

CONCEPTUAL HYDRAULIC ANALYSES OF CONNECTICUT RIVER UPSTREAM OF WYOMING DAM, VT

Client: Field Geology Services

Woodlot was contracted to perform a conceptual hydraulic analysis of changes in water surface elevations upstream of the former Wyoming Dam site on the Connecticut River near Guildhall, Vermont. The purpose of the work was to evaluate and compare water surface elevations and boundary shear stresses in the reach of river upstream of the dam under a variety of flow conditions. The results of the hydraulic analysis suggested that upstream water surface elevations decreased through the entire study reach following the failure of the dam.



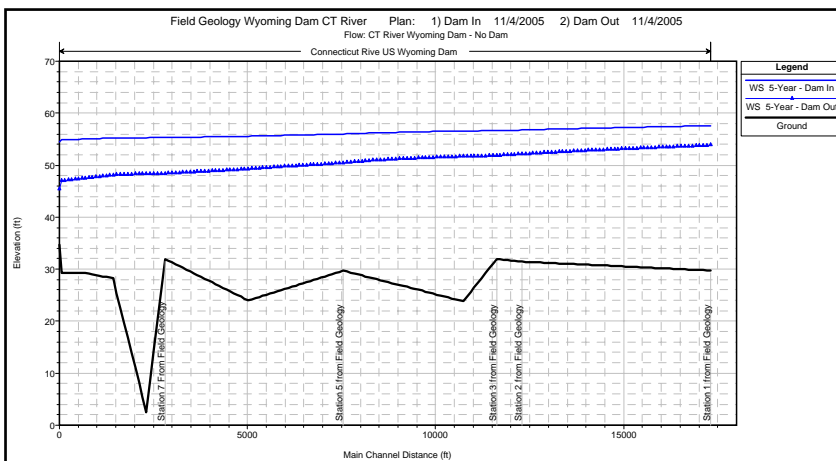
The breached Wyoming Dam site on the Connecticut River.

Woodlot's project work included the evaluation of the dam's spillway capacity prior to its failure, and hydrologic and hydraulic analyses for the affected reach of river. Spillway capacity was evaluated based on information contained in historical records obtained from state regulatory agencies, including a dam safety study performed by the U.S. Army Corps of Engineers (Corps) prior to the dam's failure. Project flows were determined using the United States Geological Survey (USGS) PEAKFQ software and daily average flow data obtained from an adjacent USGS stream gaging station, and included the determination of peak flows for a range of events with return intervals between 2 and 100-years.



Plan view of HEC-RAS hydraulic model.

A hydraulic analysis of pre- and post-failure conditions was performed using the Corps Hydrologic Engineering Center River Analysis System (HEC-RAS). The HEC-RAS hydraulic model was developed by Woodlot using cross-section data provided by the client. The pre-failure conditions were evaluated using spillway capacity information developed by Woodlot.



Calculated water surface profile for pre- and post-failure conditions.

The results of the hydraulic analysis were used to evaluate changes in water surface elevations in the upstream reach of river and associated changes in boundary shear stresses. In general, the lowered water surface elevation likely resulted in increased shear stress, resulting in increased potential for erosion of sediments and soils along the channel boundary.