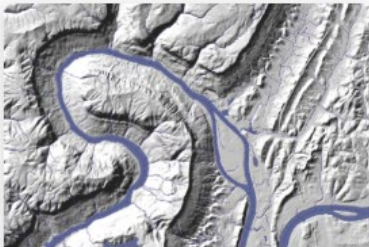




Tennessee Hydrography Program

The State of Tennessee's Strategic Technology Solutions GIS Services group leads the state's hydrography data program. Navigate below to learn more about hydrography data in Tennessee.



[3D Hydrography Program \(3DHP\)](#)

Find out more about Tennessee's current efforts to collect 3D Hydrography with USGS.

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3DHP Data Access

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Tennessee Division of Strategic Technology Solutions

NASCIO Award Category: Information & Communications

Technology

Project Title: State of Tennessee Hydrography Program (STS-GIS)

Project Dates: April 2024 - April 2026 (and into the future)

Contact: Dennis Pedersen, Geographic Information Systems Director,
Strategic Technology Solutions, Dennis.Pedersen@tn.gov

Executive Summary

Water does not stop at city, county, or state lines. Tennessee's rivers, streams, wetlands, watersheds, and drainage systems affect transportation, public safety, agriculture, conservation, economic development, recreation, and the daily lives of citizens. Yet the data used to understand those waters has historically been fragmented across agencies, maintained at different scales, and often lacked accuracy. The Tennessee Hydrography Program addresses this problem by establishing an authoritative, publicly accessible foundation for the state's surface water information. Led by Tennessee's Strategic Technology Solutions Geographic Information Systems (STS-GIS) division, the program provides a coordinated and collaborative approach by engaging local, state, federal, and private partners.

Idea

Project Description

The Tennessee Hydrography Program aligns state and local use cases and funding with the United States Geological Survey (USGS) 3D Hydrography Program (3DHP), the first systematic remapping of the nation's surface waters since the original topographic mapping program launched in 1947. The program relies on high-accuracy lidar-derived elevation data to produce 3D-enabled surface water data or elevation-derived hydrography. The USGS issued a "Call to Action," and Tennessee answered it. The state program has coordinated funding and project areas to complete statewide remapping in five years, starting in the spring of 2024. Collection areas are a collaborative decision between funding partners and the USGS. **See Figure 1.**

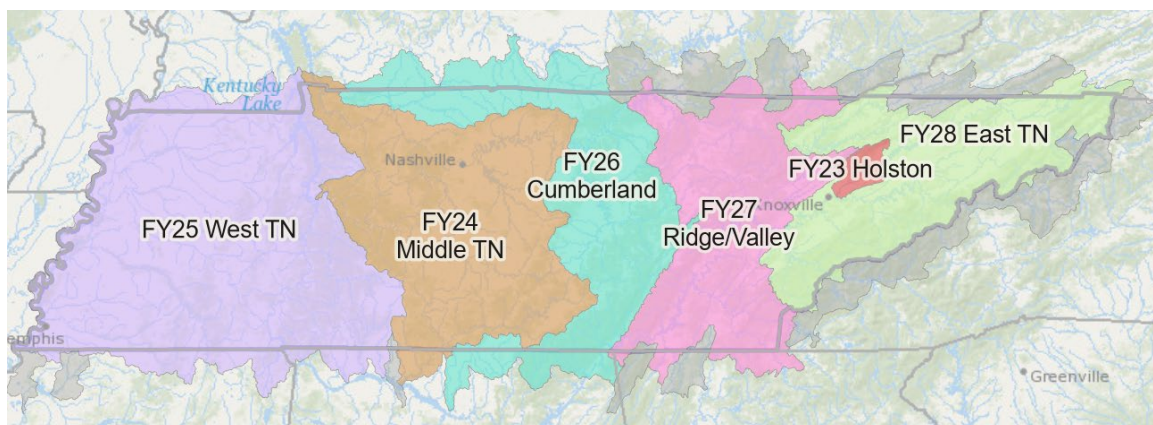


Figure 1: Five-Year Collection Plan and Project Areas – Note cross-border collection

Three of the five collection areas have been awarded and tasked, moving Tennessee toward becoming one of the few states with statewide 3DHP data in progress; the two remaining project areas will be submitted in 2027 and 2028 to complete the statewide collection, following a 2023 pilot watershed that helped stakeholders better understand project deliverables and use cases.

Why it matters

The opportunity is both practical and urgent. Tennessee has experienced unprecedented growth and has been impacted by natural disasters, including the devastating Hurricane Helene. Accurate hydrography supports bridge and culvert design, flood modeling, environmental permitting, stormwater planning, dam safety, conservation, and water quality protection. Without a shared, modern data foundation, agencies risk duplicating work, using inconsistent information, and making decisions that do not fully reflect how water moves across the landscape.

Implementation

Roadmap and Implementation

The roadmap is practical, and Tennessee worked with partners to ensure timelines and deliverables were clear. Tennessee began with pilot work, agency engagement, and use-case development. The statewide effort kicked off in mid-2024, with its first major project area assigned to Middle Tennessee. The program has been successful with awarded projects in 2025 and 2026. The program has three project areas in various stages of development, with 32,973 square miles of hydrography data currently in progress.

Technical architecture matters because it enables specialized geospatial data to be used as enterprise infrastructure. The program supports public access through the Tennessee Hydrography Program information hub, hydro.tn.gov (see Figure 2), while connecting state users to national 3DHP services and data. Data is served through a national web service and is downloadable. See Figure 3. This allows engineers, planners, environmental scientists, emergency managers, local governments, consultants, and citizens to work from a shared source. The hub has curated information about the program, use cases, benefits, training, data access, and additional resources from the state and partners.

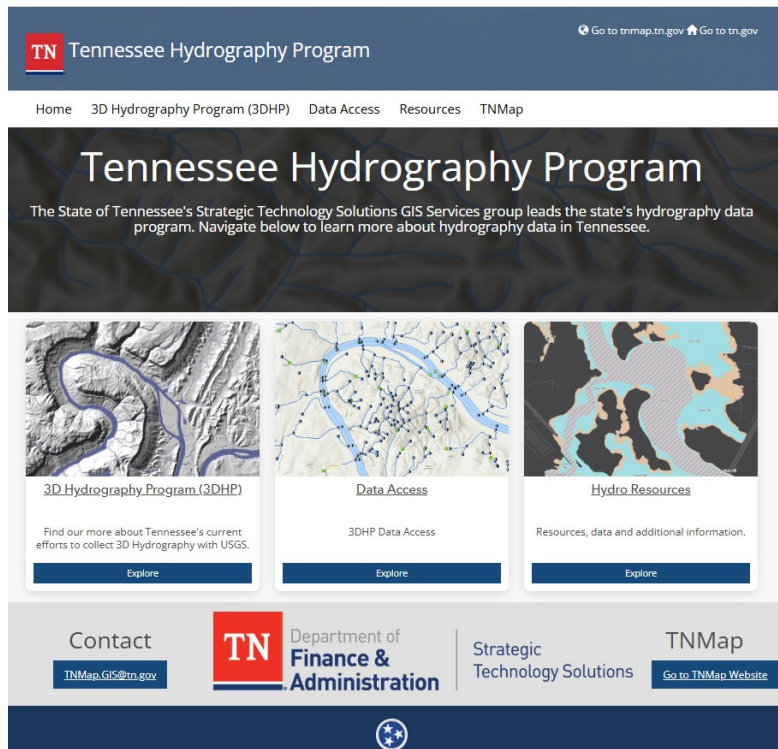


Figure 2: hydro.tn.gov, State of Tennessee Hydrography Information Hub, which has been shared with National States Geographic Information Council state members.

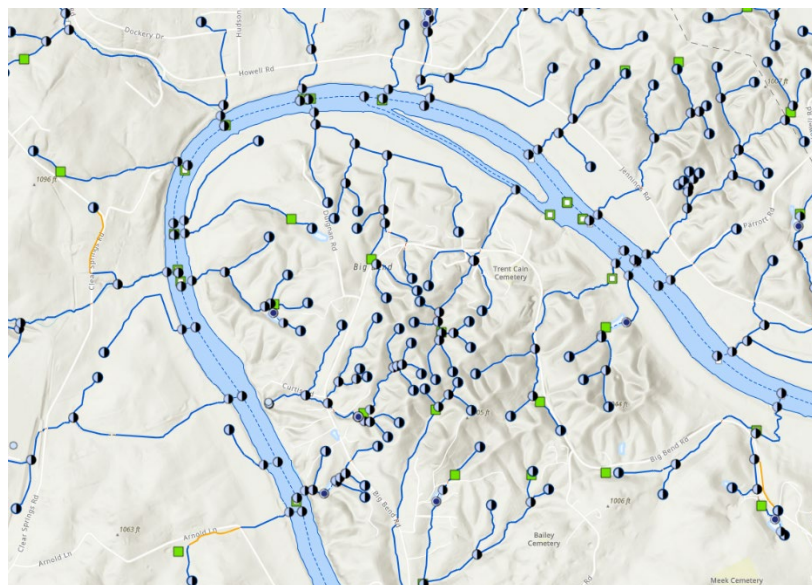


Figure 3 Finalized 3DHP Data in the Holston Watershed in Tennessee, showing surface water and connections.

Partnership/Collaboration

The project is a strong example of cross-boundary collaboration because it brings together partners whose missions differ, but who share a need for reliable data. Tennessee interagency funding and support includes the Tennessee Department of Transportation (TDOT), the Tennessee Department of Environment and Conservation (TDEC), and the West Tennessee River Basin Authority (WTRBA). Four local municipalities in Middle Tennessee joined the funding effort. A federal partnership between the USGS and the United States Department of Agriculture (USDA) connects Tennessee's work to national standards and shared federal priorities.

Collaboration with neighboring states is equally important because watersheds and river systems extend beyond political boundaries. Tennessee has collaborated with state geographic information offices in Kentucky, Alabama, Mississippi, and Georgia to coordinate project areas and create a common operating picture. The 2026 project area boundary was created in partnership with the Alabama Department of Economic and Community Affairs (ADECA) Geospatial office to ensure areas did not overlap and to enable Alabama to benefit from Tennessee's strong funding pool.

Funding Partners

- State of Tennessee – Department of Finance and Administration
- State of Tennessee – Department of Transportation
- State of Tennessee – Department of Environment and Conservation
- Davidson County, Williamson County, City of Brentwood, City of Franklin
- USDA – Farm Production and Conservation
- USDA – Natural Resource Conservation Service
- USGS – National Geospatial Operations

Thanks to this collaboration and coordination, taxpayer dollars go farther because bringing multiple partners to the table shares the costs.

"We have a five-year plan to complete the entire state and appreciate the contributions of all our funding partners at the federal, state, and local levels. This statewide coordination is the cornerstone of the Tennessee Base Mapping Program, which provides the GIS community with access to this critical GIS dataset at a reduced cost." – **Dennis Pedersen, State of TN Geographic Information Systems Director.**

STS-GIS has also been engaged with the National States Geographic Information Council (NSGIC) to participate in the 3DHP for the Nation working group, collaborating with other states and learning how they are engaged in the national efforts. Tennessee has emerged as a national leader, and the Director, Dennis Pedersen, also serves as the 3DHP liaison to the Federal Geospatial Data Committee, which assists with governance, standards, coordination, and advisement on the national program.

Impact

What makes this project innovative is that it is not simply another map layer. 3DHP creates a modern stream network derived from and integrated with high-quality 3D Elevation Program data, improving representation of stream gradients, channel conditions, waterbodies, hydrologic units, and other water-related attributes. The data will support open, interoperable web tools, maps, and data catalogs, enabling users to connect water-related information to the stream network.

How the Tennessee Hydrography Program is making an impact on citizens:

- **Safer bridges, culverts, and roadways:** TDOT's hydraulic design use case explains that enhanced stream network information, elevation data, and connections to groundwater and engineered drainage systems can increase the accuracy of flood-flow calculations, bridge and drainage structure sizing, and bridge-scour analysis.
- **Stronger flood and stormwater decisions:** TDOT planning and municipality use cases include analysis of drainage structures, identification of flood-prone areas, improved highway resilience, support for geohazard analysis, and evaluation of how watersheds may contribute to erosion or other roadway risks.
- **Better environmental protection:** TDEC use cases include dam safety, rare species and natural community protection, ecological restoration, land protection for aquatic systems, and improved environmental review. These uses help protect communities, natural resources, and the streams and rivers Tennesseans depend on.
- **Improved hazard awareness:** The Tennessee Division of Geology identified value in using 3DHP data for more refined mapping of sinkholes, subsidence, karst terrain, caves, and sinking streams—hazards that can affect development, infrastructure, and public safety.

- **Stronger flood and stormwater decisions:** USGS identifies flood modeling and prediction, culvert and bridge engineering design, and stormwater management as key applications improved by 3DHP's integration with elevation data. The Tennessee Emergency Management Agency (TEMA) and the Federal Emergency Management Agency (FEMA) will be major users of this data to support flood risk mitigation.

"Enhanced information on the stream network with additional elevation data, including connections to groundwater and engineered hydrologic systems, would be very beneficial in increasing accuracy of our flood flow calculations... leading to more accurate sizing of bridges and drainage structures on Tennessee roadways" – **Wesley Peck, Civil Engineering Manager, State of TN Department of Transportation (TDOT).**

There are significant returns on investment. USGS reports that the Hydrography Requirements and Benefits Study identified \$538.5 million in annual benefits from current national hydrography datasets and an additional \$602.55 million in annual benefits if unmet needs are addressed, for a total of more than \$1.14 billion each year. Tennessee's investment captures those benefits at the state level by reducing duplication, improving data quality, accelerating analysis, and helping agencies make better decisions before projects reach construction, permitting, or emergency response.

What now?

Before this project, Tennessee agencies often had to reconcile older or inconsistent hydrography sources on a project-by-project basis. After implementation, the state has a coordinated program, a shared funding model, a public access point, alignment with national standards, and a five-year path toward statewide modernization.

The national call to action is clear: 3DHP will succeed through partner funding, shared priorities, and multi-partner collaboration. Tennessee has answered that call by creating a program that pools federal, state, local, and regional investment to benefit many missions at once. It is not a one-time application; it is a shared cross-boundary dataset that will support better decisions wherever water affects people, property, infrastructure, agriculture, and the environment.