



**US Army Corps
of Engineers®**
Engineer Research and
Development Center

ADaptive Hydrology/Hydraulics (ADH) Model System

Technology

Adaptive Hydrology/Hydraulics (ADH) is a modular, parallel, adaptive finite-element model for one-, two-, and three-dimensional flow and transport. ADH is a module of the Department of Defense (DoD) Surface-Water Modeling System and Ground-Water Modeling System. ADH simulates groundwater flow, internal flow, and open channel flow. The ADH module was developed in the Engineer Research and Development Center's [Coastal and Hydraulics Laboratory](#) and is a product of the [System-Wide Water Resources Program](#).

Issues

ADH was developed to address the environmental concerns of the DoD in estuaries, coastal regions, river basins, reservoirs, and groundwater.

Expected Cost To Implement

The program is available to the Corps of Engineers and other DoD agencies at no charge.

Benefits/Savings

The general features in ADH that benefit the modeler include:

- **Adaptation:** The user needs only to generate a general mesh to capture the geometry of the problem. ADH will automatically refine it to provide accurate solutions and more stable and less expensive simulations.
- **Portability:** ADH can run efficiently on a wide variety of platforms ranging from standard PCs to high-end supercomputers.

Status

Over the next four years, all of the modules within ADH will be extended to allow more capabilities. Eventually an overall domain will include regions that are nonhydrostatic, hydrostatic, and groundwater.

ERDC POC

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Distribution Sources

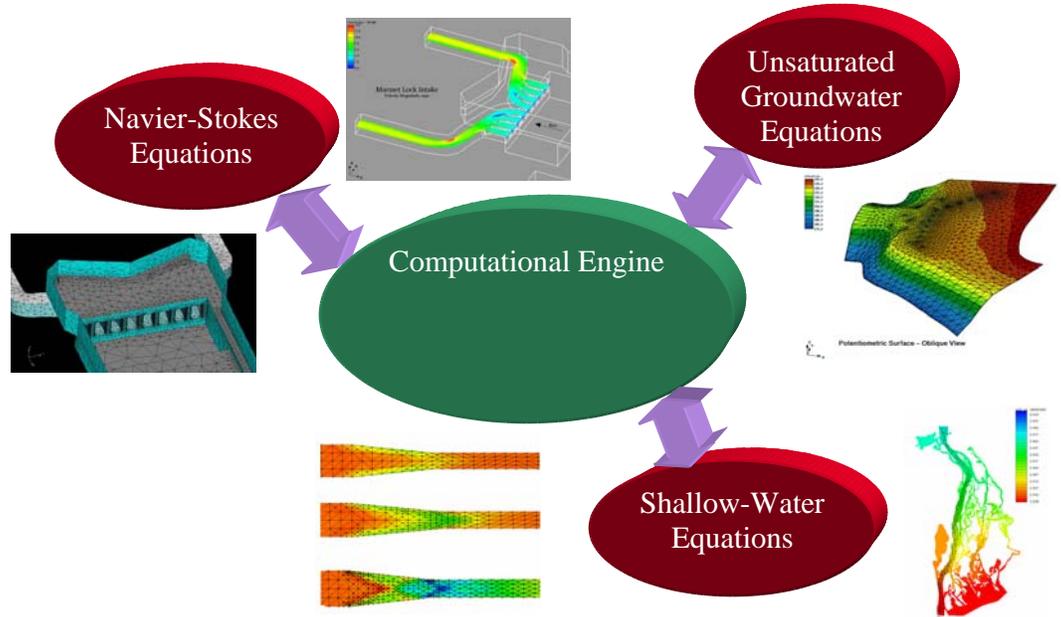
The ADH module is currently available to U.S. Army Corps of Engineers Districts and other government agencies. A version covering two-dimensional shallow-water flow with sediment transport will be released to the general public in late 2007.

**Available
Documentation**

The following technical manuals and other information pertaining to ADH can be found at <https://adh.usace.army.mil>

- **Groundwater-Surface Water Interaction (Howington et al.)**
- **Navier-Stokes Manual (Berger and Schmidt 2004)**
- **Navier-Stokes Manual (Berger and Schmidt 2000)**
- **Shallow Water Manual (Berger and Tate 2005)**
- **Quick Reference (Carrillo and Hallberg 2005)**

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ADH philosophy showing multiphysics capability