Geosyntec ▷
consultants

Tennessee River System
Models for EAP floodplain inundation maps

Client: **Tennessee Valley Authority**

Services Provided:

✓ Bathymetric surveys

✓ Hydraulic model development

✓ Geo-referencing

✓ Unsteady flow simulations

✓ Floodplain inundation mapping

Project Objective

The Tennessee Valley Authority (TVA) River Operations (RO), which regulates a system of 49 reservoirs spanning seven states, maintains Emergency Action Plans (EAPs) for dams throughout the Tennessee River System. TVA's current EAP floodplain maps are primarily based on older steady-state hydraulic models, estimated reach lengths and overbank elevations, and outdated floodplain mapping techniques. Geosyntec Consultants is working the prime consultant Riverside Technology, Inc. (Riverside) and TVA to update their EAPs floodplain inundation maps for different dam-break scenarios for all of the major dams in their system. Using pre-defined inflows for multiple scenarios, the US Army Corps of Engineers (USACE) Hydrologic Engineering Center River Analysis System (HEC-RAS) will be used to simulate the passage of flood waves through the system.

Geosyntec's Scope of Services

Geosyntec's scope of services included:

- Coordinating a strategic bathymetric surveying effort to fill in data gaps.

- Compiling and assessing the existing HEC-RAS (and others such as HEC-2 and ADYN) models and channel geometry from TVA and USACE for use in the inundation modeling.

- Geo-referencing and extending the historical cross-section geometry data to encompass Probable Maximum Flood (PMF)-sized events

- Incorporating dam structure geometry and associated operation and theoretical dam breach information into the hydraulic model.

- Developing and updating the flood inundation models for the Hiwassee River System (Hiwassee River, Nottely River, and Ocoee River); the Great Falls Dam on the Caney Fork; and the Tims Ford Dam on the Elk River to Wheeler Lake.

- Utilizing the updated HEC-RAS unsteady flow simulation models to examine three flooding scenarios:

  ○ PMF without Failure

  ○ PMF with Failure

  ○ Sunny Day Failure

Notable Accomplishments

The project was required a high level of coordination with TVA, Riverside and other contractors working in the TVA's nuclear division to share data, modeling experience and ensure the most accurate HEC-RAS models were developed.