US Army Corps of Engineers
Nashville and Memphis

Special Joint Public Notice

Public Notice No. 25-36 Date: November 4, 2025

Expires: December 19, 2025

SUBJECT: Announcement from The Tennessee Department of Environment and Conservation and the Nashville and Memphis Districts of the U.S. Army Corps of Engineers of Proposed Revisions to the Tennessee Stream Quantification Tool (TN SQT).

PURPOSE: The purpose of this public notice is to announce to Department of the Army (DA) permit applicants, sponsors, consultants, industry, and the general public of revisions to the TN SQT.

Proposed Revisions to the Tennessee Stream Quantification Tool (SQT)

Commercial and residential land development, construction of linear transportation and utility systems, and other activities that require State and Federal permits have the potential to impact and degrade Tennessee's streams. Impacts to streams often result in loss of stream resources and resource values, including stream length, hydrology, available habitat, species composition, and other beneficial ecological and physical characteristics. Where permits for unavoidable impacts result in an appreciable permanent loss of stream resource values, both the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Army Corps of Engineers (USACE) may require compensatory mitigation to off-set those resource losses to Tennessee's streams.

In 2018 the agencies released a quantitative evaluation tool for assessing the functional loss and lift of stream projects. The Tennessee Stream Quantification Tool (TN SQT) is a scientifically defensible method created to quantify the existing function of streams proposed to be impacted, and to evaluate restorative projects proposed for compensatory mitigation. Examples of mitigation projects can include third-party banks, in-lieu fee programs, and permittee responsible mitigation. The need for a resource quantification tool was critical: both the federal government and the state rules concerning mitigation for off-setting unavoidable impacts to stream resources had changed from simply using the linear feet of stream impacts to assessing the resource's 'functional value'. A systematic and scientific method was needed to assess and quantify functional resource values consistently across impact and mitigation projects. The TN SQT has been vital to ensuring lost stream resources are adequately replaced, and in supporting the creation of mitigation banks and available mitigation credits in the state.

With experience the agencies recognized that the original version of the TN SQT was problematic in several ways, and feedback from the regulated community identified similar concerns. The consensus was that certain aspects of the current SQT were unnecessarily complex, time-consuming, expensive, and could be made more user-friendly without sacrificing quality and scientific validity. The weighting of some parameters was thought to be under-represented, made the tool too unresponsive to geomorphic design improvements, and did not adequately measure

the functional lift gained in some real-life mitigation scenarios.

At the TDEC Commissioner's request, beginning in 2020 the TDEC convened a work group of experienced mitigation practitioners and agency staff from the US Army Corps of Engineers facilitated by the TN Water Resources Research Center from the University of Tennessee - Knoxville to explore possible improvements to the TN SQT. The following proposed revisions represent many of the recommendations of that workgroup, with the goal of addressing the most serious concerns with the current SQT without sacrificing its ability to consistently and accurately quantify stream functional values or significantly change the basic valuation of mitigation credits/debits.

The purpose of these proposed revisions is to provide a more streamlined and efficient quantification tool for both stakeholders and reviewing agencies that more accurately quantifies stream functional values in a wider range of scenarios without sacrificing scientific principles, environmental protections, or the spirit and intent of state and federal mitigation rules.

The existing SQT and associated documents can be found on TDEC's Compensatory Mitigation webpage. The proposed TMAT User Manual and associated spreadsheet tools may be found on the Division's Public Participation Opportunity webpage, under the Public Participation Opportunities dropdown.

The agencies have made the preliminary determination that the proposed TN SQT revision is compliant with all pertaining state and federal regulations and the ARAP rules and Stream Mitigation Guidelines, that the proposed revisions will not violate Tennessee's water quality standards and will continue to ensure that state and federal permitting will not result in an appreciable permanent loss of resource values.

The agencies are proposing the following revisions to the existing TN SQT (the existing SQT spreadsheet organization and the proposed version is attached for your convenience):

1. The name of the revised Tool will be changed to the Tennessee Mitigation Assessment Tool (TMAT). The name change was deemed beneficial in distinguishing the new version from the older version and from similar SQTs used by other states.

2. As noted above, the current SQT groups parameters and metrics unevenly across the categories, which results in uneven weighting of various parameters and metrics. The proposed version of the SQT will offer a better balance in the number of parameters and metrics under each of the 5 major categories, and the remaining base metrics in each have been identified as required values (there would still be a few optional metrics). This will help standardize all submittals and reviews and prevent 'cherry-picking' of parameters in order to artificially devalue stream resources losses or maximize mitigation lift.

3. To update the Geomorphology category, the category parameters will be spilt into two categories, Geomorphology 1 (Riparian) and Geomorphology 2 (In-channel). The current SQT did not adequately measure the functional value of wider and more healthy riparian zones, and in general too many geomorphic parameters were grouped together in a single category. These parameters were felt to be undervalued and also reduced measurable lift in metrics over which the permittee/practitioner has the most design control. The proposed TMAT spreadsheet will still be organized into 5 primary categories, but revised thusly:

   Hydrology – Hydraulics – Geomorphology 1 (Riparian) – Geomorphology 2 (In-channel) – Biology/WQ

   This will increase the relative weighting of the geomorphic and riparian parameters as measures of functional lift.

4. The Biology and Water Quality functional categories of the current SQT are proposed to be combined into a single category. The Water Quality metrics were only rarely measured and included in SQT submittals because of the time and cost of obtaining a valid dataset of the chemical parameters prior to impacts, or before and after a mitigation project. The use of the Water Quality parameter will be optional within the new combined category of Biology/Water Quality and can still be utilized in mitigation scenarios where measurable Water Quality lift can be expected.

5. Other specific revisions proposed to achieve better balance, and improve assessments:

   Under the Hydrology category, a new parameter, 'Floodplain Storage Area' is added that constitutes what percentage of the floodplain area within a project reach is available for overbank flood retention and infiltration. Floodplain Storage Area is determined as the area inundated during a 100-year flood event if that information is available through FEMA mapping, or if FEMA mapping is not available, it is the flat area between valley walls determined by a topographic map. Additionally, Hydrology category improvements are proposed in the measurement methodology for Catchment Hydrology and Stormwater Infiltration to incorporate the state design storm for stormwater control measures, thus simplifying this metric to use standard engineering calculations and methods. See section 6.1 for a description of the methodology.

   The parameter of Aggradation Ratio is proposed to be moved from the Geomorphology category to Hydraulics. Moving Aggradation Ratio to the Hydraulics functional category helps even out the weighting of the 5 major categories and Aggradation is a better logical fit there. The work group believes that this parameter may have limited practical value, but some practitioners favor its inclusion in certain situations, so it is proposed to remain an optional parameter.

   Bed Material Characterization/Size Class Pebble Analyzer has been similarly moved from a

stand-alone parameter to inclusion with other Physical Habitat metrics. The field methodology is also proposed to be modified to the very similar Wolman Pebble Count d50, which is simpler and more intuitive for permittees and reviewers.

6. Several of the metrics in the current SQT are based in Natural Channel Design/Rosgen-based methodologies, which rely upon a measurement of bankfull width. There are some existing channels and mitigation situations where the concept of bankfull is either difficult to determine (examples include artificial and heavily altered channels) or may not result in useful information for some mitigation designs (such a multi-thread channels or stream-wetland complexes). Therefore the proposed version will provide an alternate pathway for certain specified "non-bankfull" situations. The agencies will specify in the guidance when this alternate method can be applied.

   There are two new metrics within the Hydraulics category, Floodplain Connectivity and Channel Incision Potential (Sheer Stress Ratio). These parameters are proposed to be alternatives for use in non-bankfull situations that do not involve establishing bankfull depth or width. Floodplain Inundation Frequency is a measure of a stream's connectivity to its floodplain. Channel Incision Potential (Shear Stress Ratio) measures the potential for vertical downcutting due to entrenchment. These two metrics would be used as alternatives to Bank-Height Ratio and Entrenchment Ratio when appropriate. In addition, a new, non-bankfull-reliant alternate measurement method for the existing Pool—Pool Spacing Ratio is proposed only replacing the bankfull width by the active channel width. Identifying and measuring the active channel width is clearly defined. See attachment 6.2.2 for a description of the field methodologies of these metrics. Other metrics reliant on bankfull measurements related to Channel Stability have been modified or removed as described below.

7. Based on practitioner feedback and agency experience, the single most time-consuming, and therefore costly, parameter to field-measure for the current SQT is the Lateral Stability Function-Base parameter of Bank Erosion Hazard Index/Near-Bank Stress (BEHI/NBS), which requires the permittee to makes measurements at every location along a stream reach that exhibits bank erosion. It also is reliant on accurate bankfull measurement, and because it is only a single bank measure some recent research suggests that BEHI/NBS is not a very accurate measure of overall channel stability. In the revised version BEHI/NBS is proposed to be replaced by a modified version of the Rapid Geomorphic Assessment protocol (RGA) as a measure of overall channel stability developed at the USDA National Sedimentation Laboratory. The RGA methodology can be applied to a stream reach in much less time with some minimal training. See section 6.4.1.3 for a description of the modified RGA methodology.

8. The riparian parameters in the current SQT are calculated using vegetation plots established in the riparian zone, which like BEHI also represent a considerable investment in field time, especially for one-time existing condition assessments related to impact channels. The new version proposes a simpler methodology, which limits vegetation plots to the bankfull transect locations, and requires only measuring the diameter at breast height of the 3 largest woody stems in each plot plus an estimate of the percent of invasive plant cover. See section 6.3.2 for description of the field methodology.

The final metric proposed for the Riparian Vegetation Function-Base parameter is 'Canopy Cover', which is a simple measure of stream shading and available allocthonous input to the stream. The % Canopy Cover can be quickly calculated using a densiometer reading at 3 mid-channel points in a reach. See section 6.3.2 for a description of the field methodology.

9. Current parameters proposed for deletion:

   Fish Native Spp. and Catch/Unit Effort – Although optional in the current SQT version, these metrics were difficult to describe, perform, required site-specific scoring matrices, and had almost never been used.

   Erosion rate (ft/yr) – this was an optional alternative to measuring BEHI/NBS, which due to the time required to measure had never been used.

   Sinuosity – it was the consensus of the work group that sinuosity is a design component dependent on slope, valley type, stream power, etc., rather than a functional value variable. Other states with similar SQT tools have reached the same conclusion. Using sinuosity as a measure of value and lift encouraged permittees to create more sinuosity than was appropriate for a given channel, as it double-counts the functional lift associated with adding stream length.

10. The current SQT spreadsheet is recognized to be complicated and non-intuitive. The proposed SQT spreadsheet will be greatly simplified/more user-friendly. The new version will utilize a single sheet for each individual reach and removes the monitoring tracking and data summary sheets (which were only applicable for mitigation projects in the first place). The Project Assessment and Watershed Assessment sheets were similarly removed since they only apply to mitigation projects and were thought to fit better in a Prospectus or Banking Instrument documentation. Practitioners will be able to enter the field data and desktop info for any given condition assessment directly onto one spreadsheet and the spreadsheet calculates the functional resource values instantly.

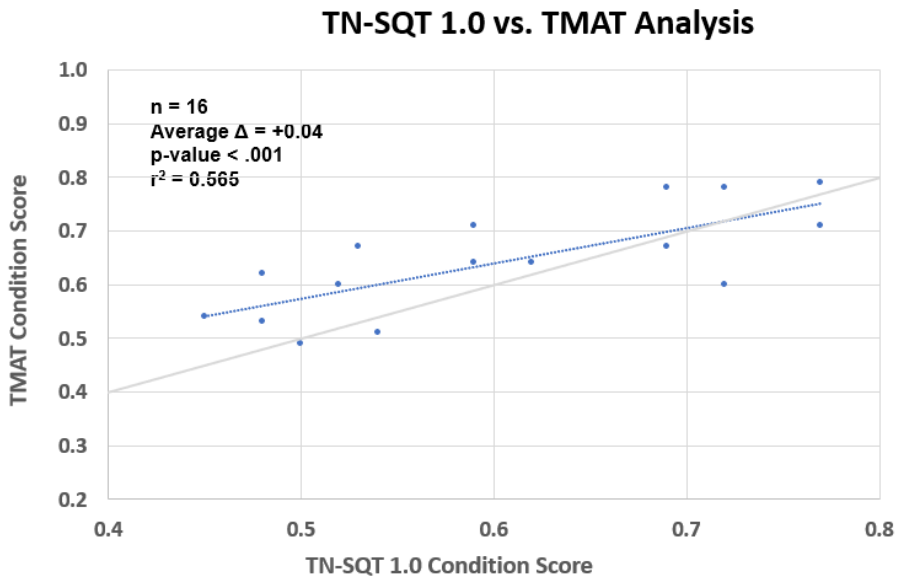
11. A new Datasheet has also been created that includes both desktop and field data entry, comprehensively allows a user to enter all data into the worksheet that computes condition scores. An Excel worksheet was created as a computational aid that takes all information recorded in the Datasheet, summaries it so it can be directly entered into the condition score worksheet for ease of use.

12. Some performance curves for existing metrics have been updated, and new performance curves were created for the proposed new metrics. The TN SQT Version 1.2 was updated on January 24, 2020, and since this time, numerous updates and lessons learned have occurred as similar SQTs were regionalized for ten other states, leading to recommended changes to curves for some of the existing metrics. These changes came from peer reviews from the USACE's Engineer Research and Development Center (ERDC), government agencies, and practitioners; as well as lessons learned from implementing the

tool, and additional reference stream data from North and South Carolina not available at the time the TN SQT was published. ERDC's advice included removing polynomial performance curves unless there was a strong reason to keep them, and instead use a series of broken linear regression lines because it was a simpler approach and easier to justify. They also recommended removing any cliffs and gap in a performance curve. This approach was codified in the Technical Guide for the Development, Evaluation, and Modification of Stream Assessment Methods for the Corps Regulatory Program by ERDC.

Existing curves for Bank Height Ratio, Entrenchment Ratio, Percent Streambank Erosion, Pool Spacing Ratio, and Buffer Width were adjusted in accordance with these recommendations and larger data sets. Additionally, a revision of the Tennessee Macroinvertebrate Index (TMI) SOP was published in 2022, and the related SQT metric curves have been changed to reflect the current TMI protocols.

These revisions are intended to increase the potential for lift within those metrics over which practitioners have the most control of from restoration (Hydrology and Geomorphology categories, for the most part) without drastically changing the overall values of existing credits. The TMAT was tested against a limited set of channels scored with the existing SQT for comparison. While scores varied as expected, there was no consistent 'skew' towards higher scores; the variance was observed in both directions. See the attached comparison graph:



The relevant documents concerning these proposed revisions , including the proposed TMAT User Manual and associated spreadsheet tools, may be found on the Division's Public Participation Opportunity webpage, under the Public Participation Opportunities dropdown.

Additional information on the current TN SQT version, and related compensatory mitigation information can be found on TDEC's Compensatory Mitigation webpage.

The agencies are also requesting feedback on transition strategies as we migrate from the SQT to the TMAT. The agencies are soliciting comments on the timeline of transition, grandfathering provisions, and other suggestions that will minimize mitigation market changes, preserve regulatory predictability, and ensure the seamless transition to TMAT.

As a transition strategy, the agencies are considering grandfathering all approved third-party mitigation and mitigation banks that have already been submitted for review. Pending mitigation bank proposals could be resubmitted using the TMAT assessment method if desired. Mitigation credit purchases would continue to occur in the same currency as the approved mitigation bank. As new mitigation bank credits become available under the TMAT currency, permittees would be required to purchase SQT credits first, if the credits are available within the primary service area.

Permittee-responsible mitigation would have the option to pick either method if the permit application is already under review. New permit applications received after the publish date of the TMAT will be required to evaluate mitigation using TMAT.

LOCATION

Statewide.

FACTORS CONSIDERED

In deciding whether to implement this revised version of the TN SQT, the agencies will consider all comments of record and the requirements of applicable federal and state laws. TDEC will also consider loss of waters or habitat, diminishment in biological diversity, cumulative or secondary impacts to water resources, and adverse impacts to unique, high quality, or impaired waters.

SOLICITATION OF COMMENTS: The Nashville and Memphis Districts are soliciting comments from the public, Federal, State, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the updates to the TN SQT. We appreciate your awareness and participation in the development of procedures to provide regulatory decisions that are consistent, transparent, rooted in sound science and compliant with applicable laws.

COMMENT PERIOD: With this public notice the agencies are requesting a broad range of facts and opinions on the proposed revisions to the TN SQT to help inform appropriate decisions. Persons wishing to comment on these proposed revisions to the TN SQT are invited to submit written comments. Comments will become part of the record and will be considered in the final decision. Written comments may be submitted directly to Jonathon Burr at jonathon.burr@tn.gov. The comments must be received by **December 19, 2025**. After considering all public comments, TDEC and Nashville and Memphis Districts will publish a final revision of the TMAT.

Interested persons may obtain additional information by emailing Jonathon.burr@tn.gov or Jimmy.r.smith@tn.gov.

/s/

Joshua W. Frost
Chief, Regulatory Division