

HSPF

Model Uses HSPF simulates watershed hydrology and water quality for toxic and organic pollutants and can be used to model fate and transport in one-dimensional stream channels.

Major Categories Water Quality

Subject Knowledge Level
Intermediate

Minor Categories Pollution

Technical Difficulty Level
Intermediate

Model Type Physical Model

Geographic in Nature?
No

Abstract

Hydrological Simulation Program (HSPF) is a comprehensive package for simulation of watershed hydrology and water quality for both conventional and toxic organic pollutants. HSPF incorporates watershed-scale ARM and NPS models into a basin-scale analysis framework that includes fate and transport in one dimensional stream channels. It is the only comprehensive model of watershed hydrology and water quality that allows the integrated simulation of land and soil contaminant runoff processes with 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 pesticide concentrations, along with a time history of water quantity and quality at any point 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. The transfer and reaction processes included are hydrolysis, oxidation, photolysis, biodegradation, volatilization, and sorption. Sorption is modeled as a first-order kinetic process in which the user must specify a desorption rate and an equilibrium partition coefficient for each of the three solids types.

Future Developments

Unknown

Model Limitations

Unknown

Model Features

- Watershed Scale ARM and NPS models are incorporated into a basin-scale analysis framework
- Allows the integrated simulation of land and soil contaminant runoff processes
- Capable of processing hydraulic and sediment-chemical interactions
- Produces time-history of runoff flow-rate, sediment load, nutrient and pesticide concentrations correlated with water quantity and quality.
- Simulates sand, silt and clay sediment types
- Models hydrolysis, oxidation, photolysis, biodegradation, volatilization and sorption transfer and reaction processes.

Required Data Types

Data is entered by the user at the DOS prompt and includes information such as water quantities, sediment types, sorption / desorption rates and equilibrium coefficients.

Model Outputs

After executing the HSPF model, the user can view an output file stored in ASCII text (non-binary) format. Results can be viewed by scrolling through the output file that was:

(1) a result of model or program execution and/or

(2) named by the user at a run time prompt. A word processor or text editor is convenient for this purpose.

Source

US Environmental Protection Agency

Source (URL)

<http://www.epa.gov/ceampubl/swater/hspf>

Hardware Requirements

Standard DOS requirements.

		Supported Platforms	
DOS	<input checked="" type="checkbox"/>	UNIX	<input type="checkbox"/>
Windows	<input type="checkbox"/>	Macintosh	<input type="checkbox"/>

Software Requirements

No additional software is required.

Cost, Licensing and Availability

Model is offered free of charge from US EPA through the link provided above.