



RAS-MODFLOW

Description

RAS-MODFLOW is a coupled model being developed by the FCSDR R&D Program's Groundwater/Surface Water Interaction work unit. Its objective is to



support improved representation of water exchange where groundwater interaction is a significant component of channel flow, and provide a more complete accounting of water storage in groundwater and channels. The model is derived from the Hydrologic Engineering Center-

River Analysis System (HEC-RAS) and Modular Three-Dimensional Groundwater Flow Model (MODFLOW). Both HEC-RAS and MODFLOW are considered to be the standards of the profession. RAS-MODFLOW will simulate all significant aspects of the channel-aquifer system and the effect of all potential stresses on this system. This includes channel flow; varying gates; operating rules; complex hydraulic structures; backwater effects; varying streambed conductance; groundwater flow; stream-aquifer interaction, including unsaturated flow when the water table drops below the streambed; groundwater pumping; and infiltration beneath the storage ponds.

Benefits

In areas where surface-water/groundwater interaction is an important hydrologic feature, new design and river management challenges require tools that simulate river hydraulics and adjacent groundwater using the latest technology available. Available public domain codes use river hydraulics and groundwater models that were developed in the 1980's or mid-1990's. The coupling of HEC-RAS and MODFLOW in conjunction with a practical, user-friendly interface will provide a much-needed, state-of-the-art, nonproprietary tool for the profession. Additionally, the new coupling algorithm will allow for the independent evolution of hydraulics and groundwater codes. This is especially useful in areas, such as south Florida, where surface-water/groundwater interaction is an important hydrologic feature.

Status	In FY07, an explicit coupled model was developed. A simple test application was successfully run, where stage and flow data were passed between HEC-RAS and MODFLOW using the model interface Open-MI. Currently, a more complex coupling is being developed which will allow for the testing of larger models. Larger models will open up the many questions and challenges in FY08 including spatial mapping, temporal issues, mass balance convergence, and computational efficiency. Robustness and user-experience are additional concerns that will be addressed in FY08.
Distribution Source(s)	The product of this work unit is currently in the development stage.
Available Documentation	None presently available.
Available Training	None presently available.
Available Support	Support for RAS-MODFLOW will be available to all Corps employees upon completion of development.
Application	An initial test application has been successfully completed. For an initial project application, RAS-MODFLOW will be used to simulate a complex surface-groundwater system along the Russian River in northern California beginning in FY09.
Point of Contact	Jon Fenske, E-mail: Jon.P.Fenske@usace.army.mil and David J. Harris, E-mail: David.J.Harris@usace.army.mil , Hydrologic Engineering Center, 609 2 nd St., Davis, CA. 95616. 530-756-1104.
Partners	N/A.