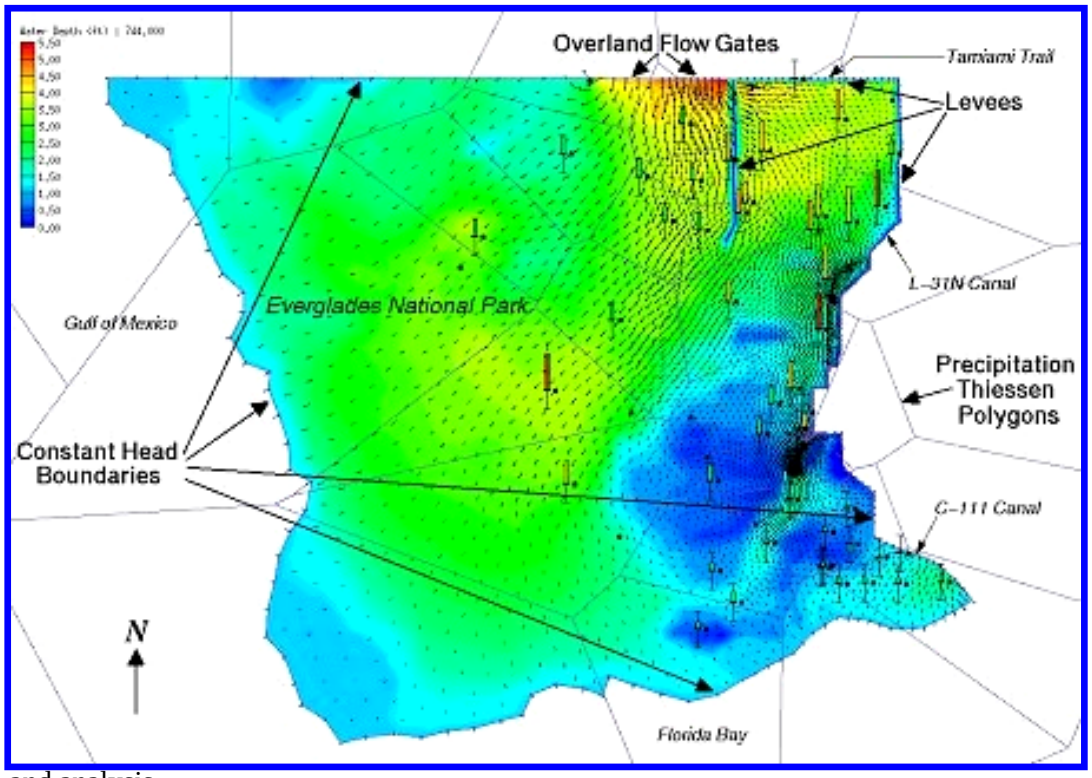
US Army Corps of Engineers®
Engineer Research and Development Center

Groundwater Modeling and Analysis

Description

The Groundwater Team at ERDC's Coastal and Hydraulics Laboratory (CHL) conduct studies for USACE Districts, the Environmental Protection Agency, the Nuclear Regulatory Commission, and various other Federal agencies using the Groundwater Modeling System (GMS) to help expedite environmental cleanups throughout the country. Due to a lack of understanding in the past of the dangers associated with the handling and disposal of certain chemical compounds, subsurface environmental groundwater problems at many of the Nation's military installations have resulted from former manufacturing and disposal practices. Cleanup of these problems could take decades with costs ranging into tens of billions of dollars, which indicates the need for thorough groundwater modeling and analysis.



Groundwater model of Everglades National Park, Florida

Capabilities

In addition to studies involving contamination, the Groundwater Team also deals with other groundwater issues, including soil moisture, bluff stability, infiltration and unsaturated flow studies. Software capabilities allow users to visualize the site, evaluate options and predict the future effects of projects.

Supporting Technology

Groundwater modeling and analysis uses GMS, which includes interfaces to several common groundwater models. In addition to model interfaces, tools are available to aid in other phases of groundwater simulations. For example, a set of geostatistical interpolation options (Inverse Distance Weighted, Natural Neighbor, Kriging, etc.) is included for the visualization of discrete point data. The map module and the new GIS module available in GMS Version 5.0 make data transfer and model setup much simpler. Other options for analyzing stratigraphic data are also available.

Benefits

Time and money can be saved through groundwater modeling because it allows the user to quickly and efficiently analyze multiple options and compare results. GMS also offers multiple visualization options to make communication of model results simpler.

Success Stories

The ERDC-CHL Groundwater Modeling Team has been involved at hundreds of sites around the country in studies involving environmental remediation evaluation and design, and water resources supply and protection. As an example, an extensive groundwater model on the island of Oahu, Hawaii was developed using GMS, where an identified area of groundwater contamination on a U.S. Army base was suspected of being the source of contamination discovered in a municipal drinking water supply well. By running the model through dozens of simulations, evaluating various possible conditions, it was determined that the identified area could not be the source of contamination in the drinking water well. The findings of the study helped convince State and Federal regulators that instead of 12 wells being placed around the identified source, only two were needed to contain the contaminant plume. Since the cost to install wells in the fractured basalt beneath the surface on Oahu is approximately $350,000, a considerable amount of taxpayer money was saved.

Point of Contact

ERDC-CHL Groundwater Team, CEERD-HC-H, (601) 634-2344
gms@erdc.usace.army.mil