Christine Stonier

TransCanada Hydro Northeast (TC) is the owner and operator of 17 hydropower dams in New England. TC was recently required to perform FERC- mandated, EAP, dam break modeling and Inundation Mapping updates. TC's consultant, GZA performed the dam break analyses with a 1-D unsteady flow model using HEC-RAS version 5.0.1 and new mapper feature to produce results within minutes after breach runs were simulated.

The Inundation Maps were developed using geospatial information management methods on a Web-based platform. The project successfully used geospatial tools to manage and present complex and varied dam breach hydraulic data. This approach raised the bar beyond traditional visualization and delivery of EAP information and flood wave propagation hydraulic data.

The vast amount of input data for the project included 300 river miles of terrain, bathymetry, bridges, and dams along the Connecticut and Deerfield Rivers. The project leveraged these large and complex datasets by combining them with internal data libraries and geospatial software. A key mapping feature was the use of the consultant-hosted SQL Server database, ArcGIS Server including the web-based GZA Geo-Tool© to integrate HEC-RAS hydraulic computer applications. This innovative tool provides interactive access to EAP information via desktop and mobile devices. This included the inundation mapping, dam locations, hydrographs and other EAP documents.
Geo-Tool© is a password-secured, web-based application constructed on ESRI's ArcGIS Platform and customized using ESRI's Web App Builder. It can be hosted on the consultant's or dam owner's dedicated infrastructure. The benefits of this mapping approach include:
• Not requiring GIS software;
• Interactivity for stakeholders, emergency responders, and plan preparers;
• Remote access from various desktop and mobile devices;
• Ease of providing map updates;
• Ability to quickly overlay publicly available GIS data layers;
• Using mobile phones and tablets, users can collect and input additional data in the field to imbed other key dam design and record data, attach documents, photos and video; and
• Applicable for subsequent staff training and other EAP tabletop exercises.

The geospatial/Web-based approach is a state-of-the-practice game changer in how the dam safety engineering community will produce inundation maps going forward.