



2018

**Tennessee's Roadmap to Securing the
Future of Our Water Resources**
Water-Related Natural Resources
Executive Summary

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Tennessee's abundant water resources, including its more than 60,000 miles of rivers and streams, 570,000 lake and reservoir acres, and an estimated 787,000 acres of wetlands, are among the state's most valuable assets. The state's rivers and streams provide habitats for some of the greatest fish and other aquatic species diversity in North America, provide life-sustaining source waters for people and wildlife, and support a wide variety of recreational opportunities that contribute substantially to the state's economy and quality of life. Tennessee is a special place to live, work and recreate because of our plentiful water resources, biodiversity and wildlife values.

Water is a public resource and all citizens are entitled to healthy, clean and abundant water. With this entitlement comes the responsibility to understand the impacts of our individual and collective actions on all the resource values that water provides, and to engage in stewardship which protects and restores these values. Today our water natural resources face challenges to their health and sustainability and require a continued commitment to proactive, collaborative and science-based management, protection, and restoration.

Watershed health is the foundational concept that underlies all other characteristics and values of Tennessee's water resources. A comprehensive framework for maintaining water availability and achieving the objectives of the state's water quality and natural resource laws must be grounded in the protection and restoration of watershed health. The 2015 "Tennessee Integrated Assessment of Watershed Health, A Report on the Status and Vulnerability of Watershed Health in Tennessee" written by RTI on behalf of the U.S. EPA Healthy Watersheds Program 2015 compiled watershed health indices for all Tennessee waters across these six attribute categories (RTI International 2015). Generally speaking, the watersheds demonstrating the highest overall health scores are located in those geographies that maintain higher degrees of natural lands, have stable stream and river channels, lower variation from natural stream flow patterns, and better water quality and habitat conditions that support a diversity of aquatic life (RTI International 2015). Areas with longer histories and higher intensities of land cover changes to urbanized and agricultural uses, and the accompanying changes to stream and river channels, have lower overall watershed health scores.

The current status of Tennessee's freshwater-dependent native species and habitats is also a direct reflection of the health of our watersheds. Of the water uses monitored by the Tennessee Department of Environment and Conservation, the areas at the top of

the list of impairments for rivers and streams are for fish and aquatic life and recreation uses (42% and 51% of assessed, respectively), and 33% of reservoirs are impaired for the recreation designated use (TDEC 2018a). The Tennessee State Wildlife Action Plan (SWAP) identifies 276 freshwater species of greatest conservation need (SGCN) and another 411 subterranean, or cave (SGCN) – many of which are dependent on the stability and quality of surface and groundwater exchanges (TWRA 2015).

Many different sportfish species are also found in streams and smaller rivers including trout, catfish, crappie, sauger, sunfish and three species of bass (TWRA 2014). Larger rivers and reservoirs also support these sportfish in addition to several types of commercial fisheries (TWRA 2014). A large variety of plant and other wildlife game species, such as migratory birds, are dependent on different types of wetland habitats for some or all of their life stages. Across the different physiographic regions of the state, river bottoms, floodplains, riparian areas and a diversity of other wetland types provide over 625,000 acres of priority habitat for Tennessee's SGCNs and the SWAP identifies 19 Conservation Opportunity Areas across the state largely designed around river systems (TWRA 2015).

A variety of land and water uses can contribute to changes in watershed health that have a negative impact to water quality and the habitat available for these native species. These types of detrimental changes include the following: increased pollutant loading; increased impervious surface; reduced groundwater recharge; stream and river flow alterations; wetland and headwater stream loss; loss of upstream, downstream and floodplain connectivity; and altered biological integrity and loss of native species. Land use changes in urbanizing environments – including the loss of trees, changes to stream and wetland habitats, and the change from pervious land cover that allows rain to absorb into soils to impervious cover which increases direct run-off to streams – all result in a wide range of changes to watershed hydrology and biology (O'Driscoll et. al. 2010). Finally, according to the Tennessee Aquatic Nuisance Species Management Plan, aquatic nuisance species (ANS) pose serious problems to the ecology and economy in Tennessee. The state's waters are impacted by a variety of aquatic invasive plant and animal species, defined as nonnative plants or animals that are likely to cause economic and/or environmental harm, and some may cause harm to human health as well (TANSMP 2010).

The future condition of Tennessee's freshwater natural resources is directly tied to the land and water management decisions and investments made today. Water quality degradation, loss of habitat, changes to stream and river flows, invasive species, and changes to precipitation and temperature patterns remain the major challenges to freshwater systems nationwide as well as in Tennessee (EPA 2012, RTI International

2015, TWRA 2015). Much is known about the causes and sources of these natural resource declines, and in past decades innovations in a wide variety of cross-disciplinary practices such as green infrastructure for stormwater, improvements in water quality treatment practices, use of agricultural best management practices, reservoir release improvement technologies, and research have presented opportunities to protect and restore our natural resources, even in the face of the growing demands placed on them.

As population and public demand for recreational access to Tennessee waters increases, there will be increased need to consider effective ways to maximize watershed protection, conservation and restoration. Four major themes encompass the areas of greatest need in the management of Tennessee's freshwater natural resources:

- Optimize the ecological function of rivers, streams, and their watersheds. Reduce pollution, mimic river flow conditions, and improve floodplain and riparian conditions.
- Foster an inclusive and transparent regulatory framework that promotes the utilization of best available science and collaborative decision-making that includes public and private sector stakeholders.
- Help communities manage the health of their local watersheds, reduce the impacts of land use changes, and prioritize stream protection and restoration to maximize natural resource benefits to citizens.
- Focus substantial effort on reducing the threats posed by aquatic nuisance species, particularly Asian carp, Eurasian milfoil, and other types of aquatic vegetation that threaten waterways.

Moving forward, an over-arching objective for both the public and private sectors should be to elevate and facilitate the significance of natural resource considerations at all decision-making levels and in all sectors (e.g., permitting, grant-making, strategic planning, and other areas). Other targeted actions pertain to the key issues related to regulation, administration and management of our water resources, as well as the inextricable link between water availability and healthy waters for sustainable economic growth and development. Protecting and restoring the foundational natural processes of our watersheds is critical to sustaining the health and abundance of Tennessee's water resources. Collaborative investments and adaptive management approaches, in both public and private sector decision-making, will be critical to ensuring the sustainability of our water resources and the protection of all natural resource values for Tennesseans into the future.

Please refer to the complete Water-Related Natural Resources Report for details.

References

Environmental Protection Agency (EPA). 2012. Identifying and Protecting Healthy Watersheds Concepts, Assessments, and Management Approaches. U.S. Environmental Protection Agency, Office of Water, Office of Wetlands, Oceans, and Watersheds. Washington, DC. EPA 841-B-11-002

O'Driscoll, M, S. Clinton, A. Jefferson, A. Manda and S. McMillan. 2010. Urbanization Effects on Watershed Hydrology and In-Stream Processes in the Southern United States. *Water* 2, 605-48. Doi: 10.3390/w2030605. Open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).

RTI. (2015). *Tennessee Integrated Assessment of Watershed Health, A Report on the Status and Vulnerability of Watershed Health in Tennessee*. US EPA Healthy Watersheds Program. From https://www.epa.gov/sites/production/files/2015-10/documents/tn_hwp_report_final_october2015.pdf

Tennessee Aquatic Nuisance Species Task Force (TANSTF). 2008. Tennessee Aquatic Nuisance Species Management Plan. Tennessee Wildlife Resources Agency. Nashville, TN.

Tennessee Department of Environment and Conservation (TDEC). 2018a. State of Tennessee water quality information posted to the "Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS)" https://ofmpub.epa.gov/waters10/attains_state.control?p_state=TN&p_cycle=2016

Tennessee State Wildlife Action Plan Team (TWRA). 2015. Tennessee State Wildlife Action Plan 2015. Tennessee Wildlife Resources Agency. Nashville, TN.

Tennessee Wildlife Resources Agency (TWRA). 2014. Tennessee Wildlife Resources Agency Strategic Plan 2014-20. Nashville, TN.