

# Tennessee Department of Environment and Conservation

## Final Version of the *Tennessee's 2022 List of Impaired and Threatened Waters*

### Summary of Public Comments and Departmental Responses

(Note: Comments submitted during the public review period in regard to topics not directly related to the *Tennessee 2022 List of Impaired and Threatened Waters* are not included in this document. These topics include comments about the economic impact of listings, NPDES permit limits, the TMDL process in general, or a specific TMDL. Comments about water quality standards have only been included if related to a specific assessment. In some instances, public comments have been summarized in order to group similar observations by multiple reviewers.)

### General Comments

**General Comment 1:** *TDEC has been inconsistent in its stream assessments. For example, a new macroinvertebrate stream survey standard operating procedure was adopted on December 28<sup>th</sup>, 2021 and TDEC has repeatedly changed its SOPs and repeatedly applied the new SOPs retroactively in its assessments, all without notice to affected dischargers. The regulated community needs consistency, stability, and predictability in TDEC's evaluations so they can effectively plan and partner with TDEC and have confidence in the agency's process. They should let communities know when they are making changes or offering new reinterpretations to data that are several years old.*

**Response:** TDEC is required by its EPA 106 Water Pollution Control Grant's monitoring commitments to review all of the monitoring Quality Assurance Program Plan (QAPP) and SOPs annually. These documents are approved by EPA. Tennessee recently revised its Macroinvertebrate SOP in 2021, which included recalibrating the ecoregionally based biological metrics, based upon continuing monitoring data of reference streams. The last revision occurred in 2017. Tennessee uses the current SOP metrics to evaluate all applicable data in its assessment process. Scores are recalculated on all data so that direct comparisons can be consistently made to stream conditions over time without introducing statistical bias.

**General Comment 2:** *When I compare what TDEC sent us back in June of 2020 versus December of 2021 there are several new comments to old bioassessments. One comment states that the TMI score is not representative, and I don't know what that means. If the bugs or invertebrates were there, how can it not be representative of the stream health. Also, TDEC has added new comments between 2020 and 2021 about algae being present. I don't understand how that has any bearing on the TMI scoring unless the new SOP somehow addresses algae.*

**Response:** The comments referred to by the commentor were intended as internal notes to help staff view the data in proper context. TDEC often adds statements to raw benthic data regarding hatches, indeterminant taxa identification, lack of sufficient organisms collected, or other aspects of an individual sample collection or processing that may aid in the assessment of that data, including when an individual TMI score may not be representative of the benthic macroinvertebrate community’s actual biological integrity. Other notes concerning algae, siltation, alterations, or other potential stressors do not have a bearing on a TMI score, but rather as additional observational data to aid in identification of potential impairments.

**General Comment 3:** *Let local resources support TDEC efforts - to start creating data trends versus the snapshots that TDEC sometimes can only afford.*

**Response:** Tennessee appreciates the comment, and welcomes all outside data, including that from local municipalities. In reviewing these data, Tennessee has a responsibility to ensure submitted data are of a sufficient quality, precision, and comparability to methodologies outlined in our SOPs and Quality Assurance Project Plan (QAPP). Where data meet these basic standards, they provide useful additions to sometimes limited TDEC datasets during the assessment process.

**General Comment 4:** *During TDEC’s review of comments it came to our attention that all listed parameters in Category 4b should have a TMDL priority of “Not Applicable” rather than “Low”. Category 4b means that a TMDL is not needed because a different type of control strategy is in place which will bring about compliance with the criterion in a reasonable amount of time.*

**Response:** All Category 4b parameters have been changed to “NA”. These include parameters in the following segments:

TN06010201620_1000	Cardiff Creek
TN06010207020_1300	Mitchell Branch
TN06010207026_0600	Bear Creek
TN06010207026_0650	Bear Creek
TN06010207247_0100	Melton Branch
TN06010207247_1000	Whiteoak Creek
TN06030005081_0200	Unnamed Trib to Shoal Creek

**General Comment 5:** *In order to delist a waterbody/pollutant combination from the 303(d) list, states must provide data showing all components of the state water quality criteria are met. Upon review of the state draft delisting rationales and additional data, EPA has determined that not all assessment units (AU) have E. coli data available to calculate a monthly geomean described in the state’s water quality criteria.*

*Although it is ideal that samples be collected for all streams to assess against the monthly geomean criteria, EPA recognizes the constraints faced by the state and, in lieu of a monthly geomean calculation, will approve delistings for waters that have a 12-month geomean value*

less than the monthly geomean criteria of 126 col/100mL. EPA has concluded that use of a 12-month geomean as a surrogate for monthly geomean values is an appropriate interpretation of the applicable water quality standard.

**Response:** Per EPA guidance, TDEC has updated delisting rationales for the following 14 Assessment Units, utilizing a calculated 12-month geomean which falls below 126 cfu/100mL :

<b>Segment Number</b>	<b>Assessment Unit Name</b>
TN06010201032_0800	Short Creek
TN06010207006T_0900	Scarboro Creek
TN06020001029_0100	Wolfe Branch
TN06020001086_1000	Grasshopper Creek
TN06020001889_0100	Little Wolftever Creek
TN06020002002_0100	Sugar Creek
TN06020002005_1300	Unnamed Trib to Candies Creek
TN06020002005_2000	Candies Creek
TN06030003010_1000	Elk River
TN06030003053_0100	Blue Creek
TN06030004029_0410	Unnamed Trib to Wet Weakley Creek
TN06040003050_0620	Grab Creek
TN08010209021_0300	North Fork Creek
TN08010209021_1000	Big Creek

Per EPA guidance, TDEC has relisted E. coli as an impaired parameter and Recreation Use as not being supported for the following 32 Assessment Units, based on a calculated 12-month geomean which exceeds 126 cfu/100mL:

<b>Segment Number</b>	<b>Assessment Unit Name</b>
TN05130108045_0300	Hudgens Creek
TN05130203018_0100	Sinking Creek
TN05130203036_1000	Hurricane Creek
TN06010102003_0100	Mill Creek
TN06010102003_0600	Little Horse Creek
TN06010102045_2000	Fall Creek
TN06010102046_0800	Gaines Branch
TN06010102046_2000	Reedy Creek
TN06010102702_0100	Possum Creek
TN06010102729_1000	Rock Springs Branch
TN06010207014_0400	North Fork Bullrun Creek
TN06020001020T_0400	Lick Branch
TN06020001020T_0510	Unnamed Trib to Dry Branch
TN06020001029_0200	Unnamed Trib to Savannah Creek

TN06020001029_1000	Savannah Creek
TN06020001038_0100	Hardin Creek
TN06020001041_0500	Little Sewee Creek
TN06020001041_0532	Collins Branch
TN06020001041_0700	Black Ankle Creek
TN06020001717_1000	Yellow Creek
TN06020001889_0300	Wilkerson Branch
TN06020001889_1000	Wolftever Creek
TN06040001064_0400	Kerr Branch
TN06040003023_1000	Sugar Fork
TN06040003023_2000	Sugar Fork
TN06040003041_0900	Lunns Branch
TN06040003041_1100	Dog Creek
TN08010204003_1000	Pond Creek
TN08010209002_0400	Oliver Creek
TN08010209008_1000	Unnamed Trib to Loosahatchie River
TN08010209016_0210	Kelly Branch
TN08010210023_0100	Unnamed trib to Fletcher Creek

**General Comment 6:** *TDEC said during the public hearing that it is listing rivers for nutrient contamination based on “negative biologic responses” rather than exceedances of regional chemical goals.*

**Response:** TDEC consistently uses multiple lines of evidence for nutrient assessments. Narrative nutrient criteria application considers ecoregional chemical goals based on data analysis, however the current CALM document states the stream must also show related biological harm. This could be elevated %Nutol submetric in the Tennessee Macroinvertebrate Index, excessive algae noted, or other secondary indicators such as low dissolved oxygen, large diurnal DO fluctuations, or pH violations.

**General Comment 7:** *Lowering the permissible threshold for dissolved oxygen to what may be tolerated by benthic organisms simply does not protect animals like fish living higher in the water column and could cause fish kills. Therefore, lowering or ignoring the dissolved oxygen standard as some municipal dischargers have proposed is short-sighted and both bad science and bad environmental and economic policy. TDEC should not entertain any such proposals.*

**Response:** TDEC will continue to use the current dissolved oxygen criteria of not less than 5 mg/l for assessments. Any change or consideration of a change would require further scientifically defensible studies and involve revisions to the Water Quality Criteria and a triennial review process.

**General Comment 8:** *TDEC’s concern with the presence of, and apparent attempts to understand and remedy, algae and algal bloom-causing conditions, while tardy, is necessary and should be encouraged.*

**Response:** TDEC is excited about exploring new tools to assess algal impacts, including through the development of diatom metrics, to potentially provide more clarity into the assessment process.

**General Comment 9:** *Does TDEC use data from Metro Nashville in Davidson County for E. coli? How can the public see the sources of data used in assessment, such as TDEC’s own biological and chemical data, permittee data, and data provided by other outside entities?*

**Response:** TDEC reviews and takes into consideration data from myriad sources, including its own watershed monitoring data. This does include E. coli data provided by the Metro Nashville MS4 program. TDEC’s chemical data is available online at [https://dataviewers.tdec.tn.gov/pls/enf\\_reports/f?p=9034:34510:::](https://dataviewers.tdec.tn.gov/pls/enf_reports/f?p=9034:34510:::) Staff are currently working on migrating biological monitoring data to this public-facing database as well. Tennessee is now attaching all data used for assessments to the EPA ATTAINS database and hoped that these documents would be made publicly available through EPA’s “How’s My Waterway” application but were recently informed otherwise. We are working with EPA to find a viable solution to make more documents such as these available.

Currently however, most data provided by outside entities are not currently publicly viewable, with a few exceptions. TVA, USGS, and USACE data are sometimes provided through the “How’s My Waterway” application. Permittee self-monitoring data and MS4 annual reports are generally available through TDEC permit dataviewers -

**General Comment 10:** *Could TDEC do more to show changes between the currently proposed Tennessee List of Impaired and Threatened Waters and the previous List (maps, Excel, etc.)?*

**Response:** TDEC continues to look for ways to be more transparent in the 303(d) program. EPA continues to provide new report features in ATTAINS that could be helpful for future review and comparisons of assessment changes. TDEC will look further into ways to incorporate these reports into meaningful tools for the review of future Tennessee List of Impaired and Threatened Waters.

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## Specific Comments

**Specific Comment 1:** *Subsequent to the initial posting of the Draft 2022 Tennessee List of Impaired and Threatened Waters, TDEC correctly determined that the West Fork Stones River segment TN05103203018\_2000 is Not Impaired for Nutrients and Sediment/Siltation*

**Response:** Due to the documented improvement in biology in this segment, we agree that these parameters can be delisted, as our narrative habitat and nutrient criteria requires that evidence of biological harm is needed to consider these criteria violated. Remaining consistent with this methodology as described fully in the current Tennessee CALM document, we will delist these parameters from the final 2022 Tennessee List of Impaired and Threatened Waters and update the information in ATTAINS.

**Specific Comment 2:** *Sinking Creek (TN05130203018\_0100) “impairment” to Fish and Aquatic Life is not evidenced by benthic results from 2016 and 2020 surveys, and delisting should be strongly considered.*

**Response:** A 2019 TDEC SQKICK at RM 0.2 (SINKI000.2RU) at Thompson Lane failed to meet regional goals documenting that the biological integrity criterion was still not being met. The Division acknowledges that a consultant’s benthic survey in 2020 met the minimal regional goal, but based on the history of documented impairment to Sinking Creek, and increasing development and other potential stressors on the health of the stream in the watershed, the Division will continue to monitor this segment and re-assess it based on future results.

**Specific Comment 3:** *West Fork Stones River segments TN05103203018\_2000 and TN05103203018\_3000 are not impaired for Fish and Aquatic Life designated uses due to observed dissolved oxygen criteria violations. The low dissolved oxygen violations are due to naturally occurring conditions in the Inner Nashville Basin ecoregion.*

**Response:** TDEC disagrees on this interpretation of numeric criteria. The West Fork Stones watershed land use/imagery show extensive urban development and agriculture upstream and does not currently reflect an unimpacted “natural condition”. The USGS gage at Blanton Drive sits at the break point between segments \_2000 and \_3000. These gage data document repeated Dissolved Oxygen criteria violations annually below the 5.0 mg/l minimum. These excursions are during the summer low flow critical period, providing evidence of a lack of assimilative capacity in the river. These West Fork Stones segments will remain listed as impaired due to low dissolved oxygen.

**Specific Comment 4:** *The fact that the West Fork Stones River supports a healthy biological community means it is not impaired - despite infrequent excursions from the statewide numeric dissolved oxygen criteria.*

**Response:** TDEC disagrees with this interpretation of numeric criteria. The biological integrity narrative criteria and numeric dissolved oxygen criteria each stand alone and are evaluated independently. The EPA guidance for setting the dissolved oxygen criteria is not solely based on benthic macroinvertebrates but on research into various aquatic biological species and life stages. TDEC also disagrees with the commentor’s interpretation of the dissolved oxygen criteria violation as “infrequent”. Dissolved oxygen values are at their most critical for aquatic

life and are most likely to show criteria violations during the low flow, warm temperature portion of the year. Permit conditions and water quality modeling primarily focus on these low flow, warm temperature conditions as dissolved oxygen and assimilative capacity sufficient to sustain all forms of aquatic life are more likely impacted.

Looking at the Blanton Drive USGS data period of record, 10/1/13 - 2/28/22, and considering the months of June-October as the summer low flow, the dissolved oxygen was less than 5 mg/l in 4.86% of all measurements. Dissolved oxygen was below 5 mg/l at least once per day for 8.96% of all days and 20.2% of days during the period of June-October. This equates to approximately one month of days (31.5) per year that dissolved oxygen is less than 5 mg/l.

**Specific Comment 5:** *Low levels of dissolved oxygen are a natural condition in the West Fork Stones River and other streams within the Inner Nashville Basin. The numeric criteria (for Dissolved Oxygen) for the West Fork Stones River may need to be revised to reflect the fact that infrequent excursions of the statewide criterion are a natural condition consistent with the designated use.*

**Response:** While TDEC once proposed a dissolved oxygen criteria change for the Inner Nashville Basin (ecoregion 71i) based on data collected in 2002-04, the EPA disagreed with our premise and requested that more data be collected to further support any changes. To consider lower dissolved oxygen levels as being a “natural condition”, minimally another multiyear study would need to be done on ecoregion 71i reference conditions.

It should also be pointed out that in the almost 20 years since the last dissolved oxygen study, middle Tennessee (ecoregion 71i) has and is undergoing significant development and growth that may degrade water quality. There are likely very few “natural condition” reference streams available within this ecoregion to evaluate or compare new data from.

**Specific Comment 6:** *There is strong evidence that the dissolved oxygen criteria adopted by Tennessee are overprotective and are substantially more restrictive than other Region 4 states. Daily average dissolved oxygen values in the WFS are consistently above 5 mg/l.*

**Response:** The current Tennessee dissolved oxygen criteria are protective and are applicable. The concept of a daily average dissolved oxygen criteria is not as appropriate or protective as a more straightforward daily minimum. As streams are more impaired due to nutrients, the diel dissolved oxygen range will often increase inflating the average dissolved oxygen value and potentially masking the periods of critically low dissolved oxygen levels. TN criteria are in line with EPA 1986 dissolved oxygen criteria guidance.

**Specific Comment 7:** *The West Fork Stones River should be identified as a category 3 water until an appropriately vetted and scientifically defensible determination can be made.*

**Response:** TDEC disagrees that this stream should be considered not assessed (category 3). Multiple years of scientifically defensible USGS data support the assessment of impairment due to dissolved oxygen criteria violations.

TDEC will again be monitoring the Stones River (05130203) watershed in 2022-23 as part of the normal watershed cycle activities. To build upon the existing dissolved oxygen data sources, TDEC will work to deploy as many continuous monitoring devices as staff time and weather permit. TDEC also plans to increase its biological monitoring for macroinvertebrates and diatoms throughout the West Fork Stones River watershed.

**Specific Comment 8:** *The upstream section of Percy Priest Reservoir (TN05130203003\_2000) should not be listed as Threatened on the 303(d) list and should be listed as Category 3 waters.*

**Response:** The USACE continues to collect grab samples, and water column profiles, documenting periods of low dissolved oxygen levels, restricted Secchi Disk depths, and elevated Chlorophyll a levels, providing sufficient data to assess this waterbody. Based on the available current and historical data, the Division believes that Category 3 (not assessed) is not appropriate, especially given the segment's previous listing status.

As more thoroughly discussed in the response to comments for the 2020 Tennessee List of Impaired and Threatened Waters (see Attachment A), TDEC believes that the Domestic Water Supply and Fish and Aquatic Life designated uses are threatened by excessive biomass made worse by elevated nutrients from the watershed. According to EPA guidance, threatened waters are those where a documented trend indicates that water quality standards will be violated before the next Listing cycle. This assessment was consistent with TDEC's published CALM and was reviewed and approved by EPA in 2017 and again in 2020.

TDEC has embarked on organizing a multi-agency stakeholder group to further investigate and refine water quality monitoring and assessment issues in Percy Priest Reservoir. We hope collaboration within this group will assist in better quantification of water quality status and identify potential improvements in data gathering and analysis.

**Specific Comment 9:** *Under the Caney Fork HUC 8, section TN05130108125-1000 of the Caney Fork River below Great Falls Dam is identified as being in Smith County. It is in DeKalb County. The additional Warren County designation is correct.*

**Response:** There is no assessment unit associated with the number TN05130108125\_1000. We assume the commentor was referring to segment TN05130108025\_1000. Based on GIS review we agree that this segment is not in Smith County. This assessment unit is the line between Warren and White Counties that flows between Great Falls Reservoir and the upper reaches of Center Hill Reservoir. We will correct this location information in ATTAINS and update the counties in the 2022 List of Impaired and Threatened Streams. Thank you for the comment and correction.

**Specific Comment 10:** *Two segments of McCrory Creek (TN05130203001\_0100 and TN05130203001\_0150) don't have Nutrients listed but they should.*



**Response:** The commentor is correct. The inadvertent omission of the listing of Nutrients, will be corrected on the 2022 List of Impaired Streams. Thank you for the comment and correction.

**Specific Comment 11:** *The 2022 303(d) draft indicates stream segment TN05130202001T\_0600 is located in Davidson County. It is in Hendersonville in Sumner County. Further, it indicates that a source of its contamination is a municipal point source. The Hendersonville Shopping Ctr package plant has been replaced by a pumping station. Review of TDEC's map shows that NPDES 0058106 permit is no longer extant, thus showing that the plant is no longer present. Therefore "municipal source" should be removed from the 303(d) list.*

**Response:** GIS analysis confirms that assessment unit TN05130202001T\_0600 is located within Sumner County. We will correct this location information in ATTAINS and update the county in the 2022 List of Impaired and Threatened Streams. The commentor is correct that the Hendersonville Shopping Center plant discharge has been eliminated. However, the White House Utility District water treatment plant, also a municipal point source, impacted this stream through chlorine permit violations during the previous assessment. This segment is a group 5 watershed and will be reassessed in the spring of 2023. We are still waiting for data to return from the state lab. When all the data have been gathered, we will reassess this stream.

**Specific Comment 12:** *Commentor asks that Beaver Dam Creek in Dickson County, located south of Burns, TN be considered for the 303(d) list due to relatively recent physical changes, sedimentation, nutrient pollution, and continuing threats of these impacts from upstream sources and disturbances.*

**Response:** This segment of Beaver Dam Creek (TN05130204006\_1200) is located in the Harpeth River watershed, which is included in TDEC's Group 1 watershed cycle. In 2016 data collected in this segment documented biological integrity was meeting regional goals and was assessed in 2019 as supporting its designated uses. TDEC is currently monitoring this waterbody again during 2021-2022, and it is scheduled to be reviewed during the 2024 Group 1 assessment cycle, once all laboratory analysis of collected data is complete. Thank you for your comment and raising our awareness of the potential degradation of this assessment unit.

**Specific Comment 13:** *Commentor provided an independent biological report done on Beaver Dam Creek (TN05130204006\_1200) in Dickson County. Commentor believes this report indicates that the channel is actively eroding, and the biological system with in Beaverdam Creek at the sampling location is showing signs of stress. Commentor would request to consider adding the stream onto the 2022 303d list.*

**Response:** The Division appreciates receiving this report. The methodology and extent of the data provided are not robust enough or comparable to TDEC's assessment methodologies to make a listing assessment at this time. However, the issues highlighted will inform the Division's assessment of this segment during the Group 1 watershed assessment process, when all TDEC monitoring data have been analyzed and reviewed, as described in the previous response to comment.

**Specific Comment 14:** *In looking at the draft list we noticed Mitchell Branch (TN06010207020\_1300) is listed as being located in Anderson County, but it is actually in Roane County.*

**Response:** GIS analysis confirms that this assessment unit, TN06010207020\_1300 is located in Roane County. We will correct this location information in ATTAINS and update the county in the 2022 List of Impaired and Threatened Streams. Thank you for the correction.

**Specific Comment 15:** *For Whiteoak Creek (TN06010207247\_1000) in the Lower Clinch River Basin, the impairments listed are “cause unknown,” “strontium,” and “cesium,” with “CERCLA NPL (Superfund) Sites” listed as Potential Impairment Source Name. We were not clear on what the “cause unknown” impairment refers to, or on the basis for that determination. Could you shed some light/help us understand?*

*Also, for strontium and cesium...it is understood that radioisotopes of those two elements are partly responsible for the radioactivity present in Whiteoak Creek. Clearly those two, among others, are remediation targets under the ongoing CERCLA cleanup work on the Department of Energy Oak Ridge Reservation, which includes White Oak Creek. It is not clear, however, why those two elements are listed as impairments on the 303(d) list; we would be interested to understand more about the basis for those listings. It is noted that the presence of those elements in Whiteoak Creek has been significantly reduced, largely due to successes with CERCLA cleanup actions, compared to in the past.*

**Response:** Data collected for Whiteoak Creek documented that the segment was not meeting regional goals for biological integrity, and no other probable cause for this degradation was apparent in the data. Therefore, the parameter causing the impairment to Fish & Aquatic Life designated use was listed as “Cause Unknown”.

Strontium and Cesium were first listed as causes of impairment to Recreation Use on Whiteoak Creek, and Strontium on Melton Branch, in 2006. At that time TDEC met with staff from Department of Energy Oversight division. Based on these conversations and data from DOE-O monitoring, the decision was made to list these parameters. During the most recent assessment of this segment, TDEC again engaged with staff from Division of Remediation – Oak Ridge. It was noted that in 2015 there was a release from a blocked pipe containing strontium leaching into Whiteoak Creek. TDEC believes that delisting of these parameters is not appropriate at this time.

**Specific Comment 16:** *We question the basis for including strontium (Sr) and cesium (Cs) as impairments in the 303(d) Listing for Whiteoak Creek and Melton Branch on the DOE Oak Ridge Reservation (ORR) (Lower Clinch Watershed) and dispute that Total Maximum Daily Loads (TMDLs) are needed for either constituent.*

**Response:** TDEC thanks the commentor for bringing the TMDL priority error to our attention and this will be corrected on the 2022 List of Impaired and Threatened Waters. We agree these parameters should remain Category 4b (TMDL), covered under the current CERCLA

Record of Determination (ROD). Category 4b means that a TMDL is not needed because a different type of control strategy is in place which will bring about compliance with the criterion in a reasonable amount of time. The basis for the original inclusion of these parameters is provided in response to comment above. While we acknowledge the progress of the CERCLA remedial process, we do not believe we have sufficient basis for delisting these parameters at this time. We remain committed to working with DOE, ORNL, and DOR-OR to evaluate future assessments and additional data.

**Specific Comment 17:** *Since the publication of the proposed 303(d) list Metro has submitted its 2020-21 NPDES report. Table 13A.1 of the report (link follows) contains results from their dissolved oxygen sampling that should be taken in account for several listings, as follows.*

[https://www.nashville.gov/sites/default/files/2021-12/Nashville\\_MS4\\_2021Annual\\_Report.pdf?ct=1640197072](https://www.nashville.gov/sites/default/files/2021-12/Nashville_MS4_2021Annual_Report.pdf?ct=1640197072)

*Sevenmile Creek (segment TN05130202007\_1400) is listed as impaired for dissolved oxygen. Multiple samples show no breach of the 5.0 mg/L standard. However, Sevenmile Creek should remain listed for other causes.*

*Segment TN05130202007\_2000 of Mill Creek is listed for low dissolved oxygen. Metro's 2020-21 NPDES report shows no breach of the 5.0 mg/L limit. This segment should remain listed for other causes.*

*Similarly, another segment of Mill Creek (TN0513020007\_3000) is listed for low dissolved oxygen levels. Metro's 2020-21 NPDES report shows no breaches of the 5.0 mg/L limit. This Mill Creek segment should also remain listed for other causes.*

**Response:** These waterbodies are located in the Cheatham Reservoir watershed, which is included in TDEC's Group 5 watershed cycle. They were assessed in 2019 as not supporting their designated Fish & Aquatic Life uses, with previously documented low dissolved oxygen levels as a contributing cause of impairment. TDEC recently conducted monitoring of these waterbodies again during 2020-2021, and they are scheduled to be re-assessed in 2023. TDEC will reevaluate these assessments when all data results, including biological samples, are available, and will include the Metro MS4 results to determine the appropriate listing status at that time. Thank you for your comment and raising our awareness of this additional information.

**Specific Comment 18:** *Shasta Branch (TN05130202007\_1410) is listed as impaired for E. coli from sanitary sewer overflows. Metro's 2020-21 NPDES report shows either no detection or extremely low levels of human bacterial levels based on PCR analysis. Also review of Metro's monthly regulatory reports shows no sanitary sewer overflows in the area. Shasta Branch should remain listed, but with the Source of E. coli only attributed to MS4 area urban runoff.*

**Response:** This waterbody is located in the Cheatham Reservoir watershed, which is included in TDEC's Group 5 watershed cycle. It was assessed in 2019 as not supporting its designated Recreation use, with previously documented high E. coli levels as a contributing cause of impairment. TDEC recently conducted monitoring of this watershed again during

2020-2021, and it is scheduled to be re-assessed in 2023. TDEC will reevaluate this specific assessment when all data results are available and will include these and any additional Metro MS4 results to determine the appropriate listing status at that time. We will also communicate with Division's Enforcement & Compliance staff and Metro Water Services to confirm sanitary sewer overflows in this watershed have remained consistently absent. Thank you for your comment and raising our awareness of this additional information.

**Specific Comment 19:** *Turkey Creek (TN05130202007\_0700) - The 2019-20 Metro NPDES report (link below) shows multiple breaches of the 5.0 mg/L limit for dissolved oxygen. See Table 13A.1 of the report. Therefore, dissolved oxygen should be added to the 2022 303(d) list.*

[https://www.nashville.gov/sites/default/files/2021-12/Nashville\\_MS4\\_2020Annual\\_Report.pdf?ct=1640197303](https://www.nashville.gov/sites/default/files/2021-12/Nashville_MS4_2020Annual_Report.pdf?ct=1640197303)

**Response:** This waterbody is located in the Cheatham Reservoir watershed, which is included in TDEC's Group 5 watershed cycle. It was previously assessed in 2019 and at that time there was not enough available data to assess Fish & Aquatic Uses, including any dissolved oxygen data. TDEC recently conducted monitoring of this waterbody again during 2020-2021, and it is scheduled to be re-assessed in 2023. TDEC will reevaluate this assessment when all data results, including biological samples, are available, and will include the Metro MS4 results to determine the appropriate listing status at that time. Thank you for your comment and raising our awareness of this additional information.

**Specific Comment 20:** *TDEC completed an E. coli TMDL for the Upper Broad Watershed (06010105) which was approved by EPA on February 3, 2022. The following segments' TMDL priority in the draft list of impaired waters should be changed from "High" to "N/A". The segments are as follows: TN06010105001\_0100 Clear Creek, TN06010105001\_0200 Long Creek, TN06010105003\_1000 Trail Fork Big Creek, TN06010105003\_1100 Johns Creek, TN06010105003\_1110 Baker Branch, TN06010105003\_2000 Trail Fork Big Creek*

**Response:** These changes were made in ATTAINS and on the final 2022 List of Impaired and Threatened Streams.

**Specific Comment 21:** *Under the TDEC proposal, Kentucky Reservoir (Tennessee River) in Hardin County is being listed as impaired for Dissolved Oxygen (DO). Data collected by the commentor for CY 2021 was previously submitted. All river DO measurements were above 5.0 ppm with the exception of four occurrences during the month of July.*

*The commentor has reviewed data collected by TVA at their Diamond Island monitoring site. Their data shows some DO levels less than 5.0 ppm but the yearly average DO value was listed at 8.1 ppm*

*The commentor's preference would be for DWR to recommend removal of the impairment listing for the Hardin County portion of Kentucky Reservoir since the majority of DO measurements made by both PCA and TVA show DO levels above the Water Quality Standard of 5.0 ppm.*

*During a conversation with the Division, you indicated that DWR may perform sampling of the Tennessee River in this area during 2022. If DWR proceeds with the impairment listing during this review, the commentor encourages DWR to collect additional data and correlate that data with flows through Pickwick Dam. Such a study would hopefully provide information to demonstrate that the cause of low DO readings in the Reservoir is the result of water release patterns through Pickwick Dam.*

**Response:** We appreciate the data collected, reviewed, and submitted by the commentor. The commentor's data represented one data point per month at each site. As noted, low oxygen levels continue to be observed in both these and TVA data. At this time TDEC does not believe the available data captures the magnitude, frequency, and duration of the known dissolved oxygen criteria violations on an annual or diurnal basis sufficiently to support delisting this parameter at this time. TDEC welcomes any additional data, and will continue to explore better methodologies to evaluate the overall patterns of oxygen levels in this reach of the Tennessee River.

**Specific Comment 22:** *Commentor is concerned over the listings for 6 specific impaired waterbodies that show an entry in the "Source Name" column of the draft 2022 303(d) List as "Highways, Roads, Bridges, Infrastructure (New Construction)" or similar highway related entries, as follows : TN05130101015\_0700 - Straight Creek, Claiborne County; TN05130101015\_2000 - Clear Fork, Claiborne County; TN05130101046\_0200 - Bennett Fork, Claiborne County; TN05130202001T\_0900 – Overall Creek; Davidson County; TN05130203010\_0310 - Rock Spring Branch, Rutherford County; and TN05130204013\_0400 – Unnamed Trib to West Harpeth River, Williamson County.*

*A review of Construction General Permit records for these 7 locations does not indicate recent significant highway or road construction activities in any of these watersheds.*

**Response:** The silt impacting the Straight Creek, Clear Fork, and Bennet Fork in Claiborne County were due to construction of haul roads for individual coal mines rather than from county, state, or federal highway construction projects.

Overall Creek was previously impacted by new sewer line infrastructure construction, producing siltation impacts, and longer-term streamflow alterations, as covered by the source category.

Rock Springs Branch was previously impacted by a road widening project. However, a more long-term impact has been the placement of a sewer line that helped "sink" the stream. Both of these are construction of infrastructures covered by the source category. Since no new data were available during this assessment, the impairment status must remain.

The Unnamed Tributary to the West Fork Harpeth River was assessed as impacted by silt during the construction of State Route 840. We consider it likely that water quality in this stream has improved, but a follow-up survey needs to be done to support delisting. Any monitoring assistance the commentor could provide would be appreciated.

**Specific Comment 23:** *180 waterbodies have been identified in which the “Source Name” is listed as “Municipal Point Source Discharges” or “Municipal (Urbanized High Density Area)” and the commentor’s MS4 is the only MS4 in the listed county. The commentor does not believe that the inclusion of its MS4 as a source for the pollutant loading in these impaired waterbodies is in the best interest of the State of Tennessee and requests that the document be modified to remove the MS4 as a possible pollutant source.*

**Response:** TDEC uses EPA’s recommended categories found in the ATTAINS database to identify sources and “*Municipal Point Source Discharges*” cited by the commenter is specifically intended for Individual NPDES municipal point source dischargers, such as a municipal sewer plant outfall. “*Municipal (Urbanized High Density Area)*” cited by the commenter is specifically intended for nonpoint source urban runoff, whether or not the area is part of an MS4-permitted area, based on land use and aerial imagery. Neither listing implies that a specific MS4 outfall is a significant contributor of the listed parameter.

**Specific Comment 24:** *Legacy releases of hexavalent chromium contaminated groundwater into Mitchell Branch (TN06010207020\_1300) in Roane County were identified in 2007. A significant remedial investigation and corrective action was conducted to successfully capture and treat the contaminated hexavalent groundwater that was being released into Mitchell Branch. Sampling has been conducted on a quarterly basis for hexavalent chromium over the past 10 years immediately downstream of the release area at MIK 0.79 and at the Mitchell Branch exit pathway sampling location at the K-1700 weir. The K-1700 weir location is the final location before Mitchell Branch water enters Poplar Creek.*

*The significant number of results over the past 10 year period have shown no quarterly measurements that exceed the most restrictive ambient water quality criteria level of 11 µg/L. Based on the significant amount of data that shows the levels of hexavalent chromium continue to be well below the ambient water quality criteria for hexavalent chromium, we request that hexavalent chromium be removed as an impairment in the 2022 303(d) update for Mitchell Branch in Roane County.*

**Response:** TDEC has reviewed the most recent data from 2016-2021, and agrees with the commentor that all readings of hexavalent chromium from Mitchell Branch have been below the most stringent water quality criteria. Over 115 sampling events collected from six stations along Mitchell Branch, there were no readings above 11 µg/L. TDEC will propose delisting hexavalent chromium as one of the causes of impairments to the Fish & Aquatic Life designated use, and include this delisting on the 2022 List of Impaired and Threatened Waters.

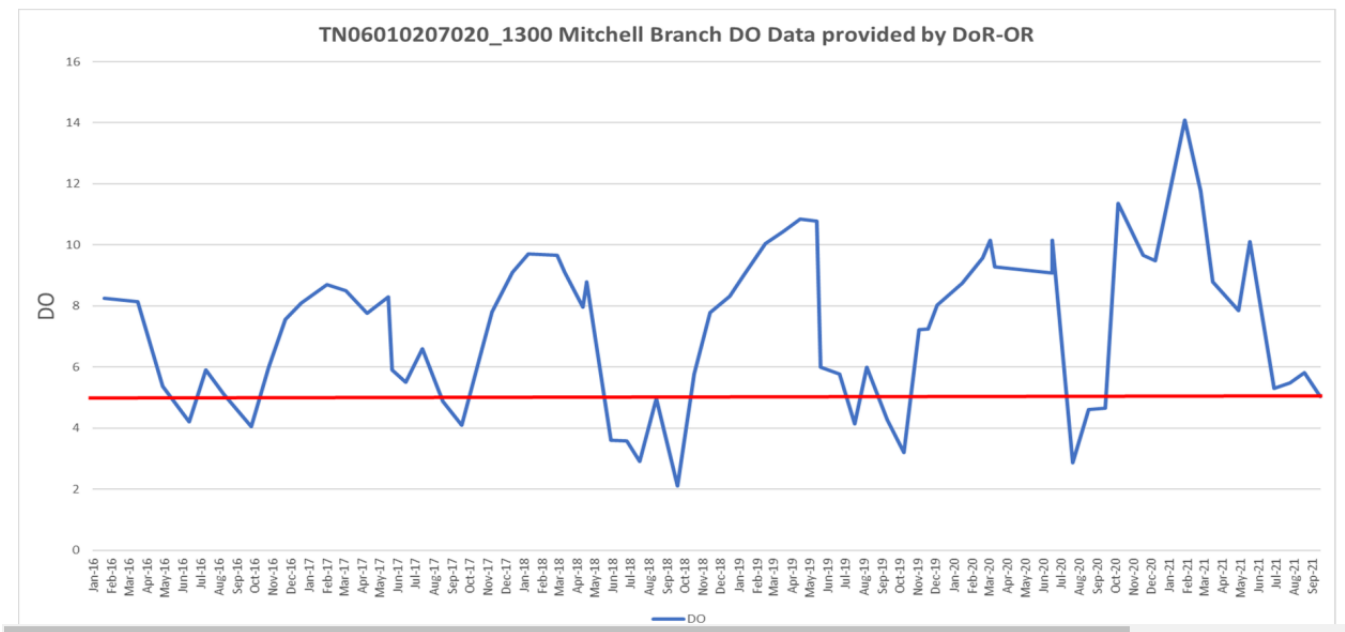
**Specific Comment 25:** *Dissolved oxygen was added as an impairment for Mitchell Branch (TN06010207020\_1300) in Roane County in the draft 2022 303(d) list update. We recommend this parameter be removed from the final 303(d) list due to the following.*

*Dissolved oxygen has been measured over the past 10 years at five surface water locations in the Mitchell Branch stream on a quarterly basis. The significant database of results over the past 10 year period for all five locations has shown very few measurements that were below the most restrictive ambient water quality criteria level of 5.0 mg/L. Over the past five years of*

quarterly sampling, there was only one sampling event in August of 2018 that was below the 5.0 mg/L level.

Based on this quarterly data, we request that dissolved oxygen not be added as an impairment in the 2022 303(d) update for Mitchell Branch in Roane County on the Oak Ridge Reservation.

**Response:** In addition to the data provided by the commentor, TDEC received and reviewed Mitchell Branch monitoring data from the Division of Remediation - Oak Ridge office. From 2016-2021 DoR-OR monthly sampling at RM 0.1 results showed multiple D.O. criteria violations, as illustrated in the graph below. The magnitude, frequency and duration of these criteria violations support listing of this parameter. TDEC recommends increased collaboration between agency monitoring efforts in Mitchell Branch, including collection of continuous monitoring data to provide more clarity on dissolved oxygen criteria exceedances in Mitchell Branch.



**Specific Comment 26:** Multiple commentors requested that nutrient impairment of the South Fork Holston (TN06010102001\_1000) be removed from the 2022 TN List of Impaired Waters.

**Response:** This assessment unit has been listed for Nutrient (Total Phosphorus) impairment for multiple assessment cycles. To remove this listing would require data that support the delisting process and contribute to a scientific data-driven delisting rationale. Currently, the available data used to assess this assessment unit do not support the delisting of this parameter at this time.

Commentors attached a copy of their previously submitted 2020 comments to support their request to remove nutrients as an impairment. The TDEC 2020 response to comments (see

Attachment A) goes into great detail in addressing these comments. TDEC has no new information that would change its position or response to the 2020 comments at this time.

**Specific Comment 27:** *As part of commentor's request to remove the listing of nutrients from the South Fork Holston (TN06010102001\_1000), the commentor provided monthly Total Phosphorus results for 2018-2021 with their comments. The mean value of all results provided is 0.049 mg/l. Commentor noted that the downstream nitrate/nitrite average in 2018-19 was 0.823 mg/l, suggesting that nitrogen would not be a contributing to biological impairment.*

**Response:** TDEC thanks the commentor for their continued data collection efforts. As covered in the previous 2020 responses to comments (see Attachment A), the correct ecoregional Total Phosphorus goal for these results should be 0.04 mg/l. The average of 0.049 mg/l provided by the commentor is still above this regional goal. The 0.823 mg/l downstream average for Nitrate/Nitrite is well below the ecoregional goal of 1.22 mg/l. However, these data do not shed any light on which nutrient species could be the limiting factor in the continued observed growth of algae and potential nutrient-related impacts to the stream.

Also of note, during this assessment cycle TVA provided data for Ft. Patrick Henry Reservoir, directly above this segment of the South Fork Holston River. Chlorophyll a values ranged from 3-42 µg/l with growing season averages (April-September) of 15 µg/l (2015), 21.8 µg/l (2016), 13 µg/l (2017), and 13.7 µg/l (2019). These data represent one data point at 4 ft depth rather than true profile data. This is notable as TDEC uses the mean of the photic zone composite Chlorophyll a to determine a daily value, therefore the mean Chlorophyll a levels in this reservoir may be even higher. Also, there were at least 14 pH criteria violations in the reservoir above the 9.0 pH value for lakes. Elevated pH is often indicative of lake eutrophication. More data and future collaborations with TVA and other stakeholders will be needed to further evaluate the nutrient condition of this lake. However, these data do show that the potential for nutrient loading and impacts below the dam in the South Fork Holston exist and need further consideration.

**Specific Comment 28:** *Commentor believes that the proposed change in from the previously listed impairment cause of "Total Phosphorous" to the more general "Nutrients" is in response to TDEC's realization that Phosphorous listing is not supported for the South Fork Holston (TN06010102001\_1000).*

**Response:** TDEC's decision to clarify the impairment parameter from Total Phosphorus to Nutrients is not specific to this assessment unit. The rationale for this listing clarification was implemented in the Draft 2022 List of Impaired and Threatened Waters and addressed for all segments impaired by nutrient species in the Group 2 and Group 3 watersheds. As more data and information related to nutrient impairment and its effects have been reviewed, it became clear that the Division was not adequately considering the potential for limiting nutrient species, and that time and resources are not available during the assessment process to make this determination. Therefore, a more general parameter listing of "Nutrients" was determined to be more appropriate. This concept was updated in the TN Consolidated Assessment and Listing Methodology document and added in the clarification rationale for these parameters.



**Specific Comment 29:** *Commentor states that TDEC data on % Nutrient Tolerant macroinvertebrate organisms shows improvement as you move downstream through the South Fork Holston River Segment \_1000 and past industrial and municipal point sources.*

**Response:** TDEC disagrees. In fact, these % nutrient tolerant values increase as you move downstream in the South Fork Holston River. This comment was also addressed in the 2020 response to comments (see Attachment A), and supported with the table below.

**Results of 2019 TDEC Biological Surveys in Vicinity of Segment 1000**

**Note: the station at Holston River mile 142 is just downstream of this segment**

Station	Location	EPT Taxa	Total Taxa	% Nutrient Tolerant Taxa	Tennessee Macroinvertebrate Index Score
SFHOL007.4SU	d/s Fort Patrick Henry dam near Holston Hills	1	17	19.5	22
SFHOL001.4SU	Tilthammer Shoals	7	34	30.5	30
SFHOL001.1SU	Ridgefield Bridge	8	25	63.2	22
HOLST142.0SU	Golf Course d/s North Fork Holston Confluence	9	36	40.8	28
HOLST131.5SU	Goshen Valley Road	12	33	35.3	38

Nutrient tolerant scores (%NuTol) are relatively low directly downstream of Fort Patrick Henry Dam, but then rise dramatically downstream of the dischargers. The lowest TMI score – and highest %NuTol score – occurred at mile 1.1. At this station, almost two-thirds (63.2%) of the individuals were classified as nutrient tolerant.

**Specific Comment 30:** *The commentor requests that the rationale for selenium impairment on the South Fork Holston (TN06010102001\_1000) be made public for review.*

**Response:** As stated in the TN Consolidated Assessment and Listing Methodology (CALM): “According to EPA guidance, numeric chronic fish and aquatic life protection criteria should not be exceeded more than once in a three year period. This time interval presents an

implementation challenge to staff, as our chemical sampling normally is on a five year cycle. Where TDEC has multiple years of chemical data at a site - such as ambient and reference stations, or sites where dischargers collect and submit instream data - we will follow the one exceedance every three years guidance for establishing use impairment. In the more common occurrence where we have a year's worth of data every five year cycle, we will not List if only one exceedance, but will consider impaired if a chronic criterion is violated twice."

The chronic criterion for Selenium is 3.1 µg/l. Data collected in the South Fork Holston at river mile 1.4 in 2016-2017 show two results above 3.1 (5.2 and 5.5 µg/l). Therefore, due to these chronic criteria violations TDEC is obligated to list this assessment unit as impaired due to elevated selenium.

**Specific Comment 31:** *It appears that as part of TDEC's overall efforts to refine the listings for nutrient-related parameters from the listing of specific nutrient species such as "Nitrate-Nitrite" or "Total Phosphorus" to the listing of more general "Nutrients", two segments for which this change was made were missing from the "Listing Clarification" tab on the draft 303d impaired waters spreadsheet. These are Mill Creek (TN05130108033\_0410) and Cherry Creek (TN05130108043\_0100).*

**Response:** TDEC has corrected these inadvertent omissions on the "Listing Clarification" tab in Tennessee's 2022 *List of Impaired and Threatened Waters* spreadsheet.

# **ATTACHMENT A**

## **Tennessee Department of Environment and Conservation**

### **Proposed Final Version of the 2020 List of Impaired Waters**

#### **Summary of Public Comments and Departmental Responses**

(Note: Comments submitted during the public review period in regard to topics not directly related to the 2020 List of Impaired Waters are not included in this document. These topics include comments about the economic impact of listings, NPDES permit limits, the TMDL process in general, or a specific TMDL. Comments about water quality standards have only been included if related to a specific assessment. In some instances, public comments have been summarized in order to group similar observations by multiple reviewers.)

#### **General Comments**

##### **General Comment 1: *How can the public access the data used by TDEC in assessments?***

**Response:** Most of the department's data are public facing in the Waterlog database, which can be accessed on our website: <https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-resources-data-map-viewers.html>

##### **General Comment 2: *TDEC should not create a proposed final 2020 List of Impaired Waters to submit to EPA until the additional concerns, data, information or studies cited by the commenter(s) are used to reassess the stream of particular interest to the commenter. There are important economic or developmental ramifications to the current assessment.***

**Response:** The draft 2020 List is different from the 2018 version in that it incorporates the results of the Group 5 and Group 1 reassessments. In several instances, commenters submitted or referenced additional studies on February 14 they feel should be used to reassess Group 2 or Group 3 waterbodies prior to submission of a proposed final version to EPA.

Commenters should note that TDEC had previously published a public notice requesting Group 2 water quality data. This public notice was issued in April 2019.

In order to provide the maximum amount of public review of the List of Impaired Waters, but still meet the federal statutory deadline for state submission of April 1, 2020, the department published the public notice on November 15, 2019, set the public hearing for January 2, 2020, and established the deadline for submitting comments on February 14. Many of these comments were received on February 14. This schedule, while benefiting the public, only left the department with a little over a month to summarize comments, prepare and finalize responses, and coordinate with EPA.

Some of the reports/surveys/models cited by commenters are in the possession of the department and some are not. Given the critical time constraints and the magnitude of some of the specific reassessments requested, we do not have adequate time to compile, analyze and reassess data for these waterbodies.

Additionally, we do not think reassessment efforts would be improved by haste and have serious doubts that EPA would approve such a process. We agree with the commenters that these are critically important assessment decisions, but that logic argues for a more deliberate approach. We invite the commenters to submit the data they cited in their comments, but we prefer to stick to the published watershed cycle on these very important waterbodies.

**General Comment 3: *Having a pollutant source for an impaired stream identified as “Discharges from an MS4 Area” or “Urban Runoff” triggers requirements under the MS4 permit.***

**Response:** We do not agree. Requirements under the Municipal Separate Storm Sewer System program are triggered by the applicable permit, rather than by TDEC’s identification of sources in the draft 2020 List of Impaired Waters. Comments about these requirements would be most appropriate during the MS4 permit renewal process.

**General Comment 4: *A publication written by USGS documented that habitat alteration of a stream was a much more important cause of loss of biointegrity than nutrients.***

**Response:** We are familiar with the publication in question. The streams researched in this case study were channelized and otherwise significantly altered by agricultural activities. The department does not dispute that habitat quality plays an important role in biointegrity scores, but state and federal law require our water quality assessment efforts to identify all parameters violating water quality criteria, including nutrients. We do not believe USGS is advocating ignoring other pollutants.

**General Comment 5: *Tennessee’s water quality criterion for nutrients is subjective and thus is implemented subjectively by the department.***

**Response:** It is true that the criterion for nutrients is narrative rather than numeric. However, it’s important to note that EPA approved the nutrient criterion as currently written. Although

historical nutrient assessments have been appealed to Region 4, EPA has never disapproved any of our proposed listings or delistings on any basis, including allegations that we misapplied our criteria.

The department would prefer- and recommended during the last triennial review – that the narrative criterion be modified to be more specific as to the factors utilized in the assessment process, but these efforts failed in the face of significant opposition. Ironically, opposition to making the criterion more specific has at times come from commenters who then suggest implementation is subjective.

Since the authority to promulgate water quality criteria resides with the Tennessee Board of Water Quality, Oil and Gas, the department's responsibility is to apply the existing nutrient criterion as consistently as possible. Guidance, plus written policies like the Consolidated Assessment and Listing Methodology (CALM), assist staff in the development of non-subjective measures. These documents are available for reference on the department's website.

**General Comment 6: *Tennessee's fish and aquatic life protection narrative water quality criterion for nutrients can be violated two ways: (1) the growth of algae is stimulated to the point it interferes with habitat, or (2) biointegrity is impacted.***

**Response:** We agree, but there is also a third way. If nutrients in a waterbody cause or contribute to harm in a downstream waterbody, that is also a violation.

**General Comment 7: *Tennessee should consider ratios of total nitrogen to total phosphorus in assessing water quality.***

**Response:** TDEC thanks the commenter for this suggestion. TDEC very seldom samples for total nitrogen, preferring to analyze for the various forms of nitrogen, such as nitrate+nitrite, ammonia, and total kjeldahl nitrogen.

**General Comment 8: *The department's Consolidated Assessment and Listing Methodology states that a stream meeting the biointegrity criterion based on TMI score should not be assessed as impaired due to siltation.***

**Response:** That's not exactly what the CALM says. Here is the actual passage from page 35 of the document:

*Ecoregions vary in the amount of silt that can be tolerated before aquatic life is impacted. Through work at reference streams, staff found that the appearance of excessive sediment/silt is often, but not always, associated with loss of biological integrity. Thus, for water quality assessment purposes, it is important to establish whether or not aquatic life is being impaired. For those waterbodies where loss of*

*biological integrity can be documented, the habitat assessment can determine if this loss is due to excessive silt deposits.*

Departmental biologists have learned through experience that methods like a Semi Quantitative Single Habitat survey (SQSH) which targets riffles may dramatically underestimate impacts from silt, which due to scour tends to accumulate in pools rather than riffles. That is why the passage cited clearly states that excessive silt is not always associated with loss of biological integrity.

The commenter is additionally reminded that suspended solids has its own “free from” criterion in Rule 0400-40-.03(3)(c).

**General Comment 9: *Treated effluent discharged from well operated sewage treatment plants actually improves, rather than impacts streams.***

**Response:** Streams that do not violate water quality criteria, including those with domestic wastewater discharges, are in no danger of being listed as impaired.

**General Comment 10: *TDEC’s selection methodology for reference streams is scientifically flawed and causes nutrient impacted streams to be under represented in the Draft List.***

**Response:** Reference streams are least-impacted waters that must also be representative of the subecoregion they are in. The commenter is correct that in some regions in Tennessee, the reference condition includes higher concentrations of nutrients compared to other areas of the state. However, the value of even these reference streams for setting attainable regional goals is important.

The commenter is reminded that EPA not only approved the reference stream approach to clean water goalsetting, they recommended this approach to states. EPA approved the nutrient criteria Tennessee developed based on the reference stream approach and took the unusual step of placing two TDEC employees, Dr. Sherry Wang and Greg Denton, on its National Stream Nutrient Criteria Work Group. TDEC considers this validation of the work we did.

We are always open to recommendations of new reference streams as many historical stations have been lost due to new pollutant sources or habitat alteration.

**General Comment 11: *TDEC has misapplied EPA guidance in setting nutrient criteria.***

**Response:** This is a water quality standards comment rather than an assessment comment. Please see the previous response.

**General Comment 12: *In setting regional total phosphorus and NO<sub>2</sub>+NO<sub>3</sub> goals, TDEC used the 90<sup>th</sup> percentile of reference data rather than the more protective 75<sup>th</sup> percentile. By making this choice, TDEC deliberately decided to be less protective than Tennesseans deserve.***

**Response:** This is a water quality standards comment rather than a water quality assessment comment and was submitted in previous listing cycles. This was the department's response at that time and has not changed:

TDEC's goal in criteria setting is to be appropriately protective. The commenter is directed to the 2001 study entitled "Development of Regionally-based Interpretations of the Narrative Nutrient Criterion" for an explanation for how these protection levels were selected.

[https://www.tn.gov/content/dam/tn/environment/water/documents/nutrient\\_final.pdf](https://www.tn.gov/content/dam/tn/environment/water/documents/nutrient_final.pdf)

As part of the study, TDEC ground-truthed the 75<sup>th</sup> and 90<sup>th</sup> percentiles to see which concentration level most accurately predicted biological harm. The conclusion of that work was that the 75<sup>th</sup> percentile of the reference condition was an inaccurate predictor of biological harm and thus overly-protective. The 90<sup>th</sup> percentile was found to be more accurate.

Tennessee's regional approach was (1) based on methods suggested by EPA, (2) peer reviewed by national experts, (3) promulgated as rule in an open process that incorporated public review and comments, and (4) approved by EPA.

**General Comment 13: *The commenter is concerned with the reference stream approach for dissolved oxygen criteria, but believes TDEC has applied the criterion properly in the stream of concern to them.***

**Response:** This is a water quality standards comment rather than an assessment comment, but TDEC notes that the criterion for dissolved oxygen is 5 mg/L in most parts of the state. In some of the other areas of the state like the Blue Ridge Mountains, the criterion is actually set higher. These more stringent criteria were based on the reference stream approach the commenter objects to.

**General Comment 14: *When TDEC receives a "greater than" result for a pathogen sample, the agency doesn't really know how high the result really was. Performing follow-up dilutions would help solve this problem.***

**Response:** We often do request dilution when samples are from waters likely to have significantly elevated pathogens. But the blanket approach advocated by the commenter has a clear downside: if a diluted sample has low pathogen level, the result is reported as <100

cfu. “Less than” results cannot be used to calculate geometric means, which also impacts our ability to accurately apply criteria.

The commenter should also be aware with the very short holding times associated with pathogen samples, each can be run only once, not multiple times at various dilutions.

Additionally, such an approach would dramatically raise laboratory costs. In the calendar year 2019, the division sent 4,095 *E. coli* samples to the laboratory (including QA/QC samples). At a cost per analysis rounded to \$30, the cost to the program budget was \$122,885. Running duplicates for each pathogen sample – even at only one additional dilution - would double these analytical costs.

**General Comment 15: *When TDEC receives a “greater than” result for a pathogen sample, which is frequently reported as “>2019 cfu,” the agency cannot tell if the fish and aquatic life pathogen criterion (2880 cfu) is being met.***

**Response:** The commenter is correct, but is referred to the previous response. For additional perspective, less than 3% of all *E. coli* samples in 2019 were reported as “greater than.”

**General Comment 16: *TDEC should consider using a more conservative criterion for streams actively used by the public for contact recreation.***

**Response:** This is a water quality standards comment rather than an assessment comment. As the commenter may be aware, Exceptional Tennessee Waters and lakes have a lower single sample maximum *E. coli* criterion than do other waters. Revising this approach as envisioned by the commenter would need to be promulgated in Rule by the Tennessee Board of Water Quality, Oil and Gas. It’s not something TDEC can just decide to do on its own.

**General Comment 17: *TDEC assessed multiple streams (list provided by commenter) as being impacted by pollutants from “Municipal Point Source Discharges.” Is TDEC referring to MS4 outfalls in this source category?***

**Response:** Thank you for the opportunity to clarify. TDEC uses EPA’s recommended categories found in the ATTAINS database to identify sources and the one cited by the commenter is specifically intended for municipal sewage treatment plant outfalls.

**General Comment 18: *TDEC assessed multiple streams (list provided by commenter) as being impacted by pollutants from “Urban Runoff.” Is TDEC referring to MS4 outfalls in this source category?***



**Response:** Thank you for the opportunity to clarify. TDEC uses EPA's recommended categories found in the ATTAINS database to identify sources and the one cited by the commenter is specifically intended for nonpoint source urban runoff.

**General Comment 19:** *The commenter would like a personal response from the department.*

**Response:** During the public review process, it is important that comments be addressed in a public forum so that other participants may benefit from the comments submitted by others and TDEC's response. Staff can be contacted if additional elaboration regarding responses is needed or desired.

Any commenter who feels their concerns were not adequately addressed by TDEC may also seek EPA's assistance in their role as approver of the List.

**General Comment 20:** *TDEC is too slow in developing TMDLs.*

**Response:** This is not a comment specifically about the assessment process.

**General Comment 21:** *It should be easier for the public to tell what has changed from a previous list to a new version.*

**Response:** TDEC appreciates this suggestion. It is our understanding that EPA is developing new reporting tools in the ATTAINS database that will make this task easier to accomplish.

**General Comment 22:** *How often does TDEC update the public-facing mapviewer with new water quality assessments?*

**Response:** This update is done following the assessment of a new watershed Group, so usually once per year.

**General Comment 23:** *When does the public get to comment on assessment changes in odd numbered years?*

**Response:** These mid-cycle watershed group assessments will be included in the List published in even-numbered years.

**General Comment 24:** *How are delistings identified for the public?*

**Response:** Appendix A contains a rationale for every parameter that is being delisted.

**General Comment 25: *Does TDEC put biological data on its dataviewer? Are data from other agencies or the regulated community on the dataviewer?***

**Response:** Biological data are not yet public facing, but we are working to accomplish this. When completed, biological data from other entities will be public facing, if appropriate TDEC QA/QC review measures are passed.

TDEC does not place other Agency or regulated community chemical data on its dataviewer, other than DMR data from dischargers. The commenter can contact these other entities for their data.

Some biological data, such as taxa lists, are available on EPA's database, WQX.

**General Comment 26: *TDEC does not identify all sources of a pollutant.***

**Response:** The commenter is correct. TDEC does not identify all of the possible sources of a pollutant during the assessment and listing process. Staff lists the most significant potential sources that can be identified during the sampling event or as part of the assessment process. The TMDL process is designed to provide a more in depth source analysis and determine the percent of pollutant contribution by each source. In order to provide more clarification, TDEC will modify the column header on the 2020 Tennessee List of Impaired and Threatened Streams from Source\_Name to Potential\_Source\_Name.

## Specific Comments

**Specific Comment 1: *Goose Creek (TN05130108002-0200) is identified as being in Smith County when it is actually only in Wilson and DeKalb counties.***

**Response:** The commenter is correct and we will make this revision.

**Specific Comment 2: *Rock Creek in Claiborne County (TN05130101015\_0710) is assessed as impacted by silt from Highway/Road/Bridge/Infrastructure Construction. Is this correct?***

**Response:** The silt impacting this stream was due to haul roads for individual coal mines rather than from county, state, or federal highway construction projects. Rock Creek is a tributary to Straight Creek. (See next comment.)

**Specific Comment 3: *Straight Creek in Claiborne County (TN05130101015\_0700) is assessed as impacted by silt from Highway/Road/Bridge/Infrastructure Construction. Is this correct?***

**Response:** The silt impacting this stream was due to haul roads for individual coal mines rather than from county, state, or federal highway construction projects. Straight Creek is a tributary to Clear Fork. (See next comment.)

**Specific Comment 4: *Clear Fork in Claiborne and Campbell counties (TN05130101015\_2000) is assessed as impacted by silt from Highway/Road/Bridge/Infrastructure Construction. Is this correct?***

**Response:** The silt impacting this stream was due to haul roads for individual coal mines rather than county, state, or federal highway construction projects.

**Specific Comment 5: *Bennett Fork in Claiborne County (TN05130101046\_0200) is assessed as impacted by silt from Highway/Road/Bridge/Infrastructure Construction. Is this correct?***

**Response:** The silt impacting this stream was due to haul roads for individual coal mines rather than county, state, or federal highway construction projects.

**Specific Comment 6: *Drivers Branch in DeKalb County (TN05130108004\_0110) is assessed as impacted by silt from Highway/Road/Bridge/Infrastructure Construction. Is this correct?***

**Response:** The assessment is correct. The headwaters of Drivers Branch were buried by construction debris from the widening of U.S. Highway 70 between Smithville and Dowelltown.

**Specific Comment 7: *The draft 2020 List of Impaired Waters identifies a segment of Percy Priest Reservoir (TN05130203003\_2000) as being threatened by phosphorus. The Division should provide a rationale for this listing. The commenter will consider the assessment to be “subjective and without merit” if this rationale is not provided.***

**Response:** The commenter is correct that the upper portion of Percy Priest Reservoir is currently listed as “threatened.” According to EPA guidance, threatened waters are those where a documented trend indicates that water quality standards will be violated before the

next Listing cycle. This assessment was consistent with TDEC's published CALM and was reviewed and approved by EPA in 2017.

In regard to a rationale, the following was provided in the Department's responses to comments on this topic in 2016:

The commenter is correct that excessive algal biomass due to elevated nutrients caused water quality and water treatability problems in J. Percy Priest in the summer of 2016. Corps of Engineers measurements of chlorophyll *a* at a depth of 5 feet in the East Fork Stones River embayment measured 39 ug/L in June, 17.2 ug/L in August, & 17.4 ug/L in September. Equivalent data in the West Fork Stones River embayment measured 29.7 ug/L in June, 16 ug/L in August, & 30.7 ug/L in September.

Secchi disk transparency measurements at these stations ranged between 0.6 and 0.9 meters.

According to Carlson's Trophic State Index, chlorophyll *a* levels over 20 ug/L and secchi disk levels below 2 meters indicate eutrophic conditions. Chlorophyll *a* levels over 50 ug/L and secchi disk levels less than 0.5 meters indicate hypereutrophic conditions.

These documented biomass levels and water treatment issues indicate that the designated uses of domestic water supply and recreation are not fully supported. We will assess the section of J. Percy Priest Reservoir upstream of Jefferson Pike (Hwy 266) as "threatened." We will continue to follow the Corps 2017 data to see if this assessment needs to be maintained or revised.

As Percy Priest Reservoir is within a Group 2 watershed, it will be reassessed in 2020. While we are happy to explain a historical assessment decision, we think it would be more fruitful to take a fresh look at the water column profile data collected each year by the U.S. Army Corps of Engineers. We consider these data, which go back multiple years, to be our best opportunity to establish biomass trends in Percy Priest Reservoir.

***Specific Comment 8: Percy Priest Reservoir (TN05130203003\_1000 & 2000) is located in an area that is naturally very high in phosphorus.***

**Response:** We agree. However, there are many anthropogenic (man-induced) sources of nutrients as well. Much of the watershed in this rapidly developing area has been disturbed, either for development or agricultural uses. This land disturbance, plus point source dischargers, has certainly contributed to the pollutant loading to the lake.

Even if the violations of water quality standards were entirely due to natural sources, that does not argue for the authorization of increasing discharges of the same pollutant. Regardless of source, the 2020 List of Impaired Waters is a compilation of waters that violate, or appear likely to soon violate, water quality criteria. Percy Priest Reservoir is in a Group 2 watershed, so it will be reassessed in 2020.

**Specific Comment 9: *Dye studies prove that effluent from a sewage treatment plant in the watershed of Percy Priest Reservoir (TN05130203003\_1000 & 2000) remains in the metalimnion and cannot be considered a source for the excess biomass in the epilimnion and the resulting strong stratification of the lake.***

**Response:** We thank the commenter for this observation, but note that as the upper part of the reservoir is considered “threatened” rather than impaired, no sources of pollutants are currently identified. We additionally note that this frequently observed strong stratification of the water column - also documented by the commenter - is an important indicator of organic enrichment, regardless of source. The Group 2 waterbodies will be reassessed in 2020.

**Specific Comment 10: *The commenter collected phosphorus samples in middle and upper levels of Percy Priest Reservoir and documented low levels. The lake should no longer be considered threatened.***

**Response:** Phosphorus is readily taken up by algae, so the results of water column sampling might be misleading. TDEC considers the measurement of response variables such as chlorophyll a, light transmission, diel dissolved oxygen swings, and pH levels to be superior methods to gage nutrient impacts in lakes.

We noted with interest that in the commenter’s Percy Priest Lake nutrient data, the primary nitrogen forms were either ammonia in the lower depths or total kjeldahl nitrogen, rather than the oxygenated forms, NO<sub>2</sub>+NO<sub>3</sub>. Could this be an indication of water column oxygen issues in the reservoir?

**Specific Comment 11: *Rock Spring Branch (TN05130203010\_0310) near Smyrna is assessed as impacted by silt and habitat alteration, with an identified source of Highway/Road/Bridge/Infrastructure. Is this correct?***

**Response:** This stream was previously impacted by a road widening project. However, a more long-term impact has been the placement of a sewer line that helped “sink” the stream. Both of these are construction of infrastructure covered by the source category.

**Specific Comment 12: *Puckett Creek (TN05130203015\_0100), Sinking Creek (TN05130203018\_0100), and Bear Branch (TN05130203023\_0310) in Rutherford County should be reassessed.***

**Response:** The Stones River watershed will be reassessed in 2020. We are currently in the process of compiling all the available data in order to reconsider use support status. We request that the commenter submit the data they referenced in this comment, including taxa lists, so that these results can be reviewed and incorporated into the assessment process.

**Specific Comment 13:** *The most downstream segment of the West Fork Stones River (TN05130203018\_1000) is identified as being impacted by pathogens. The Draft 2020 List identified two sources of pathogens: Failing Collection Systems and Urbanized High Density Area. The Division previously agreed to remove Failing Collection System as a source, but has now re-added it. Additionally, municipal urban runoff should be not be cited, as the pathogen source is likely animal rather than human.*

**Response:** At the time this comment was originally made, data were being stored in EPA's Assessment Database (ADB). The commenter is correct that the Department previously removed collection system failure as a source in response to this comment. However, in converting the Group 2 data from the old ADB system to EPA's new ATTAINS database, the retrieval inadvertently captured the old assessment information for this segment. We thank the commenter for catching this retrieval issue and regret the confusion it may have caused.

While preparing to respond to this comment, staff reviewed the most recent pathogen data collected at the historical ambient monitoring station at Mile 6.2 of the West Fork Stones River. Ambient monitoring stations are sampled multiple times each year, unlike other stations which may be collected only during the watershed five year monitoring cycle.

Here is our ATTAINS summary of these recent pathogen data:

2017-2019 TDEC chemical station at mile 6.2 (Nices Mill). One out of 20 *E. coli* observations over 941 cfu. July-August 2017 geo mean of 5 observations = 120 cfu.

As a Group 2 watershed, the West Fork of the Stones River will be reassessed in 2020. Once we are certain we have all readily available data, we will see if this segment of the river could be delisted for *E.coli*. In the meantime, we agree with the commenter that "pasture grazing" should be added as an additional source of pathogens to this segment. We will make this change in the proposed final version of the List.

**Specific Comment 14:** *Data collected by the commenter indicate the most downstream segment of the West Fork Stones River (TN05130203018\_1000) is meeting the fish and aquatic life biointegrity criterion and should be delisted.*

**Response:** This segment is neither currently assessed nor listed as impacted for fish and aquatic life.

**Specific Comment 15:** *The West Stones River (TN05130203018\_2000) is located in an area that is naturally very high in phosphorus.*

**Response:** We agree. As stated previously in regard to J. Percy Priest Reservoir, there are many anthropogenic (man-induced) sources of nutrients as well. Much of the watershed in this

rapidly developing area has been disturbed, either for development or agricultural uses. This land disturbance, plus point source dischargers, has certainly contributed to the pollutant loading to the river.

Even if the violations of water quality criteria were entirely due to natural sources, that does not argue for the authorization of increasing discharges of the same pollutant. Regardless of source, the 2020 List of Impaired Waters is a compilation of waters that violate, or appear likely to soon violate, water quality criteria. The West Fork Stones River is in a Group 2 watershed, so it will be reassessed in 2020.

**Specific Comment 16: *Data collected by the commenter indicate segment (TN05130203018\_2000) of the West Fork Stones River is meeting the fish and aquatic life biointegrity criterion.***

**Response:** As a Group 2 watershed, the West Fork Stones will be reassessed in 2020. We are currently in the process of compiling all the available data in order to reconsider use support status. We request that the commenter submit the data they referenced in this comment, including taxa lists, so that these results can be reviewed and incorporated into the assessment process.

**Specific Comment 17: *The Department has assessed the two downstream segments of the West Fork Stones River (TN05130203018\_1000 & 2000) as impacted by siltation, which is incorrect.***

**Response:** As stated previously, Segment 1000 of the West Fork Stones River is currently assessed as supporting the fish and aquatic life use. As a Group 2 watershed, the West Fork Stones River will be reassessed in 2020. We are currently in the process of compiling all the available data in order to reconsider use support status. We request that the commenter submit the data referenced in this comment, including taxa lists, so that these results can be reviewed and incorporated into the assessment process.

**Specific Comment 18: *The Department has assessed West Fork Stones River Segment 2000 as impacted by nutrients (total phosphorus and nitrate+nitrite), which is incorrect.***

**Response:** As a Group 2 watershed, the West Fork Stones will be reassessed in 2020. We are currently in the process of compiling all the available data in order to reconsider use support status. We request that the commenter submit the data referenced in this comment, including taxa lists, so that these results can be reviewed and incorporated into the assessment process.

**Specific Comment 19:** *The commenter has prepared an assimilative capacity study of the West Fork Stones River that indicates that a source named as contributing pollutants actually helps water quality in the river.*

**Response:** The department just recently received this document, so it would be premature to respond regarding its applicability to the current assessment. As a Group 2 watershed, the West Fork Stones River will be reassessed in 2020. We are currently in the process of compiling all the available data in order to assess use support status.

**Specific Comment 20:** *Did TDEC utilize pathogen data collected by Metro Nashville to assess the State Scenic River section of the Harpeth River?*

**Response:** Yes. We appreciate their willingness to share data.

**Specific Comment 21:** *In Appendix A, TDEC states that moving the discharge point of the sewage treatment facility improved conditions in Lynnwood Creek (TN05130204016\_0100). Moving the discharge would not improve habitat. Further, Lynnwood STP always discharged into the Harpeth River.*

**Response:** We will revise the rationale for this segment in Appendix A.

**Specific Comment 22:** *Failing septic tanks should be added as a source of pathogens to Lynnwood Creek.*

**Response:** We will investigate this possibility prior to the next assessment cycle. TDEC considers the source “urban runoff” to encompass all pathogen sources within an urban area, including houses that may not have connected to available sewer lines.

**Specific Comment 23:** *A commenter believes that nitrogen should be added to the causes assigned to multiple sections of mainstem Harpeth River.*

**Response:** This comment was previously made in 2014. Here was TDEC’s response at the time, which is still our position.

When assessing this watershed, we looked at nutrient levels carefully. Clearly, nitrate+nitrite levels in the Harpeth are not of the same magnitude as total phosphorus. It appears to us that the commenter applied the division’s regional numeric interpretation (0.92 mg/L) of the narrative nutrient criterion as if it was an acute, not to be exceeded criterion. According to our guidance, the regional number is more like a chronic criterion to be compared to average nutrient levels.



We consider the nutrient of concern in the Harpeth River to be primarily total phosphorus.

Additionally, the commenter appears to have compared total nitrogen levels in the Harpeth to TDEC's regional goals for nitrate+nitrite, which is not a valid comparison. If the commenter was actually comparing total nitrogen concentrations to EPA's national criteria, they should be mindful that Tennessee promulgated alternate criteria, an approach EPA recommended and has approved.

**Specific Comment 24:** *If TDEC had adopted EPA's national criterion of 0.73 mg/L for total nitrogen, the Harpeth River would be listed for that pollutant.*

**Response:** As stated previously, EPA actively encouraged states to research and promulgate nutrient criteria based on local conditions in "least-impaired" streams. That is the approach taken by Tennessee and many other states.

**Specific Comment 25:** *TDEC should not delist Harpeth River segment TN05130204016-2000 for pathogens based on results collected at mile 85.5 (upstream Spencer Creek). One of the results was >2420 cfu, while another one measured 641 cfu.*

**Response:** We appreciate this comment, but do not agree. TDEC staff collected monthly *E. coli* samples from July 2016 to June 2017. The commenter is correct regarding the specific results of two samples collected at this station. However, we must add that nine other samples were less than 200 cfu. Only one result was over the single sample maximum and our rules allow us to give rain event samples less weight.

**Specific Comment 26:** *Appendix A did not include a rationale for the delisting of Harpeth River segment TN05130204016-2000 for pathogens.*

**Response:** The commenter is correct and we regret this oversight. We will amend Appendix A to include this information.

**Specific Comment 27:** *TDEC should consider sampling pathogens at Station HARPE089.1WI.*

**Response:** We appreciate this recommendation. The commenter should note that TDEC has recent Harpeth River pathogen data collected at both mile 85.5 and mile 89.7.

**Specific Comment 28:** *An Unnamed Trib to West Harpeth River (TN05130204013\_0400) is assessed as impacted by silt, with an identified source of Highway/Road/Bridge/Infrastructure. Is this assessment correct?*

**Response:** This stream was assessed as impacted by silt during the construction of State Route 840. We consider it likely that water quality in this stream has improved, but a follow-up survey needs to be done. Any assistance the commenter could provide would be appreciated.

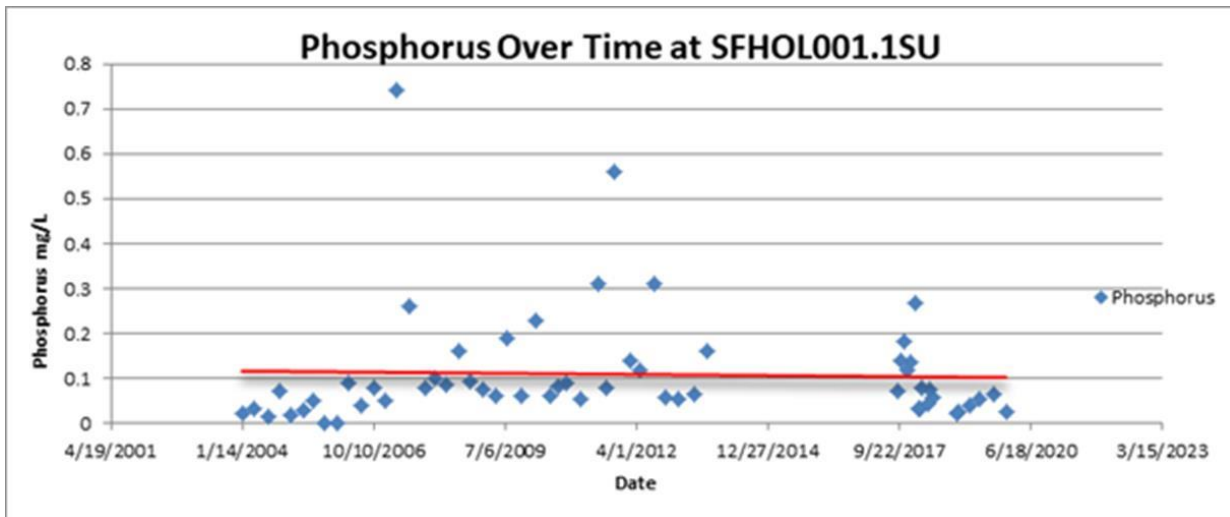
**Specific Comment 29:** *TDEC should schedule additional sampling of pathogens in the Harpeth River headwater areas around Eagleville.*

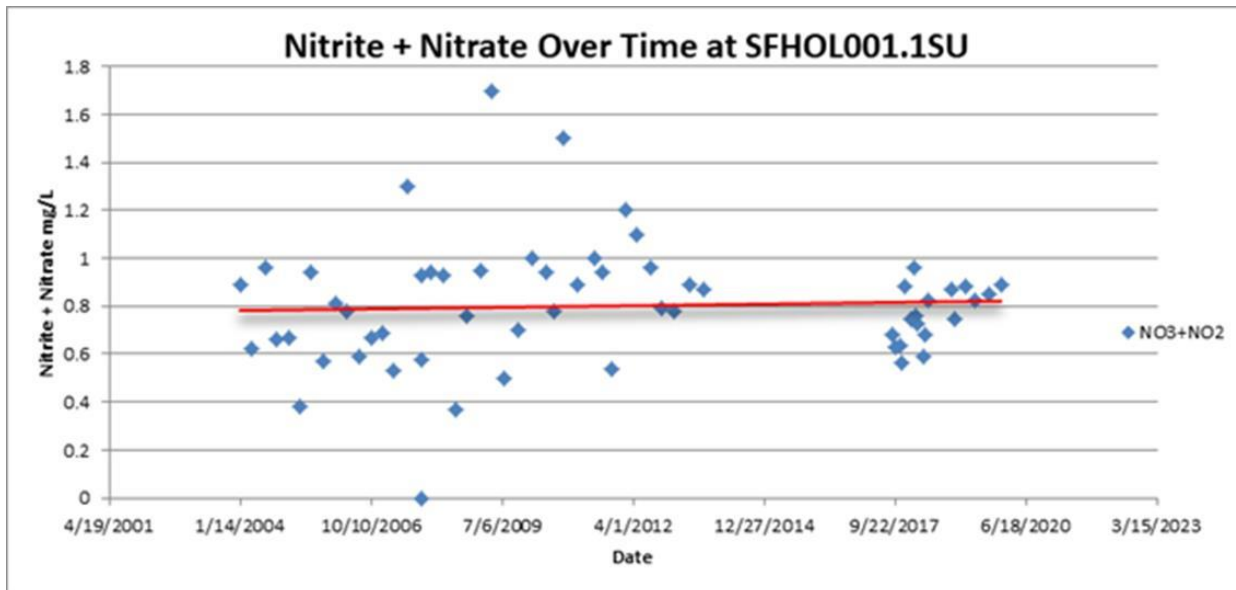
**Response:** We appreciate this recommendation.

**Specific Comment 30:** *Phosphorus concentrations in South Fork Holston River segment TN06010102001\_1000 are lower than previously documented. None of the 2019 total phosphorus observations were over 0.09 mg/L at the stations at mile 1.1 and 1.4.*

**Response:** We acknowledge the appearance of reduced concentrations in 2019, but we are not sure that constitutes a trend. In a previous response, we reminded commenters about EPA’s requirement that we consider “all readily available data.” In a later response we will address the regional total phosphorus goal for this waterbody.

The station with the longest and most consistent sampling history is our ambient monitoring site at Ridgefield Bridge. Following are graphs of both total phosphorus and nitrate+nitrite results over time at this station.





(Note: the gap in sampling from 2014 to 2017 was due to the alternate sampling at the station at mile 1.4, Tilthammer Shoals)

There is no obvious trend in these levels that we can see, but we do acknowledge that recent concentrations have helped slow the previously noted steady increases in these levels. If nutrient levels are in fact decreasing, that's a welcome sign, but we have learned from experience that slight differences from year to year may be due to flow levels and other factors.

If phosphorus loadings to the South Fork Holston have not decreased, we consider it unlikely that water concentrations have significantly decreased.

**Specific Comment 31: Commenters agree that South Fork Holston River Segment 1000 is impaired, but the data do not support the listing of total phosphorus as a cause. Total phosphorus should be delisted.**

**Response:** The department thanks the commenters for the submission of additional information. This segment of the South Fork Holston River is already listed for total phosphorus, an action that took place in 2016. In 2017 and 2018, TDEC explained its weight-of-evidence approach to assessing nutrient impairment, consistent with its published CALM. These factors in general include nutrient concentrations, population dominance by taxa tolerant to excess nutrients, exaggerated diel dissolved oxygen swings, and visual documentation of algae.

TDEC is also working on a diatom index in conjunction with EPA and several other states.

So in 2020, can the river be delisted for this pollutant? The basis for such a delisting would be that the water quality standard for total phosphorus is now being met. In order to do that, the stream would have to improve.

This portion of the South Fork Holston is a Group 3 watershed, thus is scheduled to be formally reassessed in late 2020/early 2021. In the meantime, the biological results and observations the department collected in 2019 are instructive.

The following table provides the results of biological surveys performed by the department in 2019, surveys that were observed by representatives of the commenters.

### Results of 2019 TDEC Biological Surveys in Vicinity of Segment 1000

**Note: the station at Holston River mile 142 is just downstream of this segment**

Station	Location	EPT Taxa	Total Taxa	% Nutrient Tolerant Taxa	Tennessee Macrobenthic Index Score
SFHOL007.4SU	d/s Fort Patrick Henry dam near Holston Hills	1	17	19.5	22
SFHOL001.4SU	Tilthammer Shoals	7	34	30.5	30
SFHOL001.1SU	Ridgefield Bridge	8	25	63.2	22
HOLST142.0SU	Golf Course d/s North Fork Holston Confluence	9	36	40.8	28
HOLST131.5SU	Goshen Valley Road	12	33	35.3	38

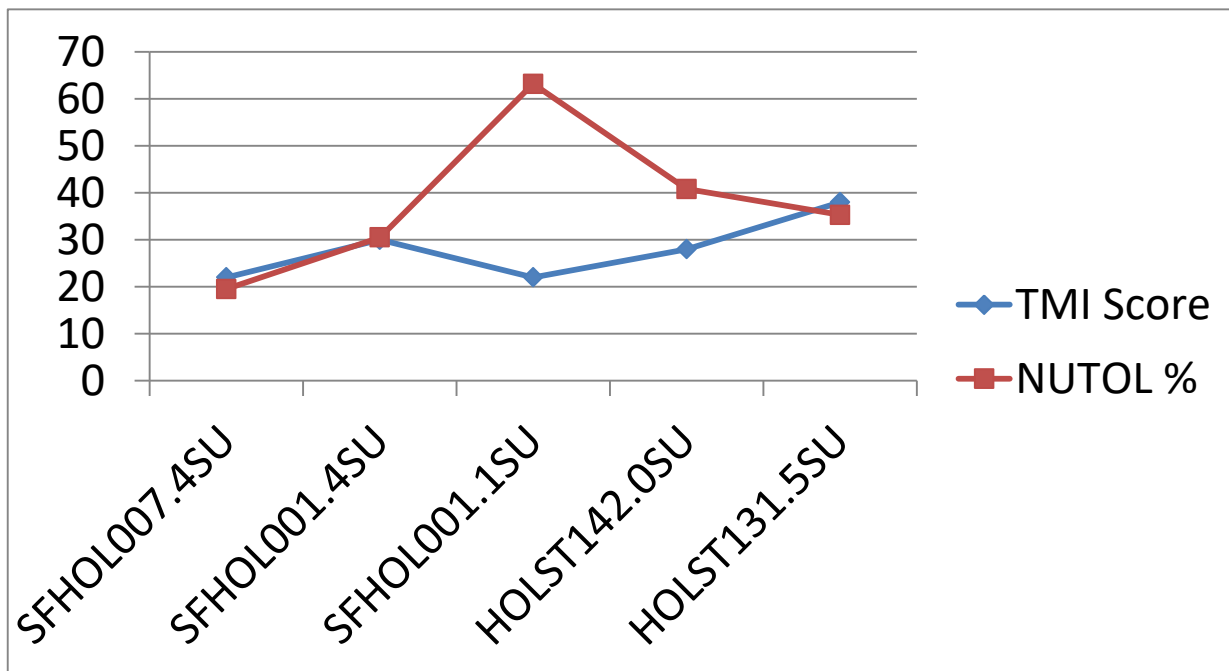
Nutrient tolerant scores (NUTOL) are relatively low directly downstream of Fort Patrick Henry Dam, but then rise dramatically downstream of the dischargers.

The lowest TMI score – and highest NUTOL score – occurred at mile 1.1. At this station, almost two-thirds (63.2%) of the individuals were classified as nutrient tolerant. Observing that

the TMI scores clearly go down as NUTOL scores go up is in contrast to the commenter's position that biological impacts are unrelated to nutrients.

Here is an illustration of TMI and NUTOL data documented in the table:

TMI vs %NUTOL Downstream of Fort Patrick Henry Dam



The commenters should also note that at each station in Segment 1000 last summer, high levels of algae were observed by trained field staff. These observations were consistent with previous observations that helped lead to Segment 1000 being listed for total phosphorus in 2016.

The department's results from the collection of diatoms, which are not yet available, plus the application of a diatom index currently in development, will shed additional light on this assessment.

**Specific Comment 32: Commenters note that TMI scores are lowest near the Fort Patrick Henry dam, but steadily improve downstream of the dischargers. Additionally, the scores for the percentage of individuals classified as tolerant to nutrients are similar at each station.**

**Response:** Please see the previous response, especially the table of biological results.

Additionally, we noted that while biointegrity at Station 1.4 scored a TMI of 30, the biota was dominated by black fly larvae (20 percent of total individuals). While black flies are not a desirable taxon, their presence artificially increased the TMI score by inflating the “Percent clingers” metric. And while black flies are not formally classified as nutrient tolerant, they are dependent on phytoplankton.

In contrast, the biota at Mile 1.1 was dominated by *Cheumatopsyche*, a very nutrient tolerant taxon (39% of total individuals). This genus is commonly noted in organically enriched streams in Tennessee. Considering that a single very nutrient tolerant taxon provided over a third of the individuals documented at mile 1.1, TDEC does not concur that the biota improved immediately downstream of the dischargers. After the significant influx of the much cleaner North Fork Holston River, biointegrity did improve.

**Specific Comment 33: Commenters note the agreement between the commenter’s total phosphorus data in Segment 1000, which averaged 0.045 mg/L and TDEC’s total phosphorus data, which averaged 0.046 mg/L.**

**Response:** The averages the commenter referred to were calculated from data collected between February 2018 and December 2019 at the station at mile 1.1. (We actually calculated an average of TDEC’s data of 0.047 mg/L). TDEC followed its traditional grab sample approach while the commenter’s consultant collected 24-hour composites.

TDEC is gratified that the different sampling approaches employed by the commenter and TDEC resulted in exactly the same total phosphorus averages over this two year period. We consider this validation that TDEC’s grab sample approach is representative and free of sampling bias. Our approach has the added advantage of being consistently-applied statewide and backed by a QSSOP that EPA has reviewed and approved.

Additionally, our historical approach is much less labor and resource intensive, which is important, given that TDEC has over 60,000 miles of streams to monitor and assess statewide.

Regarding the assessment of the South Fork Holston, TDEC is unable to disregard the additional data collected in this segment at this and other stations within the five-year period EPA considers “all available data.”

In fact, TDEC’s data collected at both mile 1.1 and mile 1.4 have total phosphorus concentration averages around twice as high as the recent levels cited by the commenter. These data are provided in the following Tables:

### **TDEC Total Phosphorus Concentrations at South Fork Holston River Mile 1.1\***

<b>Date</b>	<b>Total Phosphorus Concentration (mg/L)</b>
12/12/2019	0.0246
9/9/2019	0.0663
5/29/2019	0.0554
3/13/2019	0.0397
12/19/2018	0.0255
11/29/2018	0.0225
6/7/2018	0.0561
5/15/2018	0.0764
4/30/2018	0.0418
3/15/2018	0.0785
2/28/2018	0.0343
2/20/2018	0.0336
1/23/2018	0.268
12/13/2017	0.135
11/16/2017	0.118
11/1/2017	0.181
10/2/2017	0.14
9/5/2017	0.0719

The average total phosphorus concentration during this time period is 0.082 mg/L

### **TDEC Total Phosphorus Concentrations at South Fork Holston River Mile 1.4\***

<b>Date</b>	<b>Total Phosphorus Concentration (mg/L)</b>
6/13/2019	0.0563
5/9/2019	0.0543
4/10/2019	0.085
3/12/2019	0.0271
2/5/2019	0.0469

1/9/2019	0.031
12/3/2018	0.0419
10/29/2018	0.0396
9/13/2018	0.0644
8/6/2018	0.143
7/5/2018	0.135
9/5/2017	0.0762
4/12/2017	0.08
1/12/2017	0.28
10/6/2016	0.22
7/7/2016	0.3
5/19/2016	0.22
2/22/2016	0.057
10/20/2015	0.074
7/7/2015	0.1
4/29/2015	0.046

- South Fork Holston RM 1.1 (Ridgefield Bridge) is an ambient station measured quarterly every year while RM 1.4 (Tilthammer Shoals) is a watershed station sampled monthly for one year every five years.

The average total phosphorus concentration at mile 1.4 during this time period is 0.10 mg/L

The results for the last five years readily available on TDEC's dataviewer indicate the total phosphorus levels at the stations at mile 1.1 and 1.4 averaged 0.082 and 0.10 mg/L, respectively. Thus, we do not concur that total phosphorus concentrations in this segment average less than 0.05 mg/L. The only way to produce such an average is by considering only the most recent results.

**Specific Comment 34: *Commenters note some elevated total phosphorus concentrations downstream of the dam, but upstream of the dischargers.***

**Response:** We noticed these periodic elevated total phosphorus levels also. We inquired about these results with the state laboratory and lab staff checked and validated the analyses. When the Group 3 reassessments are undertaken by the department, TDEC will consider whether segment TN06010102001\_2000 is impacted by nutrients. We will check to see if it is possible that the elevated phosphorus levels downstream of the dam were associated with spring or fall turnover of the lake. TDEC has observed this phenomenon in other reservoir tailwaters.



If the commenters are aware of any nutrient sources in this part of the river, we would be interested in learning about them.

**Specific Comment 35:** *Commenters believe that data outliers should not be used to calculate means.*

**Response:** We recognize that there are different schools of thought on this topic, but TDEC's procedure is that once the state laboratory has validated a result, we consider those data to be evidence of the natural fluctuations that occur in environmental data. In our view, outliers could not be eliminated without the danger of inherent biases.

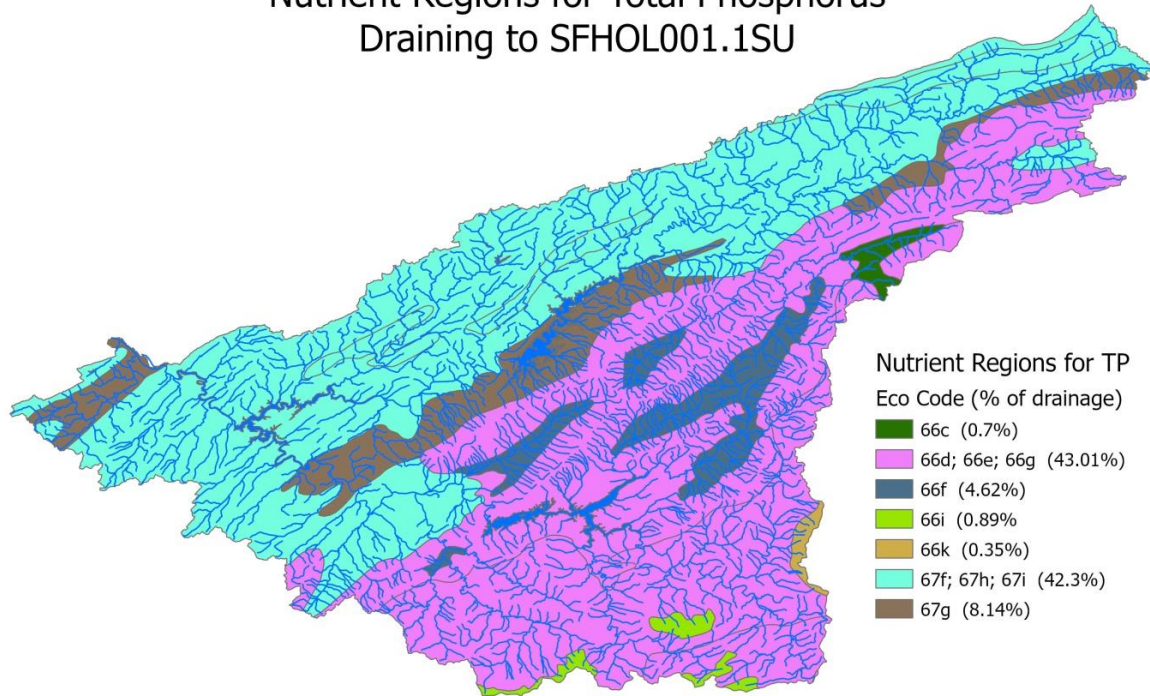
**Specific Comment 36:** *South Fork Holston River Segment 1000 is within Subcoregion 67g, which has a regional total phosphorus goal of 0.09 mg/L. This is the goal TDEC should use to compare nutrient concentrations in segment 1000. Current levels in the South Fork Holston are below this goal.*

**Response:** Please see the previous response in regard to what TDEC considers the average total phosphorus concentration to be in South Fork Holston River segment 1000.

As observed by the commenter, the South Fork Holston River has a large watershed. While the commenter only referred to the Tennessee portion of the watershed, we considered the additional extent of this watershed within Tennessee, North Carolina, and Virginia. In preparing our response, we consulted ecoregion coverage GIS layers in all three states and it is quickly apparent that only a very small part of this watershed is within 67g.

A map of all the subcoregions in the South Fork Holston River is provided in the next figure.

Nutrient Regions for Total Phosphorus  
Draining to SFHOL001.1SU

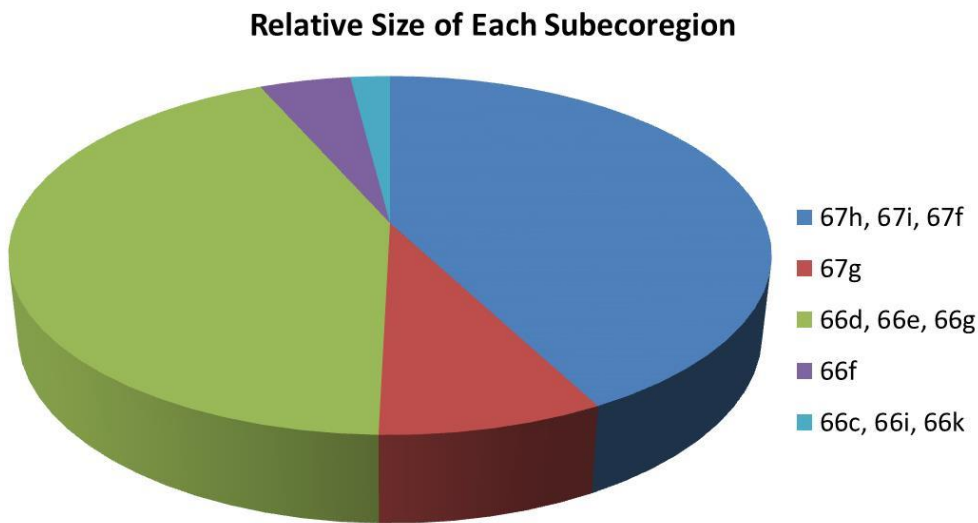


The following Table provides the watershed area of each subcoregion and the regional water quality goals for total phosphorus in each. Note that some subcoregion groups share a goal. All of these subcoregion size calculations were measured upstream from the station at mile 1.1.

**South Fork Holston River  
Subcoregion Watershed Area and Regional Total Phosphorus Goal**

Subcoregion(s)	Watershed Area (sq miles)	Percentage of Total Watershed Area	Regional Phosphorus Goal (mg/L)
67h, 67i, 67f	837.4	42.3	0.04
67g	161.1	8.1	0.09
66d, 66e, 66g,	851.9	43.0	0.01
66f	91.6	4.6	0.02
66c, 66i, 66k	38.3	2.0	Subcoregions not found in Tennessee

Here is an illustration of the relative size of these subcoregions:



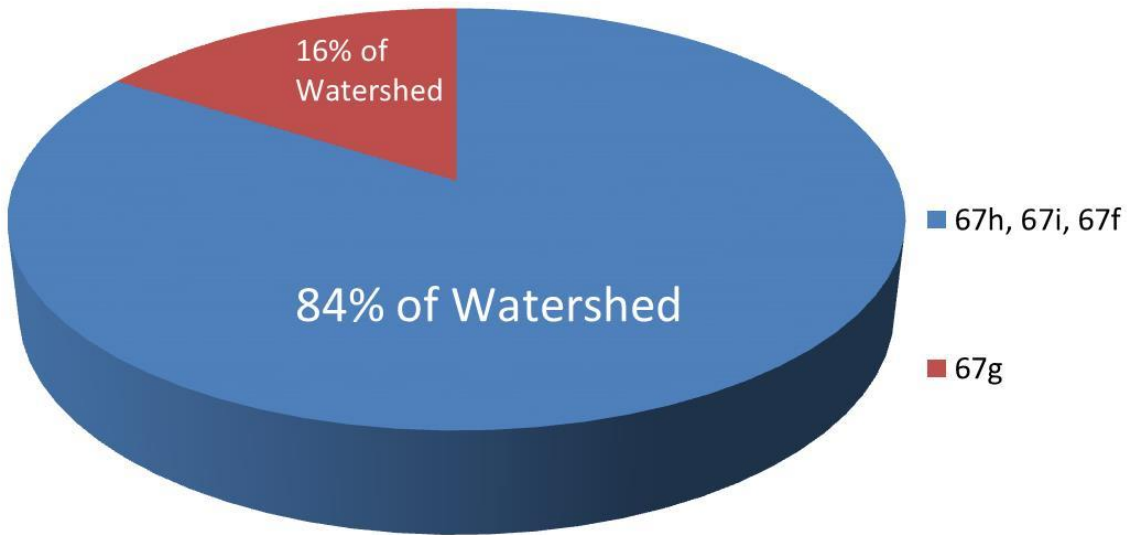
Over ninety percent of the entire watershed has a total phosphorus goal of 0.04 or less. (Two percent of the watershed is Ecoregion 66 subcoregions areas not found in Tennessee. Thus, we do not know what the total phosphorus goal for those subcoregions might be.)

If only Ecoregion 67 is considered, the results are still similar. Here's the same table excluding the Ecoregion 66 (Blue Ridge Mountains) portions of the watershed.

**Subcoregion 67 Only  
Watershed Area and Regional Total Phosphorus Goal**

Subcoregion	Watershed Area (sq miles)	Percentage of Total Watershed Area	Regional Phosphorus Goal (mg/L)
67h, 67i, 67f	837.4	83.9	0.04
67g	161.1	16.1	0.09

### Relative Size of Each Subcoregion



As subcoregion 67g is only 16% of the Ecoregion 67 portion of the watershed, or even less in the entire watershed (8%), we do not consider 67g to provide an appropriate goal for total phosphorus at our sampling station at mile 1.1. Over 90 percent of the watershed has a total phosphorus goal of 0.04 mg/L or less. As the commenters point out, this is the process established in the CALM for deciding which regional nutrient goal appropriately applies when the watershed contains more than one subcoregion.

**Specific Comment 37: *TDEC’s method of visual assessment of algae in the South Fork Holston River is subjective.***

**Response:** In a sense, this is a water quality standards comment. When the Tennessee Board of Water Quality, Oil and Gas promulgated a narrative nutrient criterion, they charged the Division of Water Resources with developing methods to interpret the criterion with as little subjectivity as possible. This has not been easy and the department has been equally criticized as either being too stringent or too lenient.

In the case of algae, we consistently follow a method documented in our QSSOP for performing biological assessments. Staff attend annual quality-control workshops to help standardize the visual assessment interpretations within these guidelines. The process for assessment of algae is established on Page 7 of Section E of the Procedures Chapter I.I of the QSSOP and gives the following guidance to field staff.

- a. Algae: Indicate level of algae through reach and type.

- Slight: Isolated pockets of algae, no effect on stream.
- Moderate: Algae may have limited effect on benthic community (feeding groups and/or reduced niche space.). Diurnal dissolved oxygen patterns may not be affected.
- High: Algae frequent, possible nutrient loading, probably causing diurnal DO swings and/or has significant effect on benthic community (feeding groups and/or niche space.)
- Choking: Algae covering most of stream, may form large mats or clumps. Excessive nutrient loading and significant diurnal DO swings indicated, Observable reduction of niche and probable change in biotic community structure.

The commenter should note that TDEC biological staff assessed algae as “high” at each station within Segment 1000 of the South Fork Holston.

TDEC’s field biologists in the Johnson City office are some of the most experienced staff in the division and have been extensively trained on field techniques. They frequently act as trainers of newer biological staff themselves. Additionally, on July 9<sup>th</sup>, staff were accompanied in the field by the division’s Fellow. The Fellow position is the highest technical position in the agency.

Additionally, the commenter is reminded that EPA reviews and must approve each revision to the QSSOP. With so much experience and training of the staff on-site, TDEC has confidence in their observations and assessments.

The QSSOP can be found on the TDEC website:

<https://www.tn.gov/content/dam/tn/environment/water/documents/DWR-PAS-P-01-Quality System SOP for Macroinvertebrate Stream Surveys-081117.pdf>

**Specific Comment 38: *While on-site, TDEC staff said algae were most extensive downstream of the dam, rather than at other sites.***

**Response:** Please refer to the previous response. TDEC assessed algae levels as “high” at Holston River mile 142 and at South Fork Holston mile 1.1, mile 1.4, and at mile 7.4. The only site where algae were assessed as “moderate” was Holston River mile 131.5, well downstream of Kingsport.

As stated in a previous response, as part of the Group 3 reassessments, we will consider whether or not Segment TN06010102001\_2000 should be listed for excessive nutrients.

**Specific Comment 39:** *During observations of habitat quality, a rating was made of the amount of algae present, on a scale of 1 to 10 with 10 being “excessive” algae. During these collections the sites were rated in a moderate range by TDEC personnel.*

**Response:** In the first sentence above, the commenter is describing the process used by their consultant to assess algae. The second statement is incorrect. As pointed out in a previous response, TDEC staff only rated one site, well downstream in the Holston River, as having moderate levels of algae. All other sites were rated as “high.”

**Specific Comment 40:** *Does TDEC consider an algae level assessed as “high” to indicate an excessive level?*

**Response:** Yes. An algae level of “high” is associated with an elevated probability of harm to the stream. This information was part of the weight-of-evidence approach established in the CALM and was used in 2016 by TDEC to conclude that nutrient concentrations were causing violations of water quality criteria in this segment. The continued presence of high levels of algae makes it difficult to conclude that stream conditions have improved and that total phosphorus should be delisted.

**Specific Comment 41:** *Middle Creek (TN6020001109\_1000) in Hamilton County should be listed as threatened due to construction of a business that will impact water quality.*

**Response:** According to EPA, the “threatened” category is only used when data indicate that it is likely that the water quality standard will be exceeded within the next two years. TDEC does not presume that construction activities automatically impact water quality. The threatened category would not be appropriate in the case described by the commenter.

**Specific Comment 42:** *The upper portion of Kentucky Reservoir downstream of Pickwick dam is listed as impacted by low dissolved oxygen. A commenter notes that the conditions that led to the original listing were observed during a previous hot, dry summer. The commenter provided 2019 data from the river indicating improved oxygen conditions and asks if segment TN6040001001\_2000 can be delisted.*

**Response:** TDEC thanks the commenter for the data and question. We noticed that in the commenter’s data, Tennessee River at river mile 190.0 near Savannah violated the dissolved oxygen criterion on September 26, 2019. Because the commenter’s sampling was monthly, it is unknown how long this violation of water quality criteria may have persisted.

Kentucky Reservoir is a Group 3 watershed, thus will be reassessed in late 2020/early 2021. It would be our preference to wait until this reassessment to consider all data in the last five years. We would ask the commenter to continue providing these data. Additionally, we would like to review any continuous dissolved oxygen data, including those collected by the Tennessee Valley Authority.

**Specific Comment 43:** *A commenter notes that chlorides levels in Sugar Creek meet the criterion of 250 mg/L.*

**Response:** The EPA chronic fish and aquatic life national criterion for chlorides is 230 mg/L.

**Specific Comment 44:** *Data collected and supplied by the commenter indicate Sugar Creek segment TN6040003023\_0200 near Mt. Pleasant is not impacted by ammonia, chlorides, and total dissolved solids.*

**Response:** The commenter should be aware that Sugar Creek segment 0200 is not currently assessed as impacted by ammonia. (An illustration of the current List for the Sugar Creek watershed appears on a following page.) However, the commenter is correct that chloride and total dissolved solids are currently assessed as impacting fish and aquatic life.

The Lower Duck River is a Group 3 watershed and is on schedule to be reassessed in late 2020 or early 2021. Given that this stream has been impacted for 35 years by unauthorized discharges from a landfill, we would prefer to wait until we have compiled all the relevant data to reassess this stream. Additionally, we are watching with interest to see if current enforcement and remediation efforts are successful in reducing pollutant loadings to this stream.

**Specific Comment 45:** *An unnamed tributary to Sugar Creek TN6040003023\_0210 near Mt. Pleasant is listed as being impacted by a “landfill.” There is no landfill in this watershed.*

**Response:** TDEC thanks the commenter for pointing out that Segment 0210 is mapped in the wrong location on our assessment mapviewer. We have corrected this indexing issue and apologize for any inconvenience this might have caused.

**Specific Comment 46:** *Data collected by the commenter in 2019 on the Unnamed Tributary to Sugar Creek TN6040003023\_0210 are lower than the 2018 data at that site collected by TDEC. This proves pollutant loadings are reducing over time.*

**Response:** TDEC points out that it is difficult to have confidence in the appearance of a trend based on the limited amount of data collected in 2018 and 2019. Both the 2018 TDEC and 2019 commenter data are well above water quality criteria levels.

**Specific Comment 47:** *Sugar Creek would provide at least a ten-fold dilution of pollutant concentrations from the Unnamed Tributary to Sugar Creek, rendering them non-toxic.*

**Response:** The 7Q10 low flow of upper Sugar Creek approaches zero, according to values derived from USGS gaging stations. Additionally, the commenter is assuming the background levels of these pollutants in Sugar Creek are zero, which is not borne out by sampling results.

**Specific Comment 48:** *Data supplied by the commenter indicate Sugar Creek segment TN6040003023\_0250 downstream of Arrow Lake near Mt. Pleasant is not impacted by ammonia, chlorides, and total dissolved solids.*

**Response:** The Lower Duck River is a Group 3 watershed and is on schedule to be reassessed in late 2020 or early 2021. Given that this stream has been impacted for 35 years by unauthorized discharges from a landfill, we would prefer to wait until we have compiled all the relevant data to reassess this stream. Additionally, we are watching with interest to see if current enforcement and remediation efforts are successful in reducing pollutant loadings to this stream.

**Specific Comment 49:** *Data reviewed by the commenter indicate Sugar Creek segment TN6040003023\_0250 downstream of Arrow Lake is meeting TDEC's 10 mg/L criterion for nitrates, thus should be delisted for nitrate+nitrite (NO<sub>2</sub>+NO<sub>3</sub>).*

**Response:** The commenter has accurately cited the nitrate criterion for protection of domestic water supplies. However, the Sugar Creek use impaired by the excessive levels of NO<sub>2</sub>+NO<sub>3</sub> is not domestic water supply protection, but rather fish and aquatic life protection.

**Specific Comment 50:** *Data supplied by the commenter indicate Sugar Creek segment TN6040003023\_0255, upstream of Arrow Lake is not impacted by ammonia, chlorides, and total dissolved solids.*

**Response:** Sugar Creek segment 0255 is not currently assessed as impacted by ammonia, chlorides, or total dissolved solids. Please see the illustration below.

## **Impaired Waters List Information for Sugar Creek Watershed**



	A	B	C	D	E	F
1	ID305B	WATER_NAME	LOCATION	WATER_TYPE	WATER_SIZE	CAUSE_NAME
31	TN06040003023_0100	Quality Creek	Maury County	RIVER	7.1	SEDIMENTATION/SILTATION
32	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	TOTAL DISSOLVED SOLIDS (TDS)
33	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	TOTAL DISSOLVED SOLIDS (TDS)
34	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	PHOSPHORUS, TOTAL
35	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	CHLORIDE
36	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	CHLORIDE
37	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	NITRATE/NITRITE (NITRITE + NITRATE AS N)
38	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	PHYSICAL SUBSTRATE HABITAT ALTERATIONS
39	TN06040003023_0200	Sugar Creek	Maury County	RIVER	2.6	SEDIMENTATION/SILTATION
40	TN06040003023_0210	Unnamed Trib to Sugar Creek	Maury County	RIVER	1	CHLORIDE
41	TN06040003023_0210	Unnamed Trib to Sugar Creek	Maury County	RIVER	1	CHLORIDE
42	TN06040003023_0210	Unnamed Trib to Sugar Creek	Maury County	RIVER	1	CHLORIDE
43	TN06040003023_0210	Unnamed Trib to Sugar Creek	Maury County	RIVER	1	AMMONIA, UN-IONIZED
44	TN06040003023_0210	Unnamed Trib to Sugar Creek	Maury County	RIVER	1	TOTAL DISSOLVED SOLIDS (TDS)
45	TN06040003023_0250	Sugar Creek	Maury County	RIVER	2.5	NITRATE/NITRITE (NITRITE + NITRATE AS N)
46	TN06040003023_0250	Sugar Creek	Maury County	RIVER	2.5	PHOSPHORUS, TOTAL
47	TN06040003023_0250	Sugar Creek	Maury County	RIVER	2.5	CHLORIDE
48	TN06040003023_0250	Sugar Creek	Maury County	RIVER	2.5	TOTAL DISSOLVED SOLIDS (TDS)
49	TN06040003023_1000	Sugar Fork	Maury County	RIVER	1.77	PHOSPHORUS, TOTAL
50	TN06040003023_1000	Sugar Fork	Maury County	RIVER	1.77	NITRATE/NITRITE (NITRITE + NITRATE AS N)
51	TN06040003023_1000	Sugar Fork	Maury County	RIVER	1.77	CHLORIDE
52	TN06040003023_1000	Sugar Fork	Maury County	RIVER	1.77	CHLORIDE
53	TN06040003023_1000	Sugar Fork	Maury County	RIVER	1.77	ESCHERICHIA COLI (E. COLI)

**Specific Comment 51:** *EPA recently approved an E. coli TMDL for the Sequatchie River watershed (TN6020004). Shouldn't the EPA category be changed for the E. coli impaired segments included in this TMDL?*

**Response:** The commenter is correct. EPA approved this TMDL after the Draft 2020 List of Impaired and Threatened Waters in Tennessee was published. The TMDL category for the following waterbodies has been changed from 5 (waterbodies that need a TMDL) to 4b (waterbodies with an EPA approved TMDL).

- |    |                    |                                       |
|----|--------------------|---------------------------------------|
| 1. | TN06020004001_0600 | Unnamed Tributary to Sequatchie River |
| 2. | TN06020004001_1200 | Shiloh Branch                         |
| 3. | TN06020004005_0100 | Coops Creek                           |
| 4. | TN06020004007_0200 | Flatwood Branch                       |
| 5. | TN06020004007_0600 | Little Creek                          |
| 6. | TN06020004007_1500 | Mill Branch                           |

These waterbodies are still considered impaired, so will continue to be listed until water quality criteria are met.