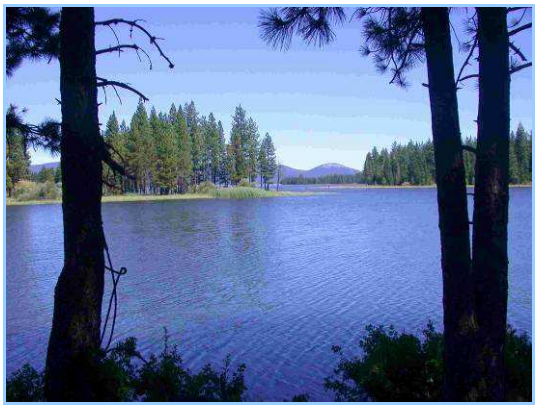
Geomorphology of the Hamilton Branch

North Fork Feather River, California

Pacific Gas and Electric Company owns and operates a hydroelectric project on the Hamilton Branch of the Feather River. Project features include a storage reservoir, diversion structures, power canal, penstock, and powerhouse. R2 completed a geomorphology study of the river focusing on identifying any changes in morphology that have occurred due to historic and current operation of the project.

Historic air photos, topographic maps, and field measurements were used to classify reaches of the river and characterize the response potential of the river to changes in water and sediment supply. In addition, the loading and recruitment of large woody debris was characterized for the river.

A hydrologic model was developed to reverse route historic streamflow and reservoir level records in order to synthesize natural flow records. Average annual sediment yields were estimated for both natural and "with project" conditions. HEC-RAS models were constructed for each of four study sites to provide information to complete sediment transport analyses. Sediment transport analyses were completed with computer programs developed in-house that incorporate the Parker Equations for gravel bed rivers.



A methodology was developed to provide a means to quantify the changes that have occurred to the grainsize distribution of the streambed due to the changes in hydrology and sediment supply. At some locations, the proportion of the streambed covered by "mobile" sediments was found to have been reduced from 35% of the streambed to 19% due to historic project operations.

Project Elements:

- Fluvial Geomorphology
- Hydrology
- Reservoir operation
- HEC-RAS Modeling
- Sediment Yield
- Sediment Transport
- Fisheries