

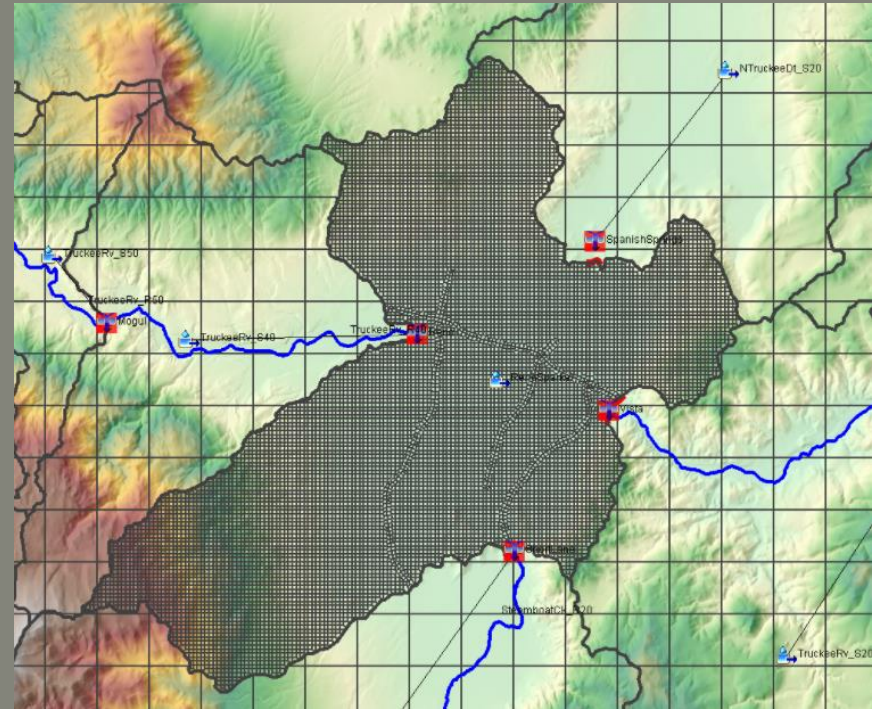
# U.S. ARMY CORPS OF ENGINEERS

## MODELING WITH HEC-HMS PART II

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Mike Bartles, P.E.

Hydrologic Engineering Center



*"The views, opinions and findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."*

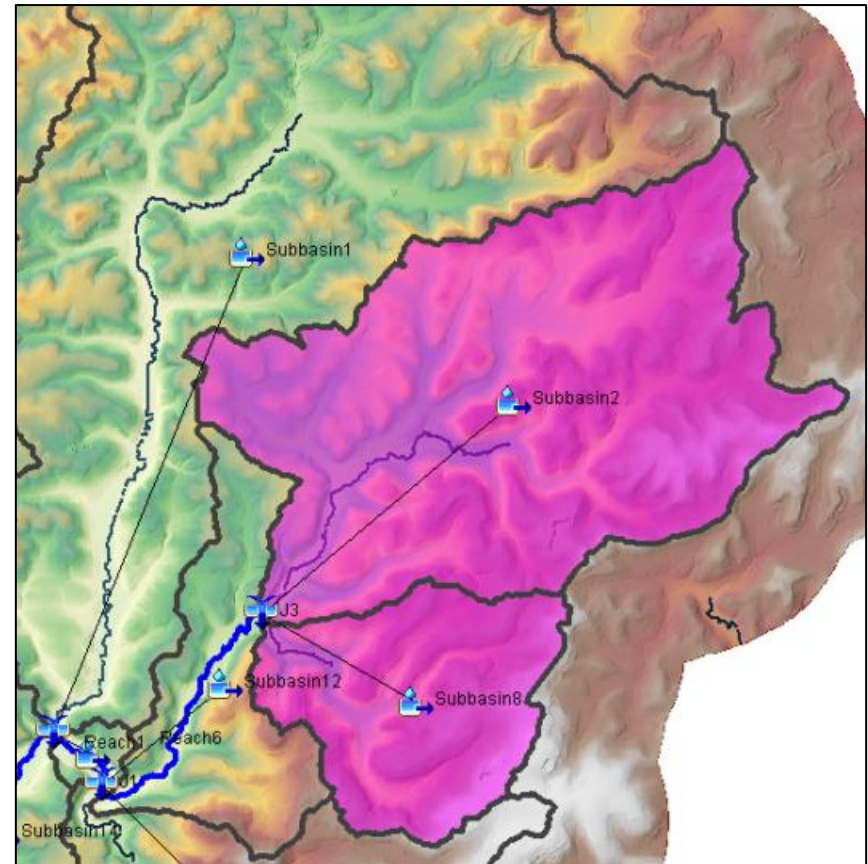


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# OVERVIEW

- Introduction
- HEC-HMS Overview
- Updated Documentation
- Demo of Recently Added Features
  - GIS
  - Expression Calculator
  - Gridded Data Processing
  - Automated Forecast
  - Results
  - 2D Flow
- Upcoming Enhancements



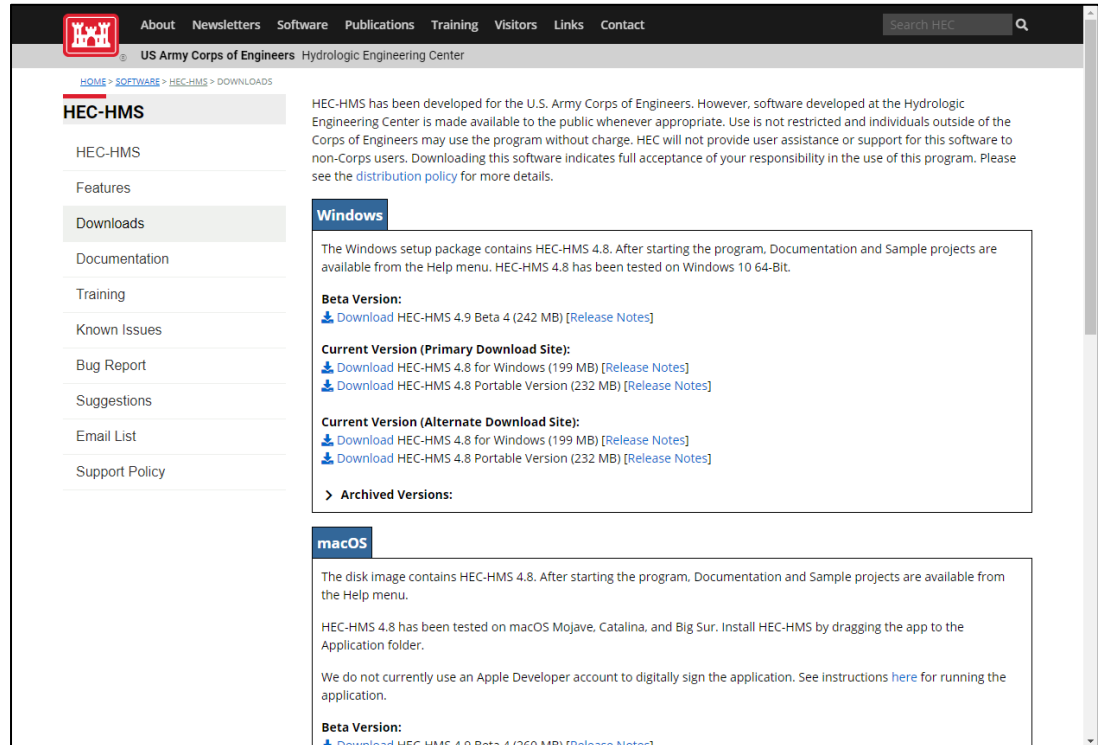
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# HEC-HMS

- Free!
- ~50,000 downloads per year
- Windows, MacOS, and Linux versions
- Latest Release
  - Version 4.8



The screenshot shows the HEC-HMS website interface. The top navigation bar includes links for About, Newsletters, Software, Publications, Training, Visitors, Links, and Contact. The main content area is titled "HEC-HMS" and features a sidebar with navigation options: Features, Downloads (highlighted), Documentation, Training, Known Issues, Bug Report, Suggestions, Email List, and Support Policy. The main content area is divided into two sections: "Windows" and "macOS".

**Windows**

The Windows setup package contains HEC-HMS 4.8. After starting the program, Documentation and Sample projects are available from the Help menu. HEC-HMS 4.8 has been tested on Windows 10 64-Bit.

**Beta Version:**  
[Download HEC-HMS 4.9 Beta 4 \(242 MB\)](#) [Release Notes]

**Current Version (Primary Download Site):**  
[Download HEC-HMS 4.8 for Windows \(199 MB\)](#) [Release Notes]  
[Download HEC-HMS 4.8 Portable Version \(232 MB\)](#) [Release Notes]

**Current Version (Alternate Download Site):**  
[Download HEC-HMS 4.8 for Windows \(199 MB\)](#) [Release Notes]  
[Download HEC-HMS 4.8 Portable Version \(232 MB\)](#) [Release Notes]

> Archived Versions:

**macOS**

The disk image contains HEC-HMS 4.8. After starting the program, Documentation and Sample projects are available from the Help menu.

HEC-HMS 4.8 has been tested on macOS Mojave, Catalina, and Big Sur. Install HEC-HMS by dragging the app to the Application folder.

We do not currently use an Apple Developer account to digitally sign the application. See instructions [here](#) for running the application.

**Beta Version:**  
[Download HEC-HMS 4.9 Beta 4 \(260 MB\)](#) [Release Notes]

## HEC-HMS Download



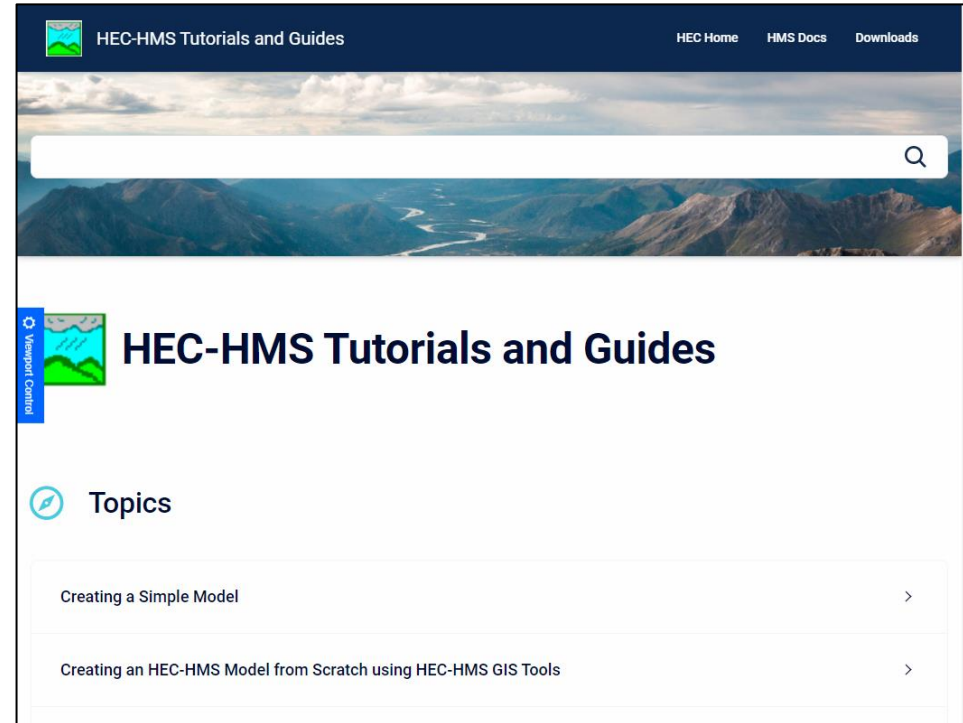
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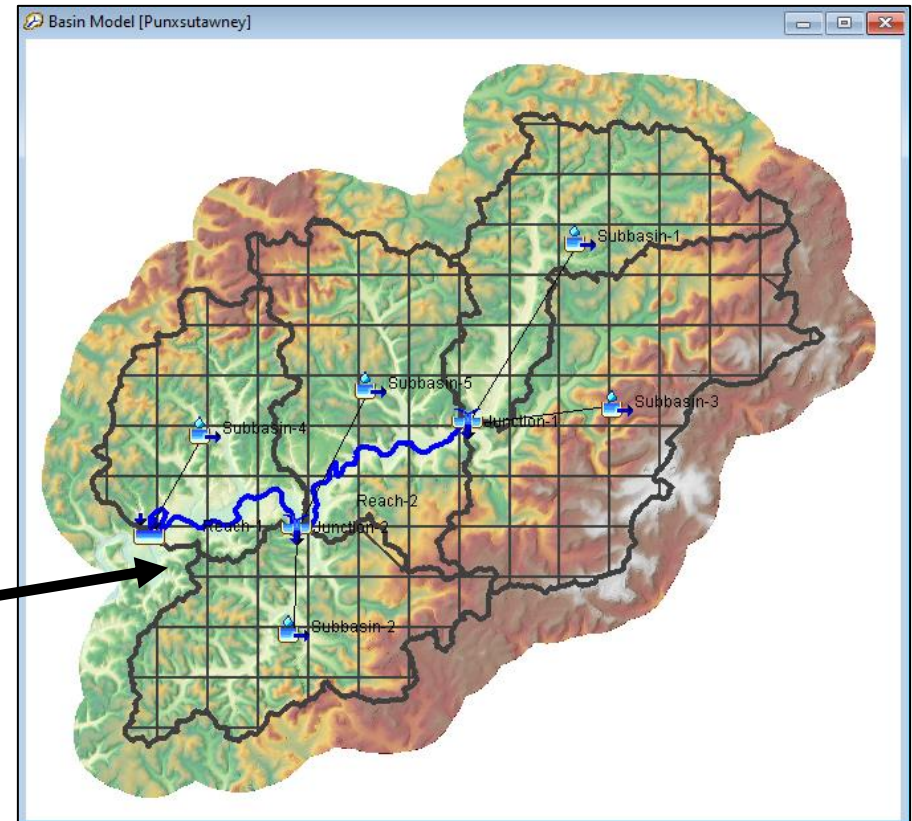
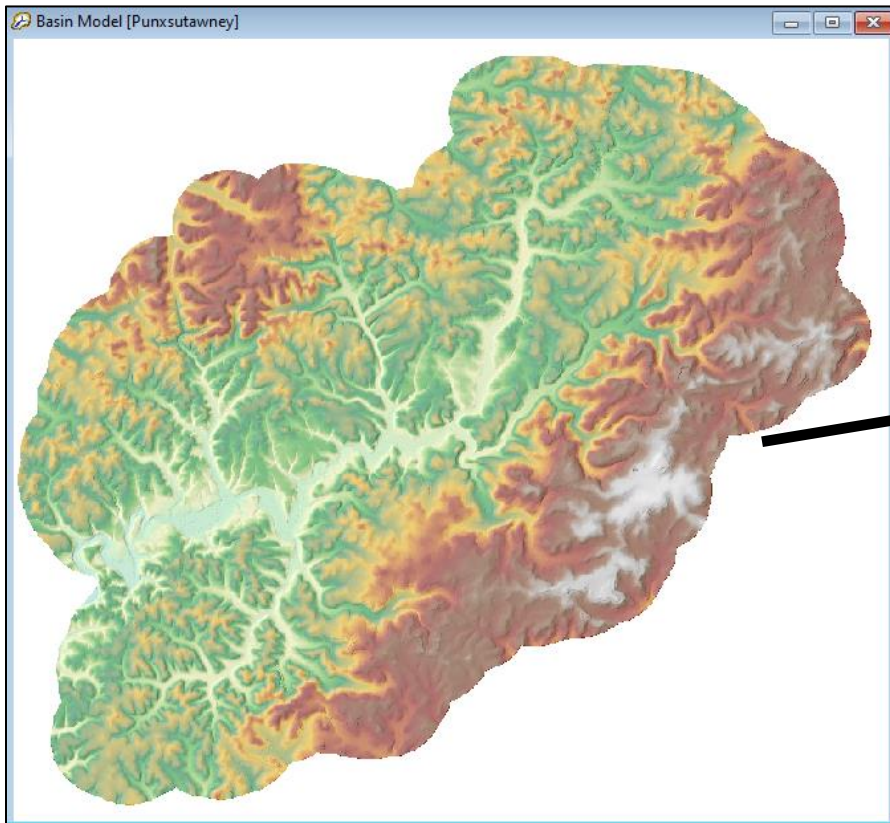
# DOCUMENTATION

- Everything is online and continuously updated
  - Quick Start Guide
  - User's Manual
  - Applications Guide
  - Technical Reference Manual
  - Release Notes
  - Validation Guide
  - **Tutorials and Guides**
  - YouTube videos



## Tutorials and Guides

# DEMO: NEW GIS FEATURES



Tutorial: [GIS Tutorials and Guides](#)

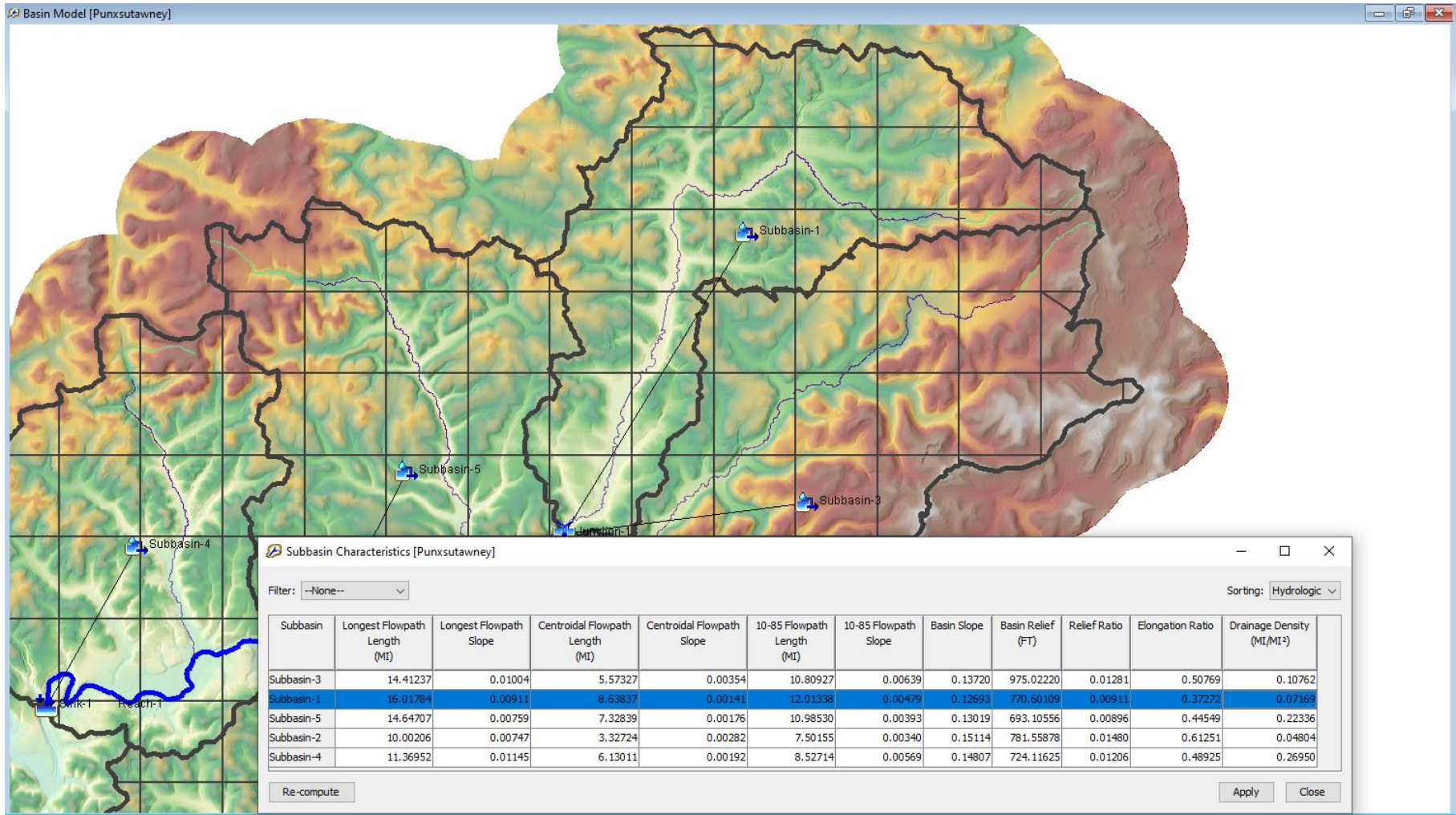


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# DEMO: CHARACTERISTICS



Tutorial: Computing Subbasin and Reach Characteristics



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# DEMO: PARAMETERIZATION

The screenshot displays a GIS application window titled 'Basin Model [Punxsutawney]'. The main view is a topographic map of a watershed, divided into several subbasins. A blue line represents a stream network. Two windows are open over the map:

- ModClark [Punxsutawney]:** A table showing parameters for different subbasins. The 'Filter' is set to '--None--' and 'Sorting' is 'Hydrologic'. The table has three columns: 'Subbasin', 'Time of Concentration (HR)', and 'Storage Coefficient (HR)'. The data is as follows:

Subbasin	Time of Concentration (HR)	Storage Coefficient (HR)
Subbasin-3	4.84	
Subbasin-1	5.95	
Subbasin-5	5.68	
Subbasin-2	4.08	
Subbasin-4	4.72	

- Expression Calculator:** A window for creating mathematical expressions. The 'Field' is 'Time of Concentration'. The 'Variables' list includes: Longest Flowpath Length (MI), Longest Flowpath Slope, Longest Flowpath Slope (FT/MI), Centroidal Flowpath Length (MI), Centroidal Flowpath Slope, Centroidal Flowpath Slope (FT/MI), 10-85 Flowpath Length (MI), 10-85 Flowpath Slope, 10-85 Flowpath Slope (FT/MI), Basin Slope, and Basin Slope (FT/MI). The 'Functions' list includes: Abs(), Atn(), Cos(), Pow(), Fix(), Int(), Log(), Sin(), Sqr(), and Tan(). The expression entered is: 
$$2.2 * (\text{pow}([\text{Longest Flowpath Length (MI)}] * [\text{Centroidal Flowpath Length (MI)}]) / (\text{pow}([\text{10-85 Flowpath Slope (FT/MI)}], 0.5)), 0.3)$$

Tutorial: [Estimating Parameters with GIS Datasets](#)



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# DEMO: AUTOMATED FORECAST

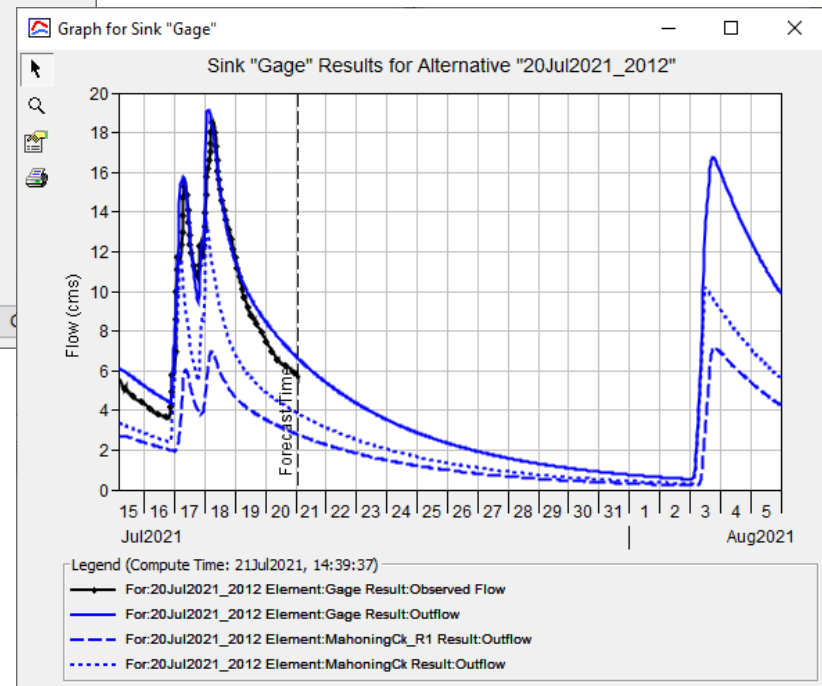
Create a Forecast Alternative [Step 4 of 4] ✕

A Forecast alternative includes a forecast period. Select data sources from the list below. Sources are listed in order of precedence. If data overlaps the source with highest precedence will prevail.

- High-Resolution Rapid Refresh, 0 to 0.75 days
- North American Mesoscale, 0 to 3.5 days
- Global Forecast System, 0 to 16 days

To continue, select data sources and click Next.

< Back Next > Cancel



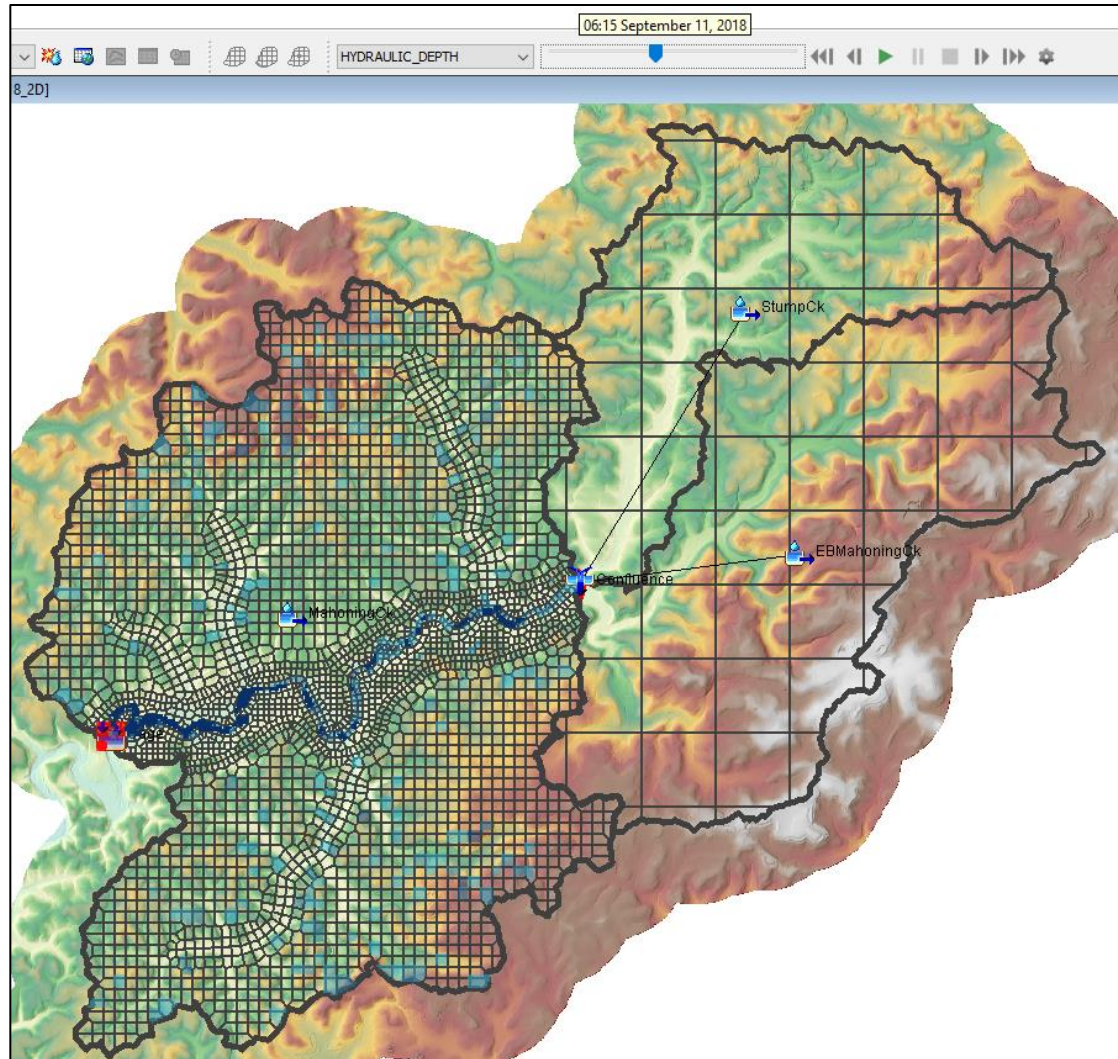
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# DEMO: 2D FLOW



Tutorial: [Using 2D Flow within HEC-HMS](#)

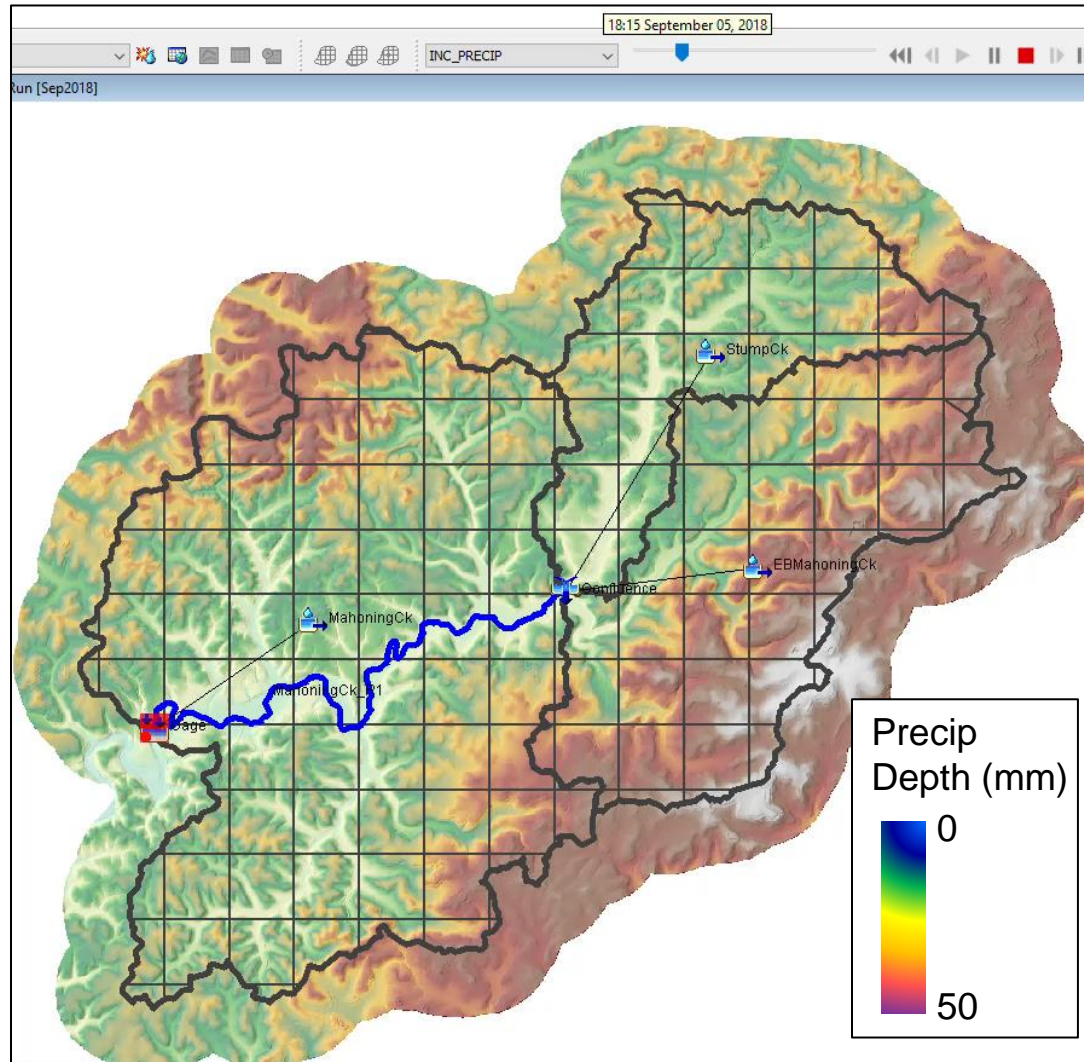


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# DEMO: SPATIAL RESULTS

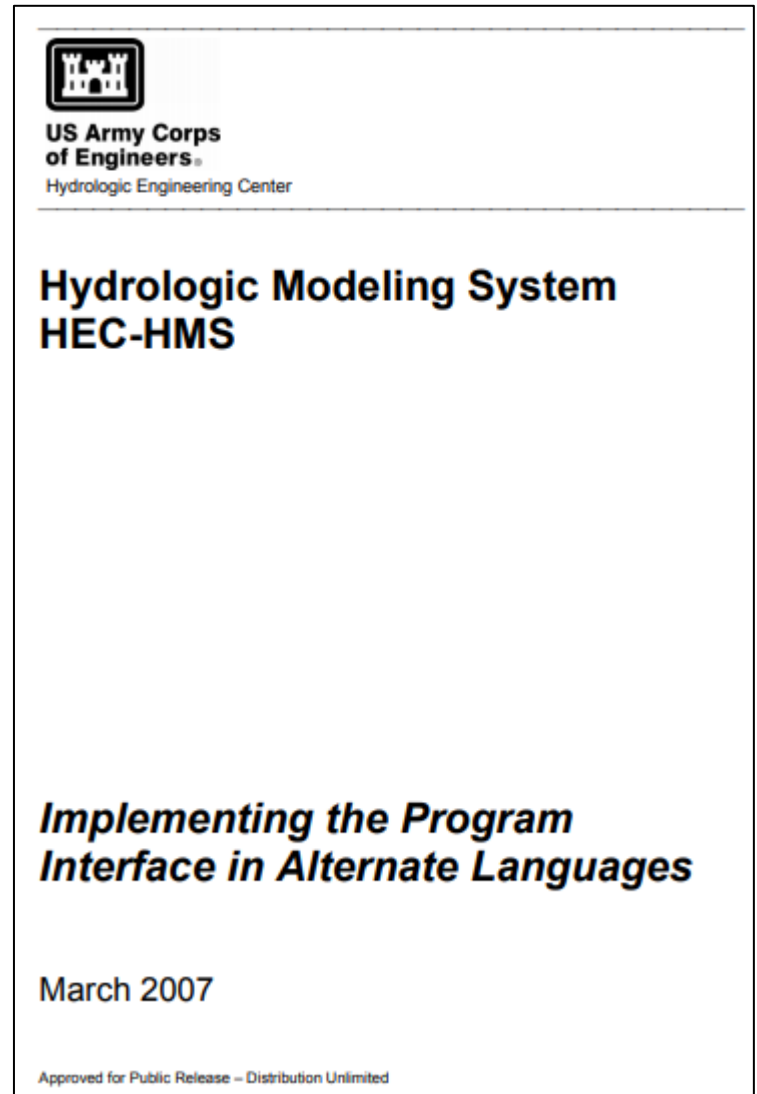


Tutorial: [Viewing Spatial Results for a Structured Discretization](#)

# INTERFACE TRANSLATION

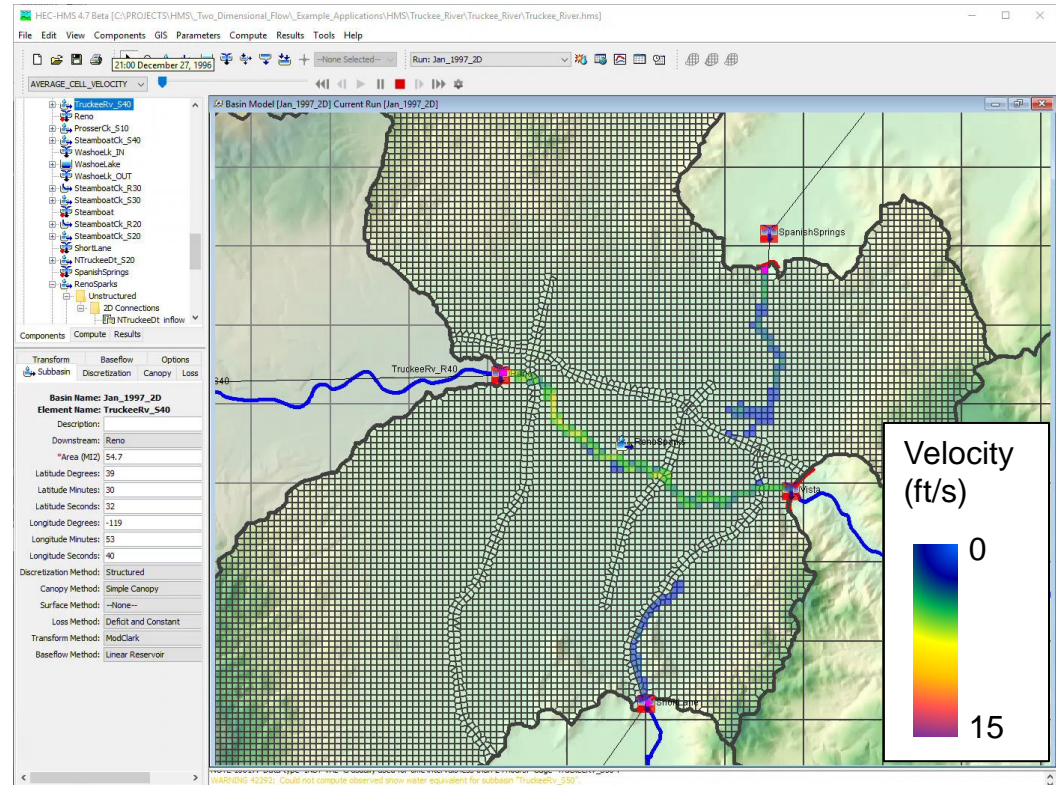
- HEC-HMS was designed to operate independent of regional and language settings on a user's computer
- 95+ language, countries, and/or locales are supported

[Interface Translation Guide](#)



# UPCOMING ENHANCEMENTS

- More GIS tools
- Better gridded data handling
- 2D sediment transport
- Additional optimization and uncertainty analysis tools
- Hypothetical Storm enhancements
- Improved spatial results
- Faster computes



# FOR MORE INFO...

The screenshot displays the HEC-HMS 4.4 software interface. The top navigation bar includes links for About, Newsletters, Software, Publications, Training, Visitors, Links, and Contact, along with a Search HEC field. The main content area is divided into a left sidebar and a central workspace. The sidebar contains a 'HEC-HMS' section with a list of features: Features, Downloads, Documentation, Training, Known Issues, Bug Report, Suggestions, Email List, and Support Policy. The central workspace shows a 3D topographic map of a watershed with a network of rivers and junctions. A 'Graph for Junction "Farad"' is overlaid on the map, showing flow results for the run 'Jan\_1997'. The graph plots Flow (cfs) on the y-axis (ranging from 0 to 16,000) against time on the x-axis (from Dec 1996 to Jan 1997). The legend indicates four data series: Run\_Jan\_1997 Element Farad Result Observed Flow (solid black line), Run\_Jan\_1997 Element Farad Result Outflow (solid blue line), Run\_Jan\_1997 Element TruckeeRv\_R70 Result Outflow (dashed blue line), and Run\_Jan\_1997 Element TruckeeRv\_S70 Result Outflow (dotted blue line). The observed flow shows a significant peak around January 1st, 1997, reaching approximately 14,000 cfs.

The Hydrologic Modeling System (HEC-HMS) is designed to simulate the complete hydrologic processes of dendritic watershed

<https://www.hec.usace.army.mil/software/hec-hms/>



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