

# TRUCKEE RIVER WATERSHED REGIONAL HYDROLOGIC MODEL

Reno, Nevada



## Client

Truckee River Flood Management Authority

## Scope of Services

Hydrology/Hydraulic Analysis

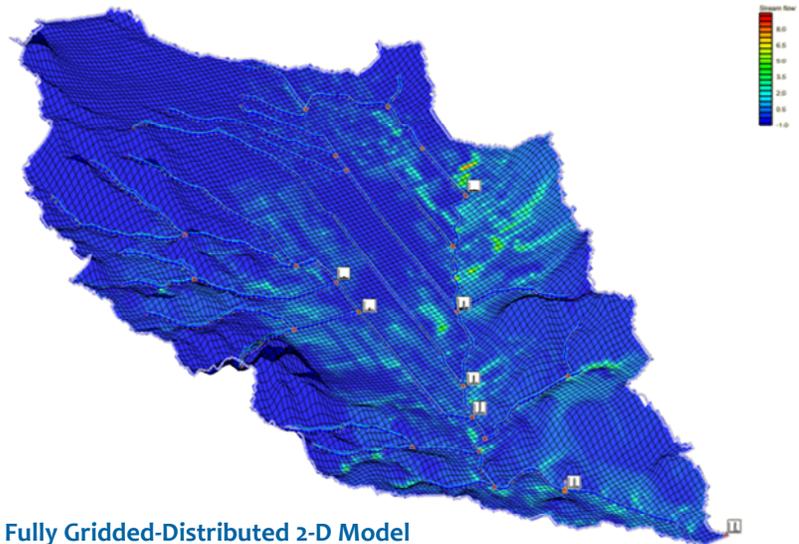
Parameter Calibration

Model Optimization

Advanced GIS Analyses

Special Areas Analyses

Flood Mitigation Alternatives



Fully Gridded-Distributed 2-D Model

Manhard was contracted to develop a detailed regional hydrologic model for the Truckee River watershed that can assist in the evaluations of impacts to stormwater flow, volume, and timing due to development, land use changes, and flood mitigation measures in the watershed. The model will provide useful information to policy makers when evaluating impacts to determine if policy requires updates for public safety. Additionally, we will provide detailed model development documentation, model upkeep/maintenance, and model-use training.

The Truckee River watershed is comprised of the entire Lake Tahoe basin, the Truckee River, and the Pyramid Lake Systems and covers an area of approximately 3,060 square miles. The hydrologic model was developed for the area extending from the outlet of Lake Tahoe in California and all the contributing area up to the Vista Narrows in Nevada. The total study area is approximately 922 square miles. The goal was to develop a model to simulate the hydrologic response of the watershed to be used to predict the effects of land use changes on the floodplains of the Truckee River and its tributaries. To meet this goal, Manhard provided a model that:

- Is scalable, (i.e., has the ability to incorporate flood mitigation measures and changes in land use at both large (> 100 acres) and small (~10 acre) scales and model the downstream impacts)
- Is GIS-based and allows for relatively easy editing of the watershed when incorporating any changes
- Is relatively simple to use and train staff to use
- Is physically-based so it can be calibrated to specific storm events that have occurred in the watershed
- Can account for both surface and subsurface flows
- Allows for spatial and temporal distribution of precipitation from actual storm events
- Is available as public domain software.

**Phase I of the Regional Hydrologic Model** project was to conduct a detailed Pilot Study to compare and contrast the results from the three different software programs (GSSHA, HEC-HMS, and SWMM5) when simulating the hydrologic response to a storm within the Sun Valley watershed between Reno and Sparks.

Manhard chose Gridded Surface Subsurface Hydrologic Analysis (GSSHA) as the preferred model. GSSHA is a gridded-distributed finite element model that utilizes one-and two-dimensional computational algorithms for surface, channel, and groundwater flow regimes.

Manhard recently began Phase II of the Regional Hydrologic Model project and is currently developing digital elevation models (DEMs), land use, and soil coverage GIS shapefiles.