



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Military Hydrology Program

Description

The [Military Hydrology Program](#) at ERDC's [Coastal and Hydraulics Laboratory](#) deals with the characteristics of surface and subsurface water features as they affect the planning and execution of military operations. CHL assists the Department of Defense in operations throughout the world with various applications affecting mobility and water supply. Included are research areas to support tactical forecasting and timely acquisition of hydrologic weather and terrain support data critical to military planning and execution.



Sava River bridge, Croatia

Capabilities

Studies conducted by CHL's military hydrology experts include:

- Dam breach analysis, which visualizes results of a dam break such as the display of a flood wave as it moves downstream. Dam break models are used to study the downstream effects.
- Base camp evaluation and floodplain analysis, which covers the possibility of and areas flooded from extreme rainfall events
- Bridge location assessment and analysis of river crossings in which predictions are made of the depth, width, and velocity at select locations along a river for bridge emplacement
- River forecasting and river stage monitoring
- GIS interfacing with existing and new hydrology models in which graphical depictions are made of flooded areas
- Hydrologic modeling in which hydrologic models are developed for selected areas worldwide
- Weather monitoring, which provides a link with Air Force Global Weather Center, to provide weather forecasts to the field

Supporting Technology

Military hydrology depends on various numerical models that use physical characteristics including [Watershed Modeling System \(WMS\)](#), a comprehensive modeling system for watershed hydraulics and hydrology; Hydrologic Engineering Center River Analysis System (HECRAS); Grid Surface Subsurface Hydrologic Analysis (GSSHA); Tactical

Dam Analysis Model (TACDAM) which can simulate the progress of a dam-break wave; and the National Weather Service's FLOODWAVE.

Benefits

Predictions of hydrologic conditions in the field are important to strategic military operations and necessary for proper planning of military exercises and deployment of troops. Detailed analysis provides maximum benefits in making critical military decisions.

Success Stories

- CHL provided extensive military hydrology support for Operation Iraqi Freedom. Concern over potential flooding and dam breach scenarios along the Tigris and Euphrates Rivers resulted in CHL conducting a series of studies on the potential military impacts should such flooding occur. CHL's efforts in support of Operation Iraqi Freedom were recognized in commendations from the National Intelligence Council, the Director of Central Intelligence, the National Ground Intelligence Center and the Marine Corps Intelligence Activity.
- CHL was involved in Operation Joint Endeavor during which the U.S. Army deployed troops and heavy vehicles into Bosnia across the Sava River at Zupanja, Croatia. Frequent floods and rapid rise and fall of river stages required frequent manipulation of the bridge anchoring. CHL along with the assistance of the Cold Regions Research and Engineering Laboratory (CRREL) assisted the troops at the bridge site with snowmelt and rainfall-runoff forecasts over 3 years beginning in December 1995. The Bosnian operation brought international recognition with acknowledgment by NATO because of the quick and accurate calculations for tactical hydrologic calculations.

Point of Contact

Earl Edris, CEERD-HC-H: Earl.V.Edris@erdc.usace.army.mil, Phone: 601-634-3378.