

Reservoir Operations Study for the Tennessee and Cumberland River Basins

TENNESSEE VALLEY AUTHORITY

PROJECT SUMMARY

The Tennessee Valley Authority required information to assess the hydrologic impact of different reservoir operating procedures at various critical locations. Riverside utilized the RiverWare® system to model reservoir operations and provided Tennessee Valley Authority with one of the most complex RiverWare® model ever built.

LOCATION
Mid-Atlantic/
Southeastern, U.S.A.

PERIOD
2001 – 2004

PROJECT DETAILS

Under contract to the Tennessee Valley Authority (TVA), Riverside Technology, inc. (Riverside) worked with engineers from Michael Baker, Jr., Inc. to perform reservoir modeling and flood frequency analysis for 36 reservoirs within the Tennessee and Cumberland River basins.

The goal of the project was to assess how different reservoir operating policies could impact flood risk, hydropower revenues, navigation on the rivers, water supply and quality, and recreational activities.

TVA operates the individual reservoirs for combinations under multiple objectives of flood control, navigation, power generation, and enhancement of environmental quality along the rivers.

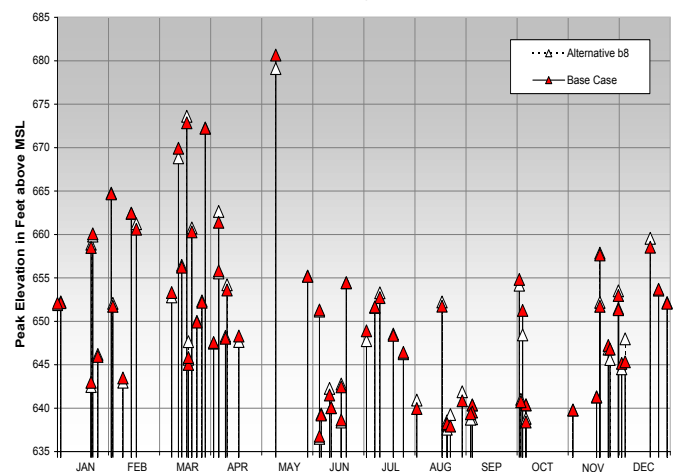
The complexity of individual reservoir operations is compounded as TVA operates many of the reservoirs jointly, holding flood waters in tributary projects until the mainstem reservoirs can safely release the flood flows, often after the peak of the storm has passed.

Riverside's primary role in the project was modeling the TVA system using the University of Colorado's RiverWare® river basin model. Riverside's RiverWare® model of the TVA system accounts for all of the individual reservoir operations as well as the feedback mechanisms between mainstem reservoirs and the tributary systems. The RiverWare® model implemented by Riverside for TVA is one of the largest and most complex RiverWare® applications ever built. The model was run at a six-hour time step for a 99-year period.

Riverside performed flood frequency analysis on annual and seasonal peak discharges or elevations generated by the model. TVA provided alternative reservoir operating scenarios and results of those runs were compared to the base line model to identify potential changes in flood risk, hydropower revenues, and recreational opportunities.

The final operating alternative became part of a larger Environmental Impact Statement (EIS) developed by TVA to examine impacts of changes in operational policies and was implemented by TVA in May 2004.

Peak Elevations - Hypothetical Design Storms - Scaling Factor 1.50
Chattanooga, TN



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