

**SCOPE OF WORK AND DELIVERABLES
FOR THE
WATERSHED MODELING AND EDUCATION PROJECT
FOR THE LOWER TUSCAN AQUIFER**

In the following a Scope of Work for the modeling of surface and subsurface water balances, stream outflows and stream water temperatures at the Big Chico, Little Chico, Butte Creek, and Cherokee foothills watersheds that drain into the Butte Basin IWFM groundwater model domain, is given.

YEAR 1

1. Reconstruction of historical hydro-climate data (precipitation, air temperature, solar radiation, wind, relative humidity) at 3 km resolution over the foothills region, encompassing Big Chico, Little Chico, Butte Creek and Cherokee watersheds, will be performed.
2. A geographical information system (GIS) for the above-mentioned four watersheds' region will be developed. This GIS will include soils, vegetation, topography, geology, land use/land cover, and existing historical climatic and hydrologic databases over Big Chico, Little Chico, Butte Creek and Cherokee watersheds.
3. The Watershed Environmental Hydrology (WEHY) model will be implemented at the above-mentioned four foothills watersheds that drain into the Butte Basin IWFM groundwater model domain. For each of the four foothills watersheds a WEHY model will be calibrated by means of the available hydrologic data, environmental data (stream water temperatures), reconstructed atmospheric data, soils data, vegetation data, topographic data, geology data, and land use/land cover data over and under the modeling region. Stream water temperatures in the stream riparian zones have fundamental impact on the ecosystem habitat (especially on the survival and spawning of Chinook Salmon) at the four foothills watersheds modeling region.

4. The watershed environmental hydrology (WEHY) model will then be validated by means of the comparison of the model simulations against the existing historical surface and subsurface hydrologic data, and water temperature data at the four foothills watersheds modeling region.

YEAR 2

1. For the historical critical drought hydro-climatic conditions the corresponding water balances and water temperatures will be simulated by the calibrated and validated WEHY model over the Big Chico, Little Chico, Butte Creek and Cherokee foothills watersheds under various land use and land management scenarios. By means of these water balance studies the stream inflows from the upstream rim region of the Big Chico, Little Chico, Butte and Cherokee watersheds into the Butte Basin IWFM groundwater model domain will be quantified under the historical critical drought conditions. The simulated water balances at the four foothills watersheds will also quantify the soil water, evapotranspiration and stream water discharge and temperature at any location within these four watersheds during the historical critical drought period under various land use and land management scenarios.
2. For the historical critical wet period, the flood hydrology and stream water temperature conditions will be simulated by the calibrated/validated WEHY model at any location within the Big Chico, Little Chico and Butte Creek, and Cherokee watersheds under various land use and land management scenarios. These simulations will provide information on the stream inflow discharges into the Butte Basin IWFM groundwater model domain during the historical critical wet period under various land use and land management scenarios.
3. A User's Manual for the WEHY model will be prepared, and the Butte County technical staff will be trained by the Hydrologic Research Laboratory staff of U.C. Davis on the use of the WEHY model.