. Stations are sampled monthly, quarterly, and semi-annually, depending on the requirements of the project long-term trend monitoring (ambient), 303(d), ecoregion, TMDLs, and watershed. Within each watershed cycle, 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. 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 2 Watersheds in FY 2017-2018 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 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 condition 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 (Table 7).

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 within 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 good stream could be harmed by unnecessary restoration.

Group 2 watershed streams will be monitored by EFOs in FY 2017-2018 (Appendix A).

Table 11 provides the parameters list for each project for sampling. The *QSSOP for Chemical and Bacteriological Sampling of Surface Water* (TDEC, 2011) 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	X	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 parameters for which stream is 303(d) listed must be sampled.

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 Single Habitat Semi-Quantitative Bank (SQBANK) or Single Habitat Semi-Quantitative 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 established fish tissue stations 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. 2017 – 2018 Fish Tissue Sampling Sites

STATION ID	RESERVOIR NAME/STREAM NAME	LOCATION	PARAMETER	Target Species	SAMPLING AGENCY
BRADL000.0CE	Woods Reservoir - Bradley Creek	Bradley Creek Embayment	106 Metals/Organics	Largemouth Bass/Channel Catfish	TDEC/TDH
BRUMA000.0FR	Woods Reservoir - Brumalow Ck	200' U/S old Brick Church Rd	106 Metals/Organics	Largemouth Bass/Channel Catfish	TDEC/TDH
CLINC080.0CA	Norris Res/Clinch Rv	Near Dam	Metals, Organics, Dioxin, PCBS	Largemouth Bass/Channel Catfish	TVA
CLINC125.0CL	Norris Res/Clinch Rv	D/S Straight Creek	Metals	Largemouth Bass/Channel Catfish	TWRA
CLINC172.4HK	Clinch Rv	D/S Swan Island	Metals, Organics,	Largemouth Bass/Channel Catfish	TVA
ELK170.0FR	Woods Reservoir - Elk River	Near Dam	106Metals/Organics	Largemouth Bass/Channel Catfish	TDEC/TDH
HIWAS007.4ME	Chickamauga Res/Hiwassee Rv	Bridge on TN Hwy 58	Metals, Organics, PCBS	Largemouth Bass/Channel Catfish	TVA
HIWAS037.0PO	Hiwassee Rv	Patty Station Rd	Metals	Largemouth Bass/Channel Catfish	TVA
LOOSA005.0SH	Loosahatchie River	North Watkins Road	106 metals and organics	Largemouth Bass/Channel Catfish	TDEC/TDH
LTENN001.0LO	Tellico Res/Little Tennessee River	At dam	Metals, Organics, PCBS	Largemouth Bass/Channel Catfish	TDH ABS
LTENN015.0LO	Tellico Res/Little Tennessee River	U/S Baker Creek	Metals, Organics, PCBS	Largemouth Bass/Channel Catfish	TDH ABS
LTENN015.0LO	Tellico Reservoir-Little Tennessee River Arm	Wide spot in reservoir near Toqua area	PCB/HG	Largemouth Bass/Channel Catfish	TDEC/TDH
NFFDE020.5GI	North Fork Forked Deer River	Old Hwy 104	Hg	Largemouth Bass	TDEC/TDH
OCOEE012.5PO	Parksville Res/Ocoee Rv	Near dam (Ocoee # 1)	Metals, Organics	Largemouth Bass/Channel Catfish	TVA
POWEL030.0UN	Norris Reservoir/Powell Rv	Stiners Woods	Metals	Largemouth Bass/Channel Catfish	TVA
POWEL065.5	Powell River	Gaging Station off River Rd u/s HWY 25 bridge			

STATION ID	RESERVOIR NAME/STREAM NAME	LOCATION	PARAMETER	Target Species	SAMPLING AGENCY
ROLLI000.0FR	Woods Reservoir - Rollins Creek	Embayment	106 Metals/Organics	Largemouth Bass/Catfish	TDEC/TDH
TELLI005.0MO	Tellico Reservoir – Tellico River Arm	Tellico embayment area working upstream in the Tellico River	PCB/HG	Largemouth Bass/Channel Catfish	TDEC/TDH
TENNE472.3HM	Chickamauga Res/Tennessee Rv	Chickamauga Forebay near lighted buoy	Metals, Organics,	Largemouth Bass/Channel Catfish	TVA
TENNE489.8HM	Chickamauga Res/Tennessee Rv	Opossum Ck Light	Metals, Organics,	Largemouth Bass/Channel Catfish	TVA
TENNE518.0ME	Chickamauga Res/Tennessee Rv	Hwy 30	Metals, Organics,	Largemouth Bass/Channel Catfish	TVA
TENNE604.0LO	Ft. Loudoun Res/Tennessee Rv	Forebay	Metals, Organics	Largemouth Bass/Channel Catfish	TVA
TENNE624.6KN	Ft. Loudoun Res/Tennessee Rv	D/S Lackey Creek near Lakeview	Metals, Organics, PCBS	Largemouth Bass/Channel Catfish	TVA
TENNE652.0KN	Ft. Loudoun Res/Tennessee Rv	D/s Confluence French Broad River	Metals, Organics, PCBS	Largemouth Bass/Channel Catfish	TVA

Table 13. Analyses for Fish Tissue

Parameter		Parameter		Parameter
Weight (Pounds)		Chlordane, total		Methoxychlor
Length (Inches)		CIS Chlordane		Dioxins
Lipid Content (Percent)		Trans Chlordane		Selenium
PCBs		CIS Nonachlor		Zinc
Aldrin		Trans Nonachlor		Furans
Dieldrin		Alpha BHC		
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 (ppm), wet weight. Analyzed by Tennessee Department of Health (TDH), Laboratory Services or a contract laboratory.

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
The list is also published in the 305(b) Report that is published every two years.

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 2017-2018, 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 and to apply the state's antidegradation rules to wetlands permitting issues. 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 in Tennessee. Tennessee has now developed HGM models for depressional, riverine, flat and slope wetlands.

The TRAM will allow for the identification of exceptional wetlands, impaired wetlands, aid in assessing the ecological consequences of §401 and ARAP permitting decisions, and assist in implementation the state's antidegradation rules. 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, TDEC was awarded an EPA Wetland Program Development Grant to build a sustainable and focused wetland program for the state of Tennessee. A key component of the 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. Some of the primary goals are training personnel on the use of the Tennessee Rapid Assessment Method, development of a stream functional assessment to guide compensatory mitigation projects, additional emphasis on enforcement and compliance, and the development of water quality standards for wetlands. In addition, the Division has contracted with NatureServ and Austin Peay State University to develop and maintain a database and reference sites representing the diversity of wetland types and plant communities across the state.

F. Southeast Monitoring Network Sites in Tennessee
FY 2018 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 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 TN intend to add 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 TN 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.

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 conducted the Aquatic Biology Section. Chemical analysis will be completed by the Inorganic Chemistry Section, TDH. 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. Wasteload Allocations/TMDL Development – (state appropriations, 106 funds, and 319(h) funds)

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) quantifies the amount of a pollutant in a stream, (2) identifies the sources of the pollutant, (3) and 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.

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

A. Complaints

The division investigates and attempts to resolve over 3700 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.

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APPENDIX A:

Monitoring Stations Scheduled to be Sampled Between July 2017 and June 2018

Projected Monitoring Stations for 2017-2018

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
AGENC002.3ME	Agency Creek	303d	TN06020002001_0100	CHEFO	12	12	1			1	
BACON001.6PO	Bacon Branch	303d	TN06020002008_0100	CHEFO	12	12					
BEANS002.7CE	Beans Creek	Watershed	TN06030003049_1000	CHEFO			1			1	
BEAVE000.1BR	Beaverdam Branch	303d	TN06020002005_1100	CHEFO	12	12		1		1	
BEAVE001.8BL	Beaverdam Creek	Watershed	TN05130108033_0200	CHEFO			1			1	
BEE007.0BL	Bee Creek	303d	TN05130108033_2000	CHEFO	12	12		1		1	
BEE012.4BL	Bee Creek	303d	TN05130108033_3000	CHEFO				1		1	
BFOOT000.5MM	Big Foot Branch	303d	TN06020002082_1300	CHEFO	12	12	1			1	
BFOX000.5BR	Black Fox Creek	303d	TN06020002005_0100	CHEFO	12	12		1		1	
BIGSB000.6BR	Bigsby Creek	Watershed	TN06020002005_0800	CHEFO			1			1	
BLACK000.5MM	Black Branch	303d	TN06020002083_0500	CHEFO	12	12		1		1	
BLOST003.4PO	Big Lost Creek	Watershed	TN06020002018_1500	CHEFO			1			1	
BRADD000.8BL	Bradden Creek	303d	TN05130108033_0420	CHEFO	12	12		1		1	
BRUSH000.5MM	Brush Creek	303d	TN06020002087_0200	CHEFO	12	12	1			1	
BRYME001.3BR	Brymer Creek	Watershed	TN06020002005_0400	CHEFO	12	12		1		1	
BSPRI000.2MM	Blue Spring Branch	303d	TN06020002084_0100	CHEFO			1			1	
BURGE000.4MM	Burger Branch	303d	TN06020002082_1100	CHEFO				1		1	
CALDW000.1GY	Caldwell Creek	303d	TN06030003044_0700	CHEFO	12	12	1			1	
CANDI012.3BR	Candies Creek	303d	TN06020002005_1000	CHEFO	12	12		1		1	
CANDI017.1BR	Candies Creek	303d	TN06020002005_2000	CHEFO	12	12		1		1	
CANDI033.1BR	Candies Creek	303d	TN06020002005_3000	CHEFO	12	12		1		1	
CANDI5.0T0.5BR	Unnamed Trib to Candies Creek	303d	TN06020002005_1300	CHEFO	12	12	1			1	
CANDI6.3T0.5BR	Unnamed Trib to Candies Creek	303d	TN06020002005_1200	CHEFO				1		1	
CANE001.5MM	Cane Creek	Ambient	TN06020002081-0100	CHEFO	4	4					
CANE006.5MM	Cane Creek	303d	TN06020002081_0150	CHEFO				1		1	

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
CARSO001.0BR	Carson Creek	Watershed	TN06020002014_0110	CHEFO			1			1	
CHATA002.0BR	Chatata Creek	303d	TN06020002012_1000	CHEFO	12	12		1		1	
CHATT000.9HM	Chattanooga Creek	Ambient	TN060200011244-1000	CHEFO	4	4					
CHEST021.2MM	Chestuee Creek	Watershed	TN06020002082_1000	CHEFO	12	12		1		1	
CHEST042.5MM	Chestuee Creek	303d	TN06020002082_2000	CHEFO	12	12	1			1	
CHILD000.2PO	Childers Creek	Watershed	TN06020002018_0600	CHEFO			1			1	
COKER002.7PO	Coker Creek	Watershed	TN06020002018_0900	CHEFO				1		1	
CONAS006.8MM	Conasauga Creek	303d	TN06020002081_1000	CHEFO	12	12		1		1	
CSPRI000.5MM	Cedar Springs Branch	303d	TN06020002083_0300	CHEFO	12	12		1		1	
DVALL000.2MM	Dry Valley Creek	303d	TN06020002084_0500	CHEFO	12	12	1			1	
ECO66G12	Sheeds Creek	SEMN	TN03150101012_0500	CHEFO		4	2	2	1	2	
ECO66G20	Rough Creek	SEMN	TN06020003013.55_0400	CHEFO		4	2	2	1	2	
ECO67G12	Dry Creek	ECO	TN06020002005_0300	CHEFO				1		1	
ECO68C20	Crow Creek	SEMN	TN06030001067_1000	CHEFO		4	2	2	1	2	
EFNMO000.3MM	East Fork North Mouse Creek	Watershed	TN06020002084_0300	CHEFO			1			1	
ELK195.3GY	Elk River	303d	TN06030003044_1000	CHEFO	12	12	1			1	
FECO66J01	Negro Creek	FECO	TN06020002018_1220	CHEFO		4	2	2	1	2	
FECO66J02	Negro Creek	FECO	TN06020002018_1220	CHEFO		4	2	2	1	2	
FECO66J03	Unnamed Trib to Turtletown Creek	FECO	TN06020002018_1210	CHEFO		4	2	2	1	2	
FILLA000.3BR	Fillauer Creek	303d	TN06020002009_0200	CHEFO	12	12	1			1	
FMILE000.1BR	Five Mile Branch	303d	TN06020002012_0100	CHEFO			1			1	
GARDN001.5BL	Gardner Creek	Watershed	TN05130108027_0300	CHEFO			1			1	
GEE000.9PO	Gee Creek	Watershed	TN06020002018_0400	CHEFO	12	12	1			1	
GILLI001.2GY	Gilliam Creek	303d	TN06030003044_0710	CHEFO	12	12		1		1	
GILLI1.3T2.3GY	Unnamed Trib to Gilliam Creek	303d	TN06030003044_0712	CHEFO	12	12		1		1	
GLADE001.2BL	Glade Creek	Watershed	TN05130108033_0400	CHEFO	12	12	1			1	
GREAS002.5BR	Greasy Creek	Watershed	TN06020002005_0900	CHEFO			1			1	

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
GUNST003.0ME	Gunstocker Creek	303d	TN06020002001_0200	CHEFO	12	12		1		1	
HARRI004.8BR	Harris Creek	ECO	TN06020002005_0500	CHEFO		4	2	2	1	2	
HIWAS013.4MM	Hiwassee River	Ambient	TN06020002008-1000	CHEFO	4	4					
HIWAS018.6MM	Hiwassee River Embayment of Chickamauga Reservoir	303d	TN06020002008_2000	CHEFO	12	12					
HIWAS023.0BR	Hiwassee River	Watershed	TN06020002008_3000	CHEFO	12	12					
HIWAS037.0PO	Hiwassee River	Watershed	TN06020002008_3000	CHEFO				1		1	
HIWAS042.7PO	Hiwassee River	Watershed	TN06020002018_1000	CHEFO	12	12		1		1	
HIWAS048.0PO	Hiwassee River	303d	TN06020002018_2000	CHEFO	12	12		1		1	
HIWAS051.2PO	Hiwassee River	303d	TN06020002018_2000	CHEFO				1		1	
HIWAS059.0PO	Hiwassee River	303d	TN06020002018_3000	CHEFO	12	12		1		1	
HIWAS062.5PO	Hiwassee River	303d	TN06020002018_4000	CHEFO	12	12		1		1	
HIWAS18.8T0.5BR	Unnamed Trib to Hiwassee River	303d	TN06020002008_0200	CHEFO			1			1	
HORTO001.3PO	Horton Branch	Watershed	TN06020002018_1900	CHEFO			1			1	
JUNEB000.1PO	Junebug Creek	Watershed	TN06020002018_1600	CHEFO			1			1	
LBEAV000.8BL	Little Beaverdam Creek	Watershed	TN05130108033_0210	CHEFO			1			1	
LCHAT000.3BR	Little Chatata Creek	303d	TN06020002012_0200	CHEFO	12	12		1		1	
LCHAT002.3BR	Little Chatata Creek	303d	TN06020002012_0200	CHEFO			1			1	
LCHES001.6MM	Little Chestuee Creek	303d	TN06020002082_0900	CHEFO	12	12		1		1	
LICK002.0BR	Lick Creek	303d	TN06020002002_1000	CHEFO				1		1	
LILLA000.8PO	Lillard Branch	Watershed	TN06020002018_1800	CHEFO			1			1	
LNMOU002.4MM	Little North Mouse Creek	303d	TN06020002084_0400	CHEFO	12	12		1		1	
LNMOU003.6MM	Little North Mouse Creek	303d	TN06020002084_0400	CHEFO				1		1	
LONDO001.7BR	London Branch	Watershed	TN06020002014_0200	CHEFO				1		1	
LOSS003.6PO	Loss Creek	Watershed	TN06020002018_0800	CHEFO			1			1	
LSCHE000.7BR	Little South Chestuee Creek	Watershed	TN06020002014_0100	CHEFO			1			1	
LSMOU000.6BR	Little South Mouse Creek	303d	TN06020002009_0100	CHEFO			1			1	
LSPRI000.4MM	Latham Spring Branch	303d	TN06020002084_0200	CHEFO	12	12	1			1	

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreconn Freq.	SQSH Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
MEADO000.8CU	Meadow Creek	Watershed	TN05130108027_0500	CHEFO			1			1	
MFORK000.5MM	Meadow Fork Creek	Watershed	TN06020002083_0600	CHEFO			1			1	
MILL000.8BL	Mill Creek	303d	TN05130108033_0410	CHEFO	12	12		1		1	
NMOUS007.3MM	North Mouse Creek	303d	TN06020002084_1000	CHEFO	12	12		1		1	
NMOUS024.3MM	North Mouse Creek	303d	TN06020002084_1000	CHEFO	12	12		1		1	
NMOUS025.4MM	North Mouse Creek	303d	TN06020002084_2000	CHEFO	12	12		1		1	
OCOEE001.0PO	Ocoee River	Ambient	TN06020003001-1000	CHEFO	4	4					
OCOEE019.6PO	Ocoee River	Ambient	TN06020003013-1000	CHEFO	4	4					
OOSTA005.8MM	Oostanaula Creek	303d	TN06020002083_1000	CHEFO	12	12		1		1	
OOSTA018.0MM	Oostanaula Creek	303d	TN06020002083_2000	CHEFO	12	12		1		1	
OOSTA028.4MM	Oostanaula Creek	303d	TN06020002083_3000	CHEFO	12	12					
OOSTA028.4MM	Oostanaula Creek	Ambient	TN06020002083-3000	CHEFO	4	4					
OOSTA031.8PO	Oostanaula Creek	303d	TN06020002083_3000	CHEFO	12	12		1		1	
OOSTA037.1MM	Oostanaula Creek	303d	TN06020002083_4000	CHEFO	12	12		1		1	
OOSTA041.0MM	Oostanaula Creek	303d	TN06020002083_5000	CHEFO	12	12		1		1	
PELL001.4PO	Pell Branch	Watershed	TN06020002018_1700	CHEFO			1			1	
PINEY005.0RH	Piney River	Ambient	TN06010201041-1000	CHEFO	4	4					
PRICE004.4ME	Price Creek	303d	TN06020002088_1000	CHEFO	12	12		1		1	
RATTL001.3BR	Rattlesnake Branch	303d	TN06020002012_0300	CHEFO	12	12	1			1	
ROGER005.1MM	Rogers Creek	303d	TN06020002087_1000	CHEFO	12	12	1			1	
ROGER18.3T0.3MM	Unnamed Trib to Rogers Creek	303d	TN06020002087_0600	CHEFO	12	12		1		1	
RUNNE000.8BR	Runner Branch	303d	TN06020002005_0600	CHEFO				1		1	
SCHES013.9BR	South Chestuee Creek	303d	TN06020002014_2000	CHEFO	12	12		1		1	
SCHIC000.4HM	South Chickamauga Creek	Ambient	TN06020001007-1000	CHEFO	4	4					
SEQUA006.3MI	Sequatchie River	Ambient	TN06020004001_1000	CHEFO	4	4					
SHOAL000.4MM	Shoal Creek	303d	TN06020002087_0300	CHEFO				1		1	
SICCO000.3PO	Siccowee Branch	303d	TN06020002018_0300	CHEFO	12	12	1			1	
SMITH002.9PO	Smith Creek	Watershed	TN06020002018_1400	CHEFO			1			1	

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
SMOUS003.5BR	South Mouse Creek	303d	TN06020002009_1000	CHEFO	12	12		1		1	
SMOUS012.7BR	South Mouse Creek	303d	TN06020002009_2000	CHEFO	12	12	1			1	
SOKEY000.1MM	Sokey Branch	303d	TN06020002083_0400	CHEFO			1			1	
SPRIN000.1BR	Spring Branch	Watershed	TN06020002005_0410	CHEFO				1		1	
SPRIN000.5PO	Spring Creek	Watershed	TN06020002018_0500	CHEFO	12	12	1			1	
SPRIN003.8MM	Spring Creek	303d	TN06020002085_1000	CHEFO	12	12	1			1	
SUGAR000.7ME	Sugar Creek	303d	TN06020002002_0100	CHEFO	12	12		1		1	
TAFT000.1BL	Taft Creek	303d	TN05130108033_0300	CHEFO	12	12		1		1	
TENNE416.5MI	TENNESSEE RIVER	Ambient	TN06020001055-1000	CHEFO	4	4					
TENNE444.0MI	TENNESSEE RIVER	Ambient	TN06020001001-1000	CHEFO	4	4					
TENNE477.0HM	TENNESSEE RIVER	Ambient	TN06020001020-1000	CHEFO	4	4					
TENNE503.3RH	Tennessee River	Ambient	TN06020001020-1000	CHEFO	4	4					
TENNE529.5RH	TENNESSEE RIVER	Ambient	TN06020001020-1000	CHEFO	4	4					
TFOEM001.8MM	Tom Foeman Creek	303d	TN06020002082_1200	CHEFO	12	12	1			1	
TOWEE005.9PO	Towee Creek	Watershed	TN06020002018_0700	CHEFO			1			1	
TRUSS1.7T0.7GY	Trussel Creek	303d	TN06030003044_0713	CHEFO	12	12		1		1	
TURTL000.1PO	Turtletown Creek	Watershed	TN06020002018_1200	CHEFO	12	12	1			1	
WALKE000.6MM	Walker Branch	303d	TN06020002083_0510	CHEFO	12	12		1		1	
WMILL000.8BR	Woolen Mill Branch	303d	TN06020002009_0300	CHEFO	12	12	1			1	
WOLF001.5PO	Wolf Creek	Watershed	TN06020002018_1300	CHEFO			1			1	
BSPRI000.1WH	BLUE SPRING CREEK	303d	TN05130108043_0500	CKEFO				1			
CALFK010.0WH	CALFKILLER RIVER	303d	TN05130108043_1000	CKEFO	12	12		1			
CALFK022.0WH	Calfkiller River	Watershed	TN05130108043_2000	CKEFO	12		1				
CALFK038.0PU	CALFKILLER RIVER	Watershed	TN05130108043_3000	CKEFO	12		1				
CALFK040.4PU	CALFKILLER RIVER	303d	TN05130108043_4000	CKEFO	12		1				
CANE004.5VA	CANE CREEK	303d	TN05130108045_0100	CKEFO				1			
CANE004.5VA	CANE CREEK	Watershed	TN05130108027_1000	CKEFO			1				
CANE011.8PU	CANE CREEK	303d	TN05130108045_0150	CKEFO			1				

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
CANE016.7VA	CANE CREEK	Watershed	TN05130108027_2000	CKEFO	12			1			
CFORK011.2SM	CANEY FORK RIVER	Ambient	TN05130108001_1000	CKEFO	4	4	1				
CHERR000.9WH	CHERRY CREEK	303d	TN05130108043_0100	CKEFO	12	12		1			
CLIFF002.1WH	Cliff Creek	303d	TN05130108025_0200	CKEFO	12						
CLIFT001.0WH	CLIFTY CREEK	303d	TN05130108036_0100	CKEFO	12	12	1				
CUMBE381.1CY	Cumberland River	Ambient	TN05130103001_1000	CKEFO	4	4					
DRY002.7DB	Dry Creek	Watershed	TN05130108004_0100	CKEFO			1				
DRY007.2VA	DRY FORK	Watershed	TN05130108027_0800	CKEFO	12		1				
DUNCA001.8CU	DUNCAN CREEK	303d	TN05130108036_0600	CKEFO	12	12	1				
ECO71H17	CLEAR FORK CREEK	SEMN	TN05130108004_0200	CKEFO	4	4	2	2	1	2	
FALL004.6DB	FALL CREEK	303d	TN05130108684_1000	CKEFO	12	12		1			
FALL004.8DB	FALL CREEK	303d	TN05130108684_1000	CKEFO	12	12		1			
FALL005.5DB	FALL CREEK	303d	TN05130108684_2000	CKEFO	12	12		1			
FECO71H04	Wilmouth Creek UT	FECO	TN05130108004_0221	CKEFO		4	2	2	1	2	
FERGU000.8SM	FERGUSON BRANCH	303d	TN05130108001_0200	CKEFO				1			
FLYNN000.3CU	FLYNN CREEK	303d	TN05130108036_0920	CKEFO				1			
FWATE009.6PU	Falling Water River	303(d)	TN05130108045_1000	CKEFO	12	12		1			
FWATE028.4PU	Falling Water River	Watershed	TN05130108045_2000	CKEFO	12	12		1			
FWATE038.3PU	FALLING WATER RIVER	Watershed	TN05130108045_3000	CKEFO				1			
GOOSE000.3DB	GOOSE CREEK	303d	TN05130108002_0200	CKEFO			1				
HELTO000.3DB	HELTON CREEK	Watershed	TN05130108004_0800	CKEFO				1			
HICKM013.0SM	HICKMAN CREEK	303d	TN05130108002_2000	CKEFO	12	12		1			
HICKM013.7DB	HICKMAN CREEK	303d	TN05130108002_2000	CKEFO	12	12		1			
HUDGE000.7PU	HUDGENS CREEK	303d	TN05130108045_0300	CKEFO	12			1			
HVALL000.5WH	Hickory Valley Branch	303d	TN05130108025_0400	CKEFO	12	12		1			
INDIA002.3PU	INDIAN CREEK	Watershed	TN05130108048_1000	CKEFO			1				
LAURE002.1VA	LAUREL CREEK	Watershed	TN05130108024_0100	CKEFO				1			
LAURE008.7CU	LAUREL CREEK	Watershed	TN05130108036_0900	CKEFO				1			

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
LINDI000.2PU	Little Indian Creek	Watershed	TN05130108048_0100	CKEFO			1				
MAXWE001.4PU	MAXWELL BRANCH	Watershed	TN05130108097_0100	CKEFO				1			
MLICK015.3PU	MINE LICK CREEK	303d	TN05130108097_2000	CKEFO	12	12		1			
MLICK015.5PU	MINE LICK CREEK	303d	TN05130108097_2000	CKEFO	12	12		1			
MULHE001.3SM	Mulherrin Creek	Watershed	TN05130108001_0600	CKEFO		12		1			
MYATT005.1CU	Myatt Creek	SEMN	TN06010208008_0100	CKEFO		4	2	2	1	2	
OBEY002.1CY	Obey River	AMBIENT	TN05130105001_1000	CKEFO	4	4					
PINE005.7DB	PINE CREEK	Watershed	TN05130108019_1000	CKEFO				1			
PINEY001.9VA	PINEY CREEK	Watershed	TN05130108027_0700	CKEFO	12		1				
PINEY012.6VA	PINEY CREEK	303d	TN05130108027_0750	CKEFO	12	12		1			
POAK000.7WH	POST OAK CREEK	303d	TN05130108045_0500	CKEFO				1			
POAK002.3WH	POST OAK CREEK	Watershed	TN05130108045_0550	CKEFO				1			
PROOS002.0PU	PIGEON ROOST CREEK	303d	TN05130108045_0400	CKEFO	12	12		1			
PROOS002.4PU	PIGEON ROOST CREEK	303d	TN05130108045_0450	CKEFO	12	12					
PROOS002.6PU	PIGEON ROOST CREEK	303d	TN05130108045_0450	CKEFO				1			
PUNCH002.0CU	PUNCHEONCAMP CREEK	303d	TN05130108036_1100	CKEFO	12	12		1			
ROCKY009.2VA	Rocky River	303d	TN05130108024_1000	CKEFO			1				
ROCKY024.5VA	ROCKY RIVER	303d	TN05130108024_4000	CKEFO	12	12					
SAUND002.5CN	SAUNDERS FORK	Watershed	TN05130108004_0300	CKEFO			1				
SINK010.7DB	SINK CREEK	Watershed	TN05130108021_1000	CKEFO				1			
SMITH001.8SM	SMITH FORK CREEK	Watershed	TN05130108004_1000	CKEFO				1			
SNOW001.4SM	SNOW CREEK	Watershed	TN05130108001_0100	CKEFO			1				
TAYLO003.2WH	TAYLOR CREEK	Watershed	TN05130108053_1000	CKEFO	12			1			
WILDC000.1WH	WILDCAT CREEK	303d	TN05130108043_0600	CKEFO			1				
ANDER004.4GS	Anderson Creek	Watershed	TN06030004029_0115	CLEFO				1			
ANDER5.2T0.1GS	UNT Anderson Creek	Watershed	TN06030004026_0111	CLEFO				1			
BBIGB008.5MY	Big Bigby Creek	AMBIENT	TN06040003019_2000	CLEFO	4	4					
BEANS001.3FR	Beans Creek	303(d)	TN06030003012_1000	CLEFO				1			

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BEANS002.7CE	Beans Creek	Watershed	TN06030003049_1000	CLEFO				1			
BFORK005.0FR	Boiling Fork Creek	303(d)	TN06030003030_1000	CLEFO	12	12		1			
BIG003.7GS	Big Creek	Watershed	TN06030004026_0300	CLEFO				1			
BLUE000.1FR	Blue Creek	303(d)	TN06030003053_0100	CLEFO	12	12		1			
BRADL003.4CE	Bradley Creek	Watershed	TN06030003051_1000	CLEFO				1			
BRADS001.3LI	Bradshaw	Watershed	TN06030003064_1000	CLEFO				1			
BUCHA003.0GS	Buchanon Creek	Watershed	TN06030004018_1000	CLEFO				1			
BUFFA073.1WE	Buffalo River	AMBIENT	TN06040004002_1000	CLEFO	4	4					
BWILL000.2CE	Betsy Willis Creek	303(d)	TN06030003044_0100	CLEFO	12	12		1			
CANE003.8LI	Cane Creek	303(d)	TN06030003060_1000	CLEFO	12	12		1			
CARR001.1LI	Carr Creek	Watershed	TN06030003001_0300	CLEFO				1			
CHILD001.8FR	Childer Creek	303(d)	TN06030003085_1000	CLEFO				1			
CMILL000.5LI	Cotton Mill Branch	Watershed	TN06030003059_1000	CLEFO				1			
COFFE000.2ML	Coffey Branch	303(d)	TN06030004043_0600	CLEFO	12	12		1			
COLDW001.3LI	Coldwater Creek	Watershed	TN06030003006_1000	CLEFO				1			
CORN000.4ML	Corn Creek	303(d)	TN06030004043_0300	CLEFO	12	12		1			
DRY001.4GS	Dry Creek	Watershed	TN06030004043_0100	CLEFO				1			
DRY002.5FR	Dry Creek	303(d)	TN06030003026_1000	CLEFO				1			
DUCK113.9MY	Duck River	AMBIENT	TN06040003024_1000	CLEFO	4	4					
DUCK248.0BE	Duck River	AMBIENT	TN06040002030_1000	CLEFO	4	4					
ECO68C13	Mud Creek	ECO	TN06030003043_1000	CLEFO	4	4	2	2	2		
ECO71F19	Brush Creek	SEMN	TN06040004013_0400	CLEFO	4	4	2	2	2		
ECO71G10	Hurricane Creek	ECO	TN06030003055_1000	CLEFO	4	4	2	2	2		
EFMUL000.7LI	East Fork Mulberry Ck	303(d)	TN06030003056_0200	CLEFO	12	12		1			
EFMUL006.2MR	East Fork Mulberry Ck	303(d)	TN06030003056_0250	CLEFO	12	12		1			
EFSHO001.0GS	East Fork Shoal Creek	Watershed	TN06030004032_0200	CLEFO				1			
EFSUG002.0LW	East Fork Sugar Creek	Watershed	TN06030004036_0400	CLEFO				1			
ELK036.5GS	Elk River	303(d)	TN06030003001_1000	CLEFO	12	12		1			

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ELK064.0LI	Elk River	Watershed	TN06030003001_1000	CLEFO				1			
ELK093.9LI	ELK River	303(d)	TN06030003010_1000	CLEFO	12	12		1			
ELK105.5LI	Elk River	Watershed	TN06030003010_2000	CLEFO				1			
ELK133.0FR	Elk River	AMBIENT	TN06030003015_1000	CLEFO	4	4					
EVERL000.3GS	EVERLY BRANCH	303(d)	TN06030004017_0300	CLEFO	12	12		1			
FANNY000.1GS	Fanny Branch	303(d)	TN06030004026_0112	CLEFO				1			
FARRI001.5MR	Farris Creek	Watershed	TN06030003015_0100	CLEFO				1			
GUM001.6FR	Gum Creek	303(d)	TN06030003552_1000	CLEFO				1			
HESSE000.8FR	Hessey Branch	303(d)	TN06030003567_1000	CLEFO	12	12		1			
HURRI10T0.1MR	UNT Hurricane Creek	FECO	TN06030003055_0100	CLEFO	4	4	2	2	2		
INDIA000.9GS	Indian Creek	303(d)	TN06030003065_1000	CLEFO				1			
KELLY001.4GS	Kelly Creek	Watershed	TN06030003003_1000	CLEFO				1			
LAURE000.1GY	Laurel Creek	Watershed	TN06030003044_0400	CLEFO			1				
LEATH000.1GS	Leatherwood Creek	Watershed	TN06030004018_0100	CLEFO				1			
LNORR000.1LI	Little Norris Creek	Watershed	TN06030003059_0100	CLEFO				1			
MOLIN002.9LI	Molino Creek	Watershed	TN06030003001_0400	CLEFO				1			
NORRI001.2LI	Norris Creek	Watershed	TN06030003059_1000	CLEFO				1			
PROOS000.7GS	Pigeon Roost Creek	303(d)	TN06030004014_1000	CLEFO				1			
PRUN000.1GS	Pleasant Run Creek	303(d)	TN06030004017_0800	CLEFO	12	12		1			
REEVE001.0GS	Reeves Branch	303(d)	TN06030003001_0100	CLEFO	12	12		1			
RFORK001.2GS	Robertson Fork Creek	303(d)	TN06030004023_1000	CLEFO	12	12		1			
RICHL002.0GS	Richland Creek	Watershed	TN06030004017_1000	CLEFO				1			
RICHL023.2GS	Richland Creek	Watershed	TN06030004017_2000	CLEFO				1			
RICHL039.6GS	Richland Creek	303(d)	TN06030004043_1000	CLEFO				1			
RICHL064.5ML	Richland Creek	303(d)	TN06030004043_1000	CLEFO				1			
RICHL24.4T0.1GS	UNT Richland Creek	303(d)	TN06030004017_0700	CLEFO				1			
RICHL26.9T0.1GS	UNT Richland Creek	303(d)	TN06030004017_0700	CLEFO				1			
ROBIN000.3FR	Robinson Creek	303(d)	TN06030003012_0400	CLEFO	12	12		1			

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ROCK009.4FR	Rock Creek	303(d)	TN06030003053_2000	CLEFO	12	12		1			
ROLLI002.4FR	Rollins Creek	Watershed	TN06030003044_1000	CLEFO				1			
SHELT000.8LI	Shelton Creek	Watershed	TN06030003010_0400	CLEFO				1			
SHOAL032.2LW	Shoal Creek	AMBIENT	TN06030005078_1000	CLEFO	4	4					
STEPH000.4LI	Stephens Creek	Watershed	TN06030003010_0100	CLEFO				1			
STEWA000.6LI	Stewart Creek	Watershed	TN06030003010_0700	CLEFO				1			
SUGAR015.2GS	Sugar Creek	Watershed	TN06030004036_1000	CLEFO				1			
SWAN000.8LI	Swan Creek	303(d)	TN06030003063_1000	CLEFO	12	12		1			
SWAN008.2LI	Swan Creek	303(d)	TN06030003063_2000	CLEFO	12	12		1			
TOWN000.8ML	Town Creek	303(d)	TN06030004043_0400	CLEFO	12	12		1			
TUCKE001.3LI	Tucker Creek	Watershed	TN06030003010_0200	CLEFO				1			
WAGNE001.4FR	Wagner Creek	303(d)	TN06030003032_1000	CLEFO	12	12		1			
WEAKL000.6GS	Weakley Creek	Watershed	TN06030004029_1000	CLEFO				1			
WFMUL001.4LI	West Fork Mulberry Ck	303(d)	TN06030003056_0100	CLEFO	12	12		1			
WFSHO000.4GS	West Fork Shoal Creek	Watershed	TN06030004032_0100	CLEFO				1			
WFSUG003.0LW	West Fork Sugar Creek	Watershed	TN06030004036_0300	CLEFO				1			
WWEAK3.2T0.1LW	UNT Wet Weakley	303(d)	TN06030004029_0410	CLEFO	12	12		1			
YELLO000.8FR	Yellow Branch	303(d)	TN06030003041_0100	CLEFO	12	12		1			
YOKLE000.1GS	Yokley Creek	Watershed	TN06030004026_0300	CLEFO				1			
ATCHI000.1JO	Atchison Branch	Watershed	TN060101020250_050 0	JCEFO	10	10		1			
BACK000.5SU	Back Creek	303(d)	TN06010102042_0200	JCEFO	14	10		1			
BARM000.1CT	Big Arm Branch	303(d)	06010102012_0810	JCEFO	5	10		1			1
BEAVE001.0SU	BEAVER CREEK moved to 1.8 due to embayment	Ambient	06010102042_1000	JCEFO							
BEAVE001.8SU	Beaver Creek	303(d)	06010102042_1000	JCEFO	14	10		1			
BEAVE011.0SU	Beaver Creek	303(d)	06010102042_2000	JCEFO	14	10		1			
BEAVE014.0JO	Beaverdam Creek	303(d)	060101020231.0_2000	JCEFO	5	10		1			1
BEAVE015.3SU	BEAVER CREEK	Ambient	06010102042_2000	JCEFO	14	10		1			

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BEAVE5.0T0.1JO	U Beaverdam Creek Unnamed Tributary Tank Hollow	Watershed	060101020231.0_0100	JCEFO							
BEIDL000.8SU	Beidleman Creek	Watershed	06010102041_1000	JCEFO	10	10		1			
BJACO001.9SU	Big Jacob Creek	Watershed	060101020540_0300	JCEFO							
BLIME000.5GE	BIG LIMESTONE CREEK	Ambient	06010108030_1000	JCEFO	4	4					
BOOHE000.0SU	Booher Creek	303(d)	06010102012_0820	JCEFO	5	10	1				1
BOOHE000.1SU	Booher Creek	303(d)	06010102237_0100	JCEFO	5	10	1				1
CANDY001.7SU	Candy Creek	303(d)	06010102006T_0300	JCEFO	5	10		1			1
CEDAR000.3SU	Cedar Creek	303(d)	06010102042_0500	JCEFO	5	10		1			1
CHALK000.1JO	Chalk Branch	Watershed	060101020231.0_0200	JCEFO							
CLINC189.8HK	CLINCH RIVER	Ambient	06010205016_1000	JCEFO	4	4					
CORUM000.1JO	Corum Branch	303(d)	060101020250_0800	JCEFO	10	10		1			1
DOE001.1CT	Doe River	Ambient	06010103013_1000	JCEFO	4	4					
DRY001.0SU	Dry Creek	303(d)	06010102012_0700	JCEFO	5	10	1				1
DRY001.3SU	Dry Creek	303(d)	06010102012_0750	JCEFO	5	10	1				1
DRYST000.2JO	Drystone Creek	Watershed	060101020250_0600	JCEFO	10	10	1				
ECO66E04	Gentry Creek	Ecoregion	060101020250_0400	JCEFO	4	4	2	2	1		
ECO66E09	Clark Creek	SEMN	06010108010_3200	JCEFO		4	2	2	1		
ECO66F07	Beaverdam Creek	Ecoregion	060101020231.0_1000	JCEFO	4	4	2	2	1		
ECO6702	Fisher Creek	SEMN	0610104015_0100	JCEFO		4	2	2	1		
ECO6707	Possum Creek	Ecoregion	06010102012_0600	JCEFO	4	4	2	2	1		
ECO67F14	POWELL RIVER	Ambient	06010206007_2000	JCEFO	4	4					
EFBEA000.2JO	East Fork Beaverdam Creek	Watershed	060101020231.0_0700	JCEFO			1				
EVANS000.4SU	Evans Creek	Watershed	06010102042_0110	JCEFO			1				
FAGAL000.1JO	Fagall Branch	Watershed	060101020231.0_0300	JCEFO							
FECO66E03	Birch Branch	FECO	060101020231.0_0400	JCEFO	4	4	1	2	2		
FECO66F01	U Laurel Creek Unnamed Tributary In Negro Grave Hollow	FECO	060101020250_0200	JCEFO							

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FECO67G11	North Prong Fishdam Creek	FECO	060101020540_0600	JCEFO	4	4	1	2	2		
FISHD001.3SU	Fishdam Creek	Watershed	060101020540_0700	JCEFO							
FLATW000.1JO	Flatwood Branch	303(d)	060101020250_0900	JCEFO	5	10		1			1
GAMMO000.7SU	Gammon Creek	303(d)	06010102006T_0100	JCEFO	5	10		1			1
HARPE000.1SU	Harpers Creek	Watershed	060101020540_0310	JCEFO							
HATCH000.3SU	Hatcher Creek	Watershed	06010102012_0500	JCEFO	10	10	1				
HOLST131.5HS	HOLSTON RIVER	Ambient	06010104011_2000	JCEFO	4	4					
INDIA001.3SU	Indian Creek	Watershed	06010102012_0800	JCEFO	10	10	1				
LAURE007.0JO	Laurel Creek	Watershed	060101020250_1000	JCEFO	10	10	1				
LAURE010.6JO	Laurel Creek	303(d)	060101020250_2000	JCEFO	10	10	1				
LICK001.0GE	LICK CREEK	Ambient	06010108035_1000	JCEFO	4	4					
LINVI000.3SU	Linville Branch	Watershed	06010102042_0100	JCEFO	10	10	1				
LITTL000.2SU	Little Creek	303(d)	06010102042_0400	JCEFO	14	10		1			
LJACO001.5SU	Little Jacob Creek	Watershed	060101020540_0400	JCEFO	10	10	1				
LLIME007.0WN	LITTLE LIMESTONE CREEK	Ambient	06010108510-2000	JCEFO	4	4					
MILLE000.9SU	Miller Branch	Watershed	06010102012_0610	JCEFO	10	10	1				
MORRE000.1SU	Morrell Creek	303(d)	06010102012_0400	JCEFO	5	10	1				1
MUDDY000.7SU	Muddy Creek	303(d)	06010102237_1000	JCEFO	14	10		1			
NFHOL004.6SU	NORTH FORK HOLSTON RIVER	Ambient	06010104001_1000	JCEFO	4	4					
NICEL000.2SU	Nicely Creek	Watershed	06010102041_0110	JCEFO	10	10	1				
NOLIC020.8GE	NOLICHUCKY RIVER	Ambient	06010108001_3000	JCEFO	4	4					
NOLIC097.5UC	NOLICHUCKY RIVER	Ambient	06010108010_5000	JCEFO	4	4					
OWENS000.1JO	Owens Branch	Watershed	060101020250_0100	JCEFO	10	10	1				
PADDL000.1SU	Paddle Creek	303(d)	06010102012_0200	JCEFO				1			
PAPER000.6SU	Paperville Creek	Watershed	06010102041_0100	JCEFO	10	10		1			
PARKS000.3JO	Parks Branch	Watershed	060101020231.0_0500	JCEFO	10	10	1				
PSPRI001.4SU	Painter Spring Branch	303(d)	060101020540_0800	JCEFO							1

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RICHL001.3GE	RICHLAND CREEK	Ambient	06010108102_1000	JCEFO	4	4					
ROBIN000.1SU	Robinson Creek	303(d)	06010102237_0110	JCEFO	10	10		1			
SFHOL001.1SU	SOUTH FORK HOLSTON RIVER	Ambient	06010104001-1000	JCEFO	4	4					
SFHOL039.5SU	South Fork Holston River	303(d)	06010102012_1000	JCEFO	10	10					1
SFHOL045.5SU	South Fork Holston River	303(d)	06010102014_1000	JCEFO							1
SFHOL35.2T0.6SU	U South Fork Holston River Unnamed Tributary	303(d)	06010102012_0100	JCEFO	5	10	1				1
SFHOL43.5T0.7SU	U South Fork Holston River Unnamed Tributary	303(d)	06010102012_0300	JCEFO	5	10	1				1
SHARP001.5SU	Sharps Creek	Watershed	060101020540_0500	JCEFO	10	10	1				
SHING000.1JO	Shingletown Branch	303(d)	060101020250_1200	JCEFO	5	10		1			1
SINKI000.5GE	SINKING CREEK	Ambient	06010108064_1000	JCEFO	4	4					
SINKI000.9SU	Sinking Creek	303(d)	06010102041_0150	JCEFO	10	10		1			1
STEEL000.3SU	Steele Creek	Watershed	06010102042_0300	JCEFO	10	10		1			
STEEL011.0SU	Steele Creek	Watershed	06010102042_0350	JCEFO	10	10		1			
THOMA000.1SU	Thomas Creek	Watershed	06010102014_0100	JCEFO	10	10		1			
WAGNE001.9SU	Wagner Creek	303(d)	06010102006T_0200	JCEFO	5	10		1			1
WATER000.1JO	Waters Branch	303(d)	060101020250_1400	JCEFO	10	10		1			1
WEAVE000.7SU	Weaver Branch	303(d)	06010102012_0900	JCEFO	5	10		1			1
WHITE000.5SU	Whitetop Creek	Watershed	06010102042_0700	JCEFO							
WHITE001.5SU	Whitetop Creek	Watershed	06010102042_0700	JCEFO	14	10		1			
WILLS000.1JO	Wills Branch	Watershed	060101020250_0700	JCEFO			1				
WOODS000.5SU	Woods Branch	303(d)	06010102012_0830	JCEFO	5	10		1			1
BARNE001.2GI	Barnett Branch	303(d)	TN08010204010_0100	JEFO							1
BEE001.1GI	Bee Creek	303(d)	TN08010204020_0500	JEFO							1
BEECH001.8CK	Beech Creek	303(d)	TN08010204010_1200	JEFO	5					1	1
BEECH010.0DE	BEECH RIVER	Ambient	TN06040001802-1000	JEFO	4	4					
BETHE001.8DY	Bethel Branch	303(d)	TN08010204004_0200	JEFO	12	12		1		1	
BSAND015.3BN	BIG SANDY RIVER -	Ambient	TN06040005027-1000	JEFO	4	4					

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	EMBAYMENT										
BUCK001.2GI	Buck Creek	303(d)	TN08010204017_1000	JEFO	12	12		1		1	
BUCK003.1CK	Buck Creek	303(d)	TN08010204007_0100	JEFO	12	12		1		1	
CAIN000.8DY	Cain Creek	303(d)	TN08010204003_0100	JEFO							1
CAIN002.1GI	Cain Creek	303(d)	TN08010204020_0900	JEFO							1
CANE002.3HE	Cane Creek	Watershed	TN08010204014_0500	JEFO			1			1	
COURT000.9HE	Courtney Branch	303(d)	TN08010204014_0900	JEFO				1		1	
COW000.4GI	Cow Creek	303(d)	TN08010204021_0200	JEFO	12	12		1		1	
CROOK000.8MN	Crooked Creek	303(d)	TN08010204010_0400	JEFO							1
CYPRE000.9CK	Cypress Creek	303(d)	TN08010204009_1000	JEFO	12	12		1		1	
CYPRE6.0T.01CK	Cypress Creek Unnamed Tributary	303(d)	TN08010204009_0200	JEFO				1		1	
DAVIS000.9GI	Davis Creek	303(d)	TN08010204017_0100	JEFO	12	12		1		1	
DLOAC001.8MN	De Loach Creek	303(d)	TN08010204010_0900	JEFO							1
DOAKV002.0DY	Doakville Creek	303(d)	TN08010204022_1000	JEFO	12	12		1		1	
DOAKV3.4T0.5DY	Doakville Creek Unnamed Tributary	303(d)	TN08010204022_0200	JEFO							1
DRY000.3GI	Dry Creek	303(d)	TN08010204021_0100	JEFO						1	
DRY000.3MN	Dry Creek	303(d)	TN08010204014_0100	JEFO	5					1	1
DRY001.0HE	Dry Branch	Watershed	TN08010204014_1100	JEFO			1			1	
DRY001.3GI	Dry Branch	303(d)	TN08010204010_0300	JEFO							1
DUFFY000.2GI	Duffy Branch	303(d)	TN08010204010_0200	JEFO							1
DYER001.9MN	Dyer Creek	303(d)	TN08010204010_0700	JEFO	5					1	1
ECO65E06	Griffin Creek	Ecoregion	TN08010204014_0400	JEFO	4	4	2	2	1	2	
ELIZA002.2DY	Eliza Creek	303(d)	TN08010204004_0400	JEFO							1
EUBAN000.9MN	Eubanks Branch	303(d)	TN08010204014_1300	JEFO							1
GILME001.0MN	Gilmers Creek	303(d)	TN08010204013_1000	JEFO				1		1	
GURLE001.0HE	Gurley Creek	Watershed	TN08010204014_1200	JEFO			1			1	
HARRI001.9DY	Harris Creek	303(d)	TN08010204022_0100	JEFO	5						1

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
HATCH126.9HR	HATCHIE RIVER	Ambient	TN08010208001-3000	JEFO	4	4					
HOG001.4GI	Hog Creek	303(d)	TN08010204020_0600	JEFO							1
JOHNS001.2MN	Johnson Creek	303(d)	TN08010204010_0600	JEFO							1
JONES001.2DY	Jones Creek	303(d)	TN08010204023_0200	JEFO	12	12		1		1	
LEWIS000.3DY	Lewis Creek	303(d)	TN08010204023_1000	JEFO	12	12					
LEWIS002.0DY	Lewis Creek	303(d)	TN08010204023_1000	JEFO				1		1	
LEWIS002.5DY	Lewis Creek	303(d)	TN08010204023_1000	JEFO				1		1	
LIGHT002.2DY	Light Creek	303(d)	TN08010204023_0210	JEFO	5					1	1
LPOND001.0CK	Little Pond Creek	303(d)	TN08010204003_0200	JEFO							1
MATTH001.5MN	Matthews Creek	303(d)	TN08010204010_1100	JEFO							1
MFFDE005.2CK	Middle Fork Forked Deer River	303(d)	TN08010204007_1000	JEFO	12	12	1	1		1	
MFFDE021.5GI	Middle Fork Forked Deer River	303(d)	TN08010204010_1000	JEFO	12	12	1	1		1	
MFFDE025.3MN	Middle Fork Forked Deer River	303(d)	TN08010204010_2000	JEFO	12	12	1	1		1	
MFFDE037.0MN	Middle Fork Forked Deer River	Watershed	TN08010204010_3000	JEFO	12	12	1	1		1	
MFOBI004.5WY	MIDDLE FORK OBION RIVER	Ambient	TN08010203015-1000	JEFO	4	4					
MILLE001.0DY	Miller Creek	303(d)	TN08010204005_0300	JEFO	12	12		1		1	
MMILL001.0CR	Mchaneys Mill Creek	Watershed	TN08010204014_0410	JEFO							1
MOIZE001.3MN	Moize Creek	303(d)	TN08010204010_0800	JEFO	5					1	1
MUD002.1GI	Mud Creek	303(d)	TN08010204021_1000	JEFO							1
NASH002.8DY	Nash Creek	303(d)	TN08010204004_0500	JEFO							1
NFFDE002.2DY	North Fork Forked Deer River	303(d)	TN08010204001_1000	JEFO	4	4					
NFFDE005.3DY	NORTH FORK FORKED DEER RIVER	Ambient	TN08010204001_1000	JEFO	4	4					
NFFDE021.6GI	North Fork Forked Deer River	Tissue	TN08010204004_2000	JEFO							
NFFDE025.5GI	North Fork Forked Deer River	303(d)	TN08010204004_2000	JEFO	12	12		1		1	
NFFDE035.7GI	North Fork Forked Deer River	303(d)	TN08010204020_1000	JEFO	12	12		1		1	
NFFDE047.7GI	North Fork Forked Deer River	303(d)	TN08010204020_3000	JEFO			1			1	
NFFDE28.9T1.7GI	North Fork Forked Deer River Unnamed Tributary	303(d)	TN08010204020_0100	JEFO						1	

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreconn Freq.	SQSH Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
NFFDE43.5T0.4GI	North Fork Forked Deer River Unnamed Tributary	303(d)	TN08010204020_0300	JEFO				1		1	
NFOBI005.9OB	NORTH FORK OBION RIVER	Ambient	TN08010202009-1000	JEFO	4	4					
NFOBI010.7OB	NORTH FORK OBION RIVER	Ambient	TN08010202009-2000	JEFO	4	4					
ODELL000.6CK	Odell Creek	303(d)	TN08010204005_0100	JEFO							1
PARKE001.0DY	Parker Ditch	303(d)	TN08010204004_0100	JEFO							1
PARKE001.7GI	Parker Branch	303(d)	TN08010204020_0800	JEFO							1
POND001.1DY	Pond Creek	303(d)	TN08010204003_1000	JEFO	12	12		1		1	
POPLA000.4MN	Poplar Creek	303(d)	TN08010204010_0500	JEFO			1			1	
REAGA000.4GI	Reagan Creek	303(d)	TN08010204017_0110	JEFO	12	12		1		1	
RICE000.4CK	Rice Creek	303(d)	TN08010204005_0200	JEFO							1
ROGER001.5GI	Rogers Branch	303(d)	TN08010204020_0200	JEFO							1
SAND001.8CK	Sand Creek	303(d)	TN08010204009_0100	JEFO							1
SFFDE027.7HY	South Fork Forked Deer River	Ambient	TN08010205010_1000	JEFO	4	4					
SFOBI005.8OB	SOUTH FORK OBION RIVER	Ambient	TN08010203001-1000	JEFO	4	4					
SIMMO000.2HE	Simmons Branch	303(d)	TN08010204014_0800	JEFO							1
SPRIN000.8HE	Spring Creek	303(d)	TN08010204014_0600	JEFO							1
SPRIN001.0MN	Spring Creek	Watershed	TN08010204014_1400	JEFO			1			1	
SQUIR001.9GI	Squirt Creek	303(d)	TN08010204004_0300	JEFO							1
STOKE001.8DY	Stokes Creek	303(d)	TN08010204005_1000	JEFO				1		1	
STOKE002.7DY	Stokes Creek	303(d)	TN08010204005_1000	JEFO	12	12					
SUGAR001.0GI	Sugar Creek	303(d)	TN08010204016_1000	JEFO							1
SUSAN001.0HE	Susan Branch	Watershed	TN08010204014_0420	JEFO			1			1	
TENNE066.3HN	TENNESSEE RIVER	Ambient	TN06040005020-1000	JEFO	4	4					
TUCKE000.8CK	Tucker Creek	303(d)	TN08010204003_0300	JEFO	5					1	1
TURKE000.8MN	Turkey Creek	303(d)	TN08010204015_1000	JEFO							1
TYLER000.5HE	Tyler Branch	303(d)	TN08010204014_0700	JEFO							1

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WALLS001.0GI	Wallsmith Branch	303(d)	TN08010204020_0700	JEFO							1
WARRE001.3CK	Warren Ditch	303(d)	TN08010204010_1300	JEFO						1	
BAKER000.3KN	Baker Creek	303d	TN06010201 721-1000	KEFO	12	12		1			
BROWN001.0BT	Brown Creek	303d	TN06010201 026-0420	KEFO	12	12		1			
CANEY000.1BT	Caney Branch	303d	TN06010201 026-0110	KEFO				1			
CARR001.0BT	Carr Creek	Watershed	TN06010201 032-0300	KEFO			1				
CASTE000.5KN	Casteel Branch	303d	TN06010201 066-0100	KEFO				1			
CLINC010.0RO	Clinch River	Ambient	TN06010207001-1000	KEFO	4	4					
CLOYD002.8LO	Cloyd Creek	303d	TN06010201 1015-1000	KEFO	5		1				
COKER005.4MO	Coker Creek	Watershed	TN06020002018-0900	KEFO				1			
COKER011.1MO	Coker Creek	303d	TN06020002018-0950	KEFO				1			
COKER011.3MO	Coker Creek	Watershed	TN06020002018-0955	KEFO				1			
CONAS024.1MO	Conasauga Creek	303d	TN06020002081-1000	KEFO				1			
CROOK001.1BT	Crooked Creek	303d	TN06010201 028-1000	KEFO	5			1			
CROOK007.2BT	Crooked Creek	303d	TN06010201 028-1000	KEFO	5						
CULTO001.1BT	Culton Creek	303d	TN06010201 026-0430	KEFO	12	12		1			
DRY000.1BT	Dry Branch	303d	TN06010201 032-0700	KEFO	5						
DRY000.6MO	Dry Creek	303d	TN06020002081-0700	KEFO				1			
ECO66E17	Double Branch	Ecoregion	TN06010201 027-0130	KEFO	4	4	2	2	1		
ECO66G05	Little River	Ecoregion/ SEMN	TN06010201032-3000	KEFO	4	4	2	2	1		
ECO67F06	Clear Creek	Ecoregion/ SEMN	TN06010207019-0100	KEFO		4	2	2	1		
ECO67F13	White Creek	Ecoregion/ SEMN	TN06010205001T-0300	KEFO		4	2	2	1		
EFTHI000.1KN	East Fork Third Creek	303d	TN06010201 067-0100	KEFO	5			1			
ELLEJ000.1BT	Ellejoy Creek	303d	TN06010201 033-1000	KEFO	5						
ELLEJ000.1BT	Ellejoy Creek	Watershed	TN06010201 033-1000	KEFO				1			
ELLEJ008.0BT	Ellejoy Creek	303d	TN06010201 033-2000	KEFO	5			1			

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FBROA003.8KN	French Broad River	Ambient	TN06010107001-1000	KEFO	4	4					
FBROA095.9CO	French Broad River	Ambient	TN06010105001_4000	KEFO	4	4					
FECO66G03	Laurel Cove Creek	Ecoregion	TN06010201 032-0641	KEFO	4	4	2	2	1		
FIRST000.1KN	First Creek	303d	TN06010201 080-1000	KEFO	12	12					
FIRST005.7KN	First Creek	303d	TN06010201 080-1000	KEFO	12	12		1			
FLAG000.1BT	Flag Branch	303d	TN06010201 028-0500	KEFO	5			1			
FLENN0.9T0.5KN	Unnamed Trib. To Flenniken Branch	Watershed	TN06010201 089-1000 TN006010201 089_0110	KEFO				1			
FLOYD002.1BT	Floyd Creek	303d	TN06010201 083-1000	KEFO	5			1			
FOURT001.2KN	Fourth Creek	303d	TN06010201 697-1000	KEFO	5			1			
GOOSE000.8KN	Goose Creek	303d	TN06010201 723-1000	KEFO	5			1			
GRAND000.5KN	Grandview Branch	303d	TN06010201 066-0400	KEFO	5						
GUNN_G0.5KN	Gunn Hollow Branch	303d	TN06010201 066-1200	KEFO	5						
HBLUF000.1KN	High Bluff Branch	303d	TN06010201 066-0600	KEFO	5						
HESSE000.4BT	Hesse Creek	303d	TN06010201 031-1000	KEFO	5		1				
HOLLY000.5BT	Hollybrook Branch	303d	TN06010201 026-0300	KEFO	12	12		1			
LBANK000.8BT	Laurel Bank Branch	303d	TN06010201 026-0431	KEFO				1			
LELLE000.2BT	Little Ellejoy Creek	303d	TN06010201 033-0100	KEFO	12	12		1			
LITTL002.6KN	Little River	Watershed	TN06010201 026-1000	KEFO	12	12					
LITTL007.6BT	Little River	Watershed	TN06010201 026-2000	KEFO	12	12					
LITTL009.6BT	Little River	Watershed	TN06010201 026-2000	KEFO				1			
LITTL017.4BT	Little River	Watershed	TN06010201 027-1000	KEFO	12	12		1			
LITTL020.3BT	Little River	Watershed	TN06010201 027-1000	KEFO				1			
LITTL027.0BT	Little River	Watershed	TN06010201 032-1000	KEFO				1			
LITTL030.8BT	Little River	Watershed	TN06010201 032-2000	KEFO				1			
LITTL034.8BT	Little River	Watershed	TN06010201 032-2000	KEFO				1			
LTURK002.1KN	Little Turkey Creek	303d	TN06010201 037-1000	KEFO				0			
MCCAL000.2KN	McCall Creek	Watershed	TN06010201 066-0500	KEFO				1			

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MILLS001.0BT	Millstone Creek	Watershed	TN06010201 033-0600	KEFO				1			
NAILS000.7BT	Nails Creek	303d	TN06010201 034-1000	KEFO	5						
NAILS000.7BT	Nails Creek	Watershed	TN06010201 034-1000	KEFO				1			
PEPPE000.7BT	Peppermint Branch	303d	TN06010201 027-0400	KEFO	5			1			
PISTO000.2BT	Pistol Creek	303d	TN06010201 026-0400	KEFO	5			1			
PITNE000.8BT	Pitner Creek	303d	TN06010201 033-0200	KEFO	5						
PITNE000.8BT	Pitner Creek	Watershed	TN06010201 033-0200	KEFO				1			
POLEC001.0BT	Polecat Creek	303d	TN06010201 983-1000	KEFO	5			1			
REED000.1BT	Reed Creek	Watershed	TN06010201 027-0100	KEFO			1				
REED003.9BT	Reed Creek	Watershed	TN06010201 027-0150	KEFO			1				
ROCKY000.8BT	Rocky Branch	303d	TN06010201 027-0300	KEFO	5			1			
RODDY000.6BT	Roddy Branch	303d	TN06010201 026-0100	KEFO	5			1			
RUSSE000.9BT	Russell Branch	303d	TN06010201 026-0500	KEFO				1			
SECON000.1KN	Second Creek	303d	TN06010201 097-1000	KEFO	12	12		1			
SFCRO000.1BT	South Fork Crooked Creek	303d	TN06010201 028-0300	KEFO				1			
SHORT000.1BT	Short Creek	303d	TN06010201 032-0800	KEFO	12	12		1			
SINKI002.1KN	Sinking Creek	303d	TN06010201 1330-1000	KEFO	5						
SPICE000.4BT	Spicewood Branch	303d	TN06010201 028-0100	KEFO				1			
SPRIN000.3BT	Springfield Branch	303d	TN06010201 026-0410	KEFO	12	12					
SPRIN000.7BT	Springfield Branch	303d	TN06010201 026-0410	KEFO				1			
SPRIN012.9MO	Spring Creek	303d	TN06020002018-0550	KEFO				1			
STOCK003.2KN	Stock Creek	303d	TN06010201 066-1000	KEFO	5						
STOCK005.6KN	Stock Creek	303d	TN06010201 066-2000	KEFO	5						
TENNE643.3KN	Tennessee River	Ambient	TN06010201020-1000	KEFO	4	4					
THIRD001.0KN	Third Creek	303d	TN06010201 067-1000	KEFO	12	12		1			
THIRD001.0KN	Third Creek	303d	TN06010201 067-1001 1000	KEFO	5						
TIPTO000.1BT	Tipton Branch	303d	TN06010201 032-0820	KEFO				1			

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TMILE000.3KN	Ten Mile Creek (formerly called Sinking Creek)	303d	TN06010201 1334-0100	KEFO	5						
TMILE002.5KN	Ten Mile Creek (formerly called Sinking Creek)	303d	TN06010201 1334-0100	KEFO	5			1			
TURKE002.6KN	Turkey Creek	303d	TN06010201 340-1000	KEFO	5			1			
WHITE000.5KN	Whites Creek	303d	TN06010201 080-0100	KEFO	5			1			
WILDW000.1BT	Wildwood Branch	303d	TN06010201 034-0200	KEFO	5						
WILDW000.1BT	Wildwood Branch	Watershed	TN06010201 034-0200	KEFO				1			
WILLI000.7KN	Williams Creek	303d	TN06010201 719-1000	KEFO	12	12		1			
BANKL001.6FA	Black Ankle Creek	303(d)	TN08010209004-0100	MEFO	12	12		1		1	
BAXTE001.0TI	Baxter Bottom	303(d)	TN08010209016-0310	MEFO							1
BEAR001.2SH	Bear Creek	303(d)	TN08010209020-0110	MEFO	12	12		1		1	
BEAVE1C1.0SH	Beaver Creek Canal	303(d)	TN08010209016-1000	MEFO	12	12		1		1	
BENNE000.2FA	Bennetts Creek	303(d)	TN08010209012-1000	MEFO	12	12		1		1	
BIG1C1.0SH	Big Creek Canal	303(d)	TN08010209021-1000	MEFO	12	12		1		1	
BIG1C13.6SH	Big Creek Canal	303(d)	TN08010209021-2000	MEFO							
BIG1C15.8SH	Big Creek Canal	303(d)	TN08010209021-3000	MEFO	12	12		1		1	
BIG1C20.8TI	Big Creek Canal	303(d)	TN08010209021-4000	MEFO	12	12					
BIG1C8.4SH	Big Creek Canal	303(d)	TN08010209021-2000	MEFO	12	12					
BUCKH002.1SH	Buckhead Creek	303(d)	TN08010209002-0500	MEFO	12	12		1		1	
CLEAR001.4SH	Clear Creek	303(d)	TN08010209003-1000	MEFO							
CLEAR001.8SH	Clear Creek	303(d)	TN08010209003-1000	MEFO	12	12		1		1	
CROOK1C1.3SH	Crooked Creek Canal	303(d)	TN08010209021-0600	MEFO	12	12		1		1	
CYPRE001.2SH	Cypress Creek	303(d)	TN08010210032-1000	MEFO	4						
CYPRE001.82SH	Cypress Creek	303(d)	TN08010210032-1000	MEFO	4						
CYPRE006.2SH	Cypress Creek	303(d)	TN08010210032-1000	MEFO	4						
CYPRE013.7FA	Cypress Creek	303(d)	TN08010209003-0200	MEFO	12	12		1		1	
EBEAV1C2.1FA	East Beaver Creek Canal	303(d)	TN08010209016-0300	MEFO	12	12		1		1	
FECO74B04	Bull Branch	FECO		MEFO	4	4	2	2	1	2	

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HALL000.8SH	Hall Creek	303(d)	TN08010209003-0100	MEFO	12	12					
HALL001.4SH	Hall Creek	303(d)	TN08010209003-0100	MEFO							
HATCH009.1TI	Hatchie River	Ambient	TN08010208001-1000	MEFO							
HOWAR002.1SH	Howard Creek	303(d)	TN08010209002-0700	MEFO	12	12		1		1	
JAKES000.3SH	Jakes Creek	303(d)	TN08010209021-0100	MEFO	12	12		1		1	
JONES001.6FA	Jones Creek	303(d)	TN08010209010-1000	MEFO	12	12		1		1	
KELLY001.0TI	Kelly Branch	303(d)	TN08010209016-0210	MEFO	12	12					
KINGS000.4FA	Kings Creek	303(d)	TN08010209011-0200	MEFO							
LAURE1C3.7FA	Laurel Creek Canal	303(d)	TN08010209014-1000	MEFO	12	12		1		1	
LCYPR003.3FA	Little Cypress Creek Canal	303(d)	TN08010209015-1000	MEFO	12	12					
LOOSA005.0SH	Loosahatchie River	303(d)	TN08010209001-1000	MEFO	12	12					
LOOSA10.8T1.3SH	Un Trib to Loosahatchie	303(d)	TN08010209002-0100	MEFO							
LOOSA10.8T1.3SH	Un Trib to Loosahatchie	303(d)	TN08010209002-0100	MEFO	12	12					
LOOSA1C15.8SH	Loosahatchie River	303(d)	TN08010209002-1000	MEFO	12	12					
LOOSA1C22.7SH	Loosahatchie River	303(d)	TN08010209002-2000	MEFO	12	12		1		1	
LOOSA1C28.6SH	Loosahatchie River	303(d)	TN08010209004-1000	MEFO	12	12					
LOOSA1C30.2SH	Loosahatchie River	303(d)	TN08010209004-1000	MEFO							
LOOSA1C34.0FA	Loosahatchie River	303(d)	TN08010209004-1000	MEFO	12	12					
LOOSA1C38.3T1.9FA	Un Trib to Loosahatchie	303(d)	TN08010209008-1000	MEFO	12	12					
LOOSA1C42.5FA	Loosahatchie River	303(d)	TN08010209007-1000	MEFO	12	12		1		1	
LOOSA1C53.6FA	Loosahatchie River	303(d)	TN08010209011-2000	MEFO	12	12					
MBEAV1C6.4TI	Middle Beaver Creek Canal	303(d)	TN08010209016-0200	MEFO	12	12					
MBEAV1C9.2TI	Kelly Corner Rd.	303(d)	TN08010209016-0200	MEFO							
MISSI734.5SH	Mississippi River	303(d)	TN08010100	MEFO	4	4					
NFORK000.6SH	North Fork Creek	303(d)	TN08010209021-0300	MEFO	12	12		1		1	
NONCO001.8SH	Nonconnah Creek	Ambient	TN0801021100711-1000	MEFO	4	4					
OLIVE001.3SH	Oliver Creek	303(d)	TN08010209002-0400	MEFO	12	12		1		1	

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ROCKY000.9SH	Rocky Branch	303(d)	TN08010209002-0200	MEFO	12	12		1		1	
ROYST1C0.9SH	Royster Creek Canal	303(d)	TN08010209021-0200	MEFO	12	12		1		1	
SCOTT001.7SH	Scotts Creek	303(d)	TN08010209002-0300	MEFO	12	12		1		1	
TODD001.6SH	Todd Creek	303(d)	TN08010209001-0100	MEFO	12	12		1		1	
WBEAV1C1.1SH	West Beaver Creek Canal	303(d)	TN08010209016-0100	MEFO	12	12		1		1	
WBEAV1C4.7SH	West Beaver Creek Canal	303(d)	TN08010209016-0100	MEFO							
WOLF000.7SH	Wolf River	Ambient	TN08010210001-1000	MEFO	4	4					
WOLF031.4SH	Wolf River	Ambient	TN08010210003-1000	MEFO	4	4					
WOLF072.6FA	Wolf River	Ambient	TN08010210009-2000	MEFO	4	4					
BEECH000.2CA	Beech Fork	Watershed	TN05130104037_0600	MS		4					
BUFFA000.1CL	Buffalo Creek	Watershed	TN05130104044_1000	MS		4					
BUFFA004.2SC	Buffalo Creek	Watershed	TN05130104044_1000	MS		4					
CLEAR030.5CA	Clear Fork	Ambient	TN05130101015_2000	MS		4					
CLEAR037.3CL	Clear Fork	Ambient	TN05130101015_	MS		4					
DUNCA001.0BT	Duncan Branch	303(d)	TN06010201026_0421	MS		1		1		1	
ECO68A03	Laurel Fork of Station Camp Creek	SEMN	TN05130104016_0100	MS		4	2	2	1	2	
FECO69D03	Bear Branch	Ecoregion		MS		2	1	1	1	2	
FECO69D04	UT to Wheeler Creek	Ecoregion		MS		2	1	1	1	2	
FECO69E01	UT to Titus Cr.	Ecoregion		MS		2	1	1	1	2	
INDIA001.0AN	Indian Fork	Watershed	TN05130104037_1600	MS		4					
LIGIA000.5AN	Ligias Fork	Watershed	TN05130104037_0700	MS		4					
MONTG000.5SC	Montgomery Fork	Watershed	TN05130104037_0400	MS		4					
NEW008.8SC	New River	Watershed	TN05130104037_1000	MS		4					
NEW045.0AN	New River	Watershed	TN05130104037_2000	MS		4					
PROCK001.0SC	Paint Rock Creek	Watershed	TN05130104037_0300	MS		4					
ROCKY024.5VA	Rocky River	303(d)	TN05130108024_4000	MS		1		1		1	
ROSE000.1CA	Rose Creek	Watershed	TN05130101015_0300	MS		4					

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
SMOKY000.8SC	Smoky Creek	Watershed	TN05130104037_1800	MS		4					
STRAI000.1CL	Straight Creek	Watershed	TN05130101015_0700	MS		4					
STRAI001.9SC	Straight Fork	303(d)	TN05130104044_0500	MS		4					
TACKE000.5CA	Tackett Creek	Ambient	TN05130101015_0800	MS		4					
TRACY000.2CL	Tracy branch	Watershed	TN05130101015_0500	MS		4					
VALLE000.1CL	Valley Creek	Watershed	TN05130101015_0600	MS		4					
ANTHO000.1WS	Anthony Branch	303(d)	TN05130203232_0110	NEFO				1			
BEAR000.8RU	Bear Branch	303(d)	TN05130203023_0310	NEFO	12	12		1			
BEAR000.8RU	Bear Branch	303(d)	TN05130203023_0310	NEFO	12	12		1			
BRADL008.2T1.4RU	Unnamed Trib to Bradley Creek	303(d)	TN05130203029_0200	NEFO	12	12		1			
BRADL008.2T1.4RU	Unnamed Trib to Bradley Creek	303(d)	TN05130203029_0200	NEFO	12	12		1			
BRADL008.4T0.2RU	Unnamed trib to Bradley Creek	303(d)	TN05130203029_0300	NEFO	12	12		1			
BRADL008.4T0.2RU	Unnamed trib to Bradley Creek	303(d)	TN05130203029_0300	NEFO	12	12		1			
BUSHM3.4T0.2RU	UNT Bushman Creek	303(d)	TN05130203023_0210	NEFO				1			
BUSHM3.4T0.2RU	UNT Bushman Creek	303(d)	TN05130203023_0210	NEFO				1			
BUSHM3.4T0.2RU	Unnamed Trib to Bushman Creek	303(d)	TN05130203023_0210	NEFO				1			
CEDAR000.3WS	Cedar Branch	303(d)	TN05130203032_0200	NEFO				1			
CEDAR000.3WS	Cedar Branch	303(d)	TN05130203032_0200	NEFO				1			
CHRIS000.7RU	Christmas Creek	303(d)	TN05130203018_0210	NEFO	5		1				
CHRIS000.7RU	Christmas Creek	303(d)	TN05130203018_0210	NEFO	5		1	1			
CUMBE075.0ST	Barkley Reservoir	303(d)	TN05130205015_1000	NEFO	2						
CUMBE075.0ST	Barkley Reservoir	303(d)	TN05130205015_1000	NEFO	2						
CUMBE124.8MT	Barkley Reservoir	Watershed	TN05130205015_2000	NEFO	2						
CUMBE124.8MT	Barkley Reservoir	Watershed	TN05130205015_2000	NEFO	2						
CUMBE158.2CH	Cheatham Reservoir	Watershed	TN05130202001_1000	NEFO	2						
CUMBE158.2CH	Cheatham Reservoir	Watershed	TN05130202001_1000	NEFO	2						

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
CUMBE174.5DA	Cheatham Reservoir	Ambient	TN05130202001_2000	NEFO	4	4					
CUMBE174.5DA	Cheatham Reservoir	Ambient	TN05130202001_2000	NEFO	4	4					
CUMBE189.0DA	Cheatham Reservoir	303(d)	TN05130202001_3000	NEFO	2						
CUMBE189.0DAM C	Cheatham Reservoir	303(d)	TN05130202001_3000	NEFO	2						
CUMBE191.0DA	Cheatham Reservoir	Watershed	TN05130202001_4000	NEFO	2						
CUMBE191.0DA	Cheatham Reservoir	Watershed	TN05130202001_4000	NEFO	2						
CUMBE215.5DA	Cheatham Reservoir	Watershed	TN05130202001_5000	NEFO	2						
CUMBE215.5DA	Cheatham Reservoir	Watershed	TN05130202001_5000	NEFO	2						
CUMBE262.9WS	Cumberland River	Ambient	TN05130201001_1000	NEFO	4	4					
CUMBE262.9WS	Cumberland River	Ambient	TN05130201001_1000	NEFO	4	4					
DFORK001.9RU	Dry Fork Creek	303(d)	TN05130203018_0300	NEFO	5		1				
DFORK001.9RU	Dry Fork Creek	303(d)	TN05130203018_0300	NEFO	5		1	1			
DRY000.1DA	Dry Fork Creek	303(d)	TN05130203035_0300	NEFO				1			
DRY000.1DA	Dry Fork Creek	303(d)	TN05130203035_0300	NEFO			1	1			
EBHUR000.1RU	East Branch Hurricane Creek	303(d)	TN05130203036_0100	NEFO				1			
EBHUR000.1RU	East Branch Hurricane Creek	303(d)	TN05130203036_0100	NEFO			1	1			
ECO71H09	Carson Fork	Ecoregion	TN05130203027_2000	NEFO	4	4	2	2	1		
ECO71H09	Carson Fork	Ecoregion	TN05130203027_2000	NEFO	4	4	2	2	1		
EFHAM001.1DA	East Fork Hamilton Creek	303(d)	TN05130203539_1000	NEFO				1			
EFHAM001.1DA	East Fork Hamilton Creek	303(d)	TN05130203539_1000	NEFO			1	1			
EFHUR002.2WS	East Fork Hurricane Creek	Ecoregion	TN05130203033_0200	NEFO	2	2	2	2	1		
EFHUR002.2WS	East Fork Hurricane Creek	Ecoregion	TN05130203033_0200	NEFO			1	1			
EFSTO011.3RU	East Fork Stones River		TN05130203023_1000	NEFO	12	12		1			
EFSTO011.3RU	East Fork Stones River		TN05130203023_1000	NEFO	12	12		1			
EFSTO045.2CN	East Fork Stones River	303(d)	TN05130203026_2000	NEFO	5			1			
EFSTO045.2CN	East Fork Stones River	303(d)	TN05130203026_2000	NEFO	5			1			
FECO71H02	East Fork Stones River Unnamed Tributary	Ecoregion	TN05130203026_0900	NEFO	2	2	2	2	1		

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
FECO71H02	East Fork Stones River Unnamed Tributary	Ecoregion	TN05130203026_0900	NEFO	2	2	2	2	1		
FECO71H03	Haws Spring Fork	Ecoregion	TN05130203027_0100	NEFO	2	2	2	2	1		
FECO71H03	Haws Spring Fork	Ecoregion	TN05130203027_0100	NEFO	2	2	2	2	1		
FECO71I03	McKnight Branch UT	Ecoregion	TN05130203026_0210	NEFO	2	2	2	2	1		
FECO71I03	McKnight Branch UT	Ecoregion	TN05130203026_0210	NEFO	2	2	2	2	1		
FINCH001.4RU	Finch Branch	303(d)	TN05130203003T_020 0	NEFO	5						
FINCH001.4RU	Finch Branch	303(d)	TN05130203003T_020 0	NEFO	5						
HARPE040.5CH	Harpeth River	Ambient	TN05130204009_1000	NEFO	4	4		1		1	
HARPE040.5CH	Harpeth River	Ambient	TN05130204009_1000	NEFO	4	4		1		1	
HARTS000.4RU	Harts Branch	303(d)	TN05130203010_0300	NEFO	12	12		1			
HARTS000.4RU	Harts Branch	303(d)	TN05130203010_0300	NEFO	12	12		1			
HURRI003.7RU	Hurricane Creek	303(d)	TN05130203036_1000	NEFO	12	12		1			
HURRI003.7RU	Hurricane Creek	303(d)	TN05130203036_1000	NEFO	12	12		1			
JARMA000.3RU	Jarman Branch	303(d)	TN05130203029_0100	NEFO	12	12		1			
JARMA000.3RU	Jarman Branch	303(d)	TN05130203029_0100	NEFO	12	12		1			
LSPRI000.8RU	Lees Spring Branch	303(d)	TN05130203022_0200	NEFO			1	1			
LSPRI000.8RU	Lees Spring Branch	303(d)	TN05130203022_0200	NEFO			1	1			
LYTLE000.6RU	Lytle Creek	303(d)	TN05130203022_1000	NEFO	5			1			
LYTLE000.6RU	Lytle Creek	303(d)	TN05130203022_1000	NEFO	5		1	1			
LYTLE008.7RU	Lytle Creek	303(d)	TN05130203022_2000	NEFO	5			1			
LYTLE008.7RU	Lytle Creek	303(d)	TN05130203022_2000	NEFO	5		1	1			
MCCRO001.5DA	McCrory Creek	303(d)	TN05130203001_0100	NEFO	12	12		1			
MCCRO001.5DA	McCrory Creek	303(d)	TN05130203001_0100	NEFO	12	12		1			
MCCRO001.7DA	McCrory Creek	303(d)	TN05130203001_0150	NEFO	12	12		1			
MCCRO001.7DA	McCrory Creek	303(d)	TN05130203001_0150	NEFO	12	12		1			
MCKNI001.2RU	McKnight Branch	Watershed	TN05130203026_0200	NEFO				1			
NFSUG000.1WS	North Fork Suggs Creek	303(d)	TN05130203232_0100	NEFO	12	12		1			

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreco n Freq.	SQS H Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
NFSUG000.1WS	North Fork Suggs Creek	303(d)	TN05130203232_0100	NEFO	12	12		1			
NORTH002.0WS	North Creek	303(d)	TN05130203230_0100	NEFO				1			
NORTH002.0WS	North Creek	303(d)	TN05130203230_0100	NEFO				1			
OLIVE000.4RU	Olive Branch	303(d)	TN05130203010_0200	NEFO				1			
OLIVE000.4RU	Olive Branch	303(d)	TN05130203010_0200	NEFO				1			
PANTH001.5RU	Panther Creek	303(d)	TN05130203018_0500	NEFO				1			
PANTH001.5RU	Panther Creek	303(d)	TN05130203018_0500	NEFO				1			
PUCKE001.9RU	Puckett Creek	303(d)	TN05130203015_0100	NEFO		0		1			
PUCKE001.9RU	Puckett Creek	303(d)	TN05130203015_0100	NEFO		0	1	1			
RED025.5MT	Red River	Ambient	TN05130206002_3000	NEFO	4	4					
RED025.5MT	Red River	Ambient	TN05130206002_3000	NEFO	4	4					
RSPRI001.9RU	Rock Spring Branch	303(d)	TN05130203010_0310	NEFO			1	1			
RSPRI001.9RU	Rock Spring Branch	303(d)	TN05130203010_0310	NEFO			1	1			
SCOTT000.1DA	Scotts Creek	303(d)	TN05130203035_0100	NEFO	12	12		1			
SCOTT000.1DA	Scotts Creek	303(d)	TN05130203035_0100	NEFO	12	12		1			
SINKI000.2RU	Sinking Creek	303(d)	TN05130203018_0100	NEFO	12	12		1			
SINKI000.2RU	Sinking Creek	303(d)	TN05130203018_0100	NEFO	12	12		1			
STEWA004.0RU	Stewarts Creek	303(d)	TN05130203010_1000	NEFO	12	12		1			
STEWA004.0RU	Stewarts Creek	303(d)	TN05130203010_1000	NEFO	12	12		1			
STEWA009.8RU	Stewarts Creek	303(d)	TN05130203010_2000	NEFO	12	12		1			
STEWA009.8RU	Stewarts Creek	303(d)	TN05130203010_2000	NEFO	12	12		1			
STONE000.9DA	Stoners Creek	303(d)	TN05130203035_1000	NEFO	5			1			
STONE000.9DA	Stoners Creek	303(d)	TN05130203035_1000	NEFO	5			1			
STONE002.0DA	Stoners Creek	303(d)	TN05130203035_2000	NEFO	5						
STONE002.0DA	Stoners Creek	303(d)	TN05130203035_2000	NEFO	5						
STONE003.9DA	Stones River	303(d)	TN05130203001_1000	NEFO	12	12		1			
STONE003.9DA	Stones River	Ambient	TN05130203001_1000	NEFO	4	4					
STONE003.9DA	Stones River	303(d)	TN05130203001_1000	NEFO	12	12		1			

DWR Station	Name	Project Name	Waterbody ID	EFO	Bact. Freq.	Chem. Freq.	Bioreconn Freq.	SQSH Freq.	Algae Freq.	Hab. Freq.	Aerial Survey
STONE003.9DA	Stones River	Ambient	TN05130203001_1000	NEFO	4	4					
STONE1.9T0.1DA	Unnamed trib to Stoners Creek	303(d)	TN05130203035_0400	NEFO				1			
STONE1.9T0.1DA	Unnamed trib to Stoners Creek	303(d)	TN05130203035_0400	NEFO			1	1			
SUGGS007.5WS	Suggs Creek	303(d)	TN05130203232_1000	NEFO	12	12		1			
SUGGS007.5WS	Suggs Creek	303(d)	TN05130203232_1000	NEFO	12	12		1			
SULPH000.1RN	Sulphur Fork	Ambient	TN05130206003_1000	NEFO	4	4					
SULPH000.1RN	Sulphur Fork	Ambient	TN05130206003_1000	NEFO	4	4					
TOWN000.1RU	Town Creek	303(d)	TN05130203022_0100	NEFO	12	12	1				
TOWN000.1RU	Town Creek	303(d)	TN05130203022_0100	NEFO	12	12		1			
WBHUR000.1DA	West Branch Hurricane Creek	303(d)	TN05130203036_0200	NEFO	12	12		1			
WBHUR000.1DA	West Branch Hurricane Creek	303(d)	TN05130203036_0200	NEFO	12	12		1			
WFHAM000.5DA	West Fork Hamilton Creek	303(d)	TN05130203539_0100	NEFO				1			
WFHAM000.5DA	West Fork Hamilton Creek	303(d)	TN05130203539_0100	NEFO				1			
WFSTO006.2RU	W Fork Stones River	303(d)	TN05130203018_1000	NEFO	5						
WFSTO006.2RU	West Fork Stones River	Ambient	TN05130203018_1000	NEFO	4	4					
WFSTO006.2RU	W Fork Stones River	303(d)	TN05130203018_1000	NEFO	5						
WFSTO006.2RU	West Fork Stones River	Ambient	TN05130203018_1000	NEFO	4	4					
WFSTO010.7RU	W Fork Stones River	303(d)	TN05130203018_2000	NEFO	12	12		1			
WFSTO010.7RU	W Fork Stones River	303(d)	TN05130203018_2000	NEFO	12	12		1			
WFSTO20.5T0.8RU	UT West Fork Stones River	303(d)	TN05130203018_0600	NEFO				1			
WFSTO36.0T1.6RU	UNT W Fork Stones River	303(d)	TN05130203018_0400	NEFO	12	12	1				
WFSTO36.0T1.6RU	UNT W Fork Stones River	303(d)	TN05130203018_0400	NEFO	12	12		1			