



# Project Summary

## Hydrological Simulation Program—FORTRAN User's Manual for Version 11

Brian R. Bicknell, John C. Imhoff, John L. Kittle, Jr., Anthony S. Donigian, Jr.,  
and Robert C. Johanson

**The Hydrological Simulation Program—FORTRAN (HSPF) is a set of computer codes that can simulate the hydrologic and associated water quality processes on pervious and impervious land surfaces and in streams and well-mixed impoundments. In this way, nonpoint source loads of sediments, organic pollutants, oxygen-demanding materials, and nutrients are generated that can easily be combined with imposed point sources within the HSPF system for watershed and basin-scale environmental management. The manual discusses the structure of the system and presents detailed discussion of the algorithms used to simulate various water quantity and quality processes. It also contains all of the information necessary to develop input files for applying the program, including descriptions of program options, parameter definitions, and detailed input formatting data.**

***This Project Summary was developed by the National Exposure Research Laboratory's Ecosystems Research Division, Athens, GA, to announce key findings of the research project that is fully documented in a separate report by the same title (see Project Report ordering information at back).***

The Hydrological Simulation Program—FORTRAN, first distributed in 1980, is a comprehensive package for simulation of watershed hydrology and water quality for

both conventional and toxic organic pollutants. HSPF incorporates submodules into a basin-scale analysis framework that includes pollutant transport and transformation in one-dimensional stream channels.

HSPF is the only comprehensive model of watershed hydrology and water quality that allows the integrated simulation of land and soil contaminant runoff processes with point sources and in-stream hydraulic and sediment-chemical interactions. The result of this simulation is a time history of the runoff flow rate, sediment load, and nutrient and organic pollutant concentrations, along with a time history of water quantity and quality at any point in the water column and benthic compartment in a watershed. HSPF simulates three sediment types (sand, silt, and clay) in addition to a single organic chemical and transformation products of that chemical.

Preparation of the updated Version 11 of HSPF was funded by the U.S. Geological Survey, in cooperation with the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency's (EPA) Chesapeake Bay Program Office, Region III, and the Ecosystems Research Division (Athens GA) of the National Exposure Research Laboratory. Documentation and code may be obtained by accessing EPA's Center for Exposure Assessment Modeling home page. The address is <http://www.epa.gov/CEAM> (case sensitive).

---

*Brian R. Bicknell, John C. Imhoff, John L. Kittle, Jr., and Anthony S. Donigian, Jr., are with AQUA TERRA Consultants, Mountain View, CA 94043; Robert C. Johanson is with the University of the Pacific, Stockton, CA 95204.*

**Frank E. Stancil, Jr.** is the EPA Project Officer (see below).

The complete report, entitled "Hydrological Simulation Program—FORTRAN: User's Manual for Version 11," (Order No. PB97-193114; Cost: \$92.00, subject to change) will be available only from:

National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
Telephone: 703-487-4650

The EPA Project Officer can be contacted at:

Ecosystems Research Division  
National Exposure Research Laboratory  
U.S. Environmental Protection Agency  
Athens, GA 30605-2700

United States  
Environmental Protection Agency  
Center for Environmental Research Information (G-72)  
Cincinnati, OH 45268

Official Business  
Penalty for Private Use \$300

EPA/600/SR-97/080

BULK RATE  
POSTAGE & FEES PAID  
EPA  
PERMIT No. G-35