



**US Army Corps  
of Engineers**  
Hydrologic Engineering Center

---

# **Hydrologic Modeling System HEC-HMS**

## **Release Notes**

Version 2.1.2  
June 2001



## Introduction

Version 2.1.1 of the Hydrologic Modeling System (HEC-HMS) was completed in February 2001 and released for general use shortly thereafter. A number of program errors have been found since that release and mainly occur in portions of the program used infrequently. However, an error was found in the reservoir element with the elevation-storage-outflow option. This new release repairs these defects without adding new capabilities and is labeled Version 2.1.2. This release is available for computers running the Microsoft Windows 2000/NT/98/95 operating systems or the Sun Microsystems Solaris operating system.

The Technical Reference Manual for Version 2.0 continues to accurately describe the mathematical models included in the program. The User's Manual labeled Version 2.1 continues to accurately describe the use and application of the program.

The installation program and all documentation are available on the HEC website at <http://www.hec.usace.army.mil>.

## Installation

If you have not previously installed the program, obtain the installation program and run it. You will be prompted to specify locations for program files, sample projects, and other required information. You should reboot the computer before attempting to use the program. The method for upgrading earlier versions of the program depends on the method used originally to install the software. If you do not know how it was originally installed, you should skip to the instructions for upgrading from any other version.

Use the following steps to upgrade to the new version *if you have installed Version 2.0.3 or any newer version:*

1. Download the installation program from the HEC website to a temporary folder on the computer. Alternately, insert the provided CD-ROM or other media in the drive.
2. Run the installation program. In Windows Explorer, double-click the icon for the installation program.
3. Follow the on-screen prompts to upgrade the installed software. The program executable and related files will automatically be replaced with updated versions. The installation itself is not modified and project data are not affected.

Use the following steps to *upgrade to the new version from any other version* of the program:

1. Uninstall the version of HEC-HMS present on the computer; project data are not affected. Use the add/remove programs applet in the control panel to uninstall the program. Future upgrades are not expected to require uninstallation.
2. Download the installation program from the HEC website to a temporary folder on the computer. Alternately, insert the provided CD-ROM or other media in the drive.

3. Run the installation program. In Windows Explorer, double-click the icon for the installation program.
4. Follow the on-screen prompts to begin the installation process, specifying locations for program files, sample projects, and other required information.
5. Reboot the computer when the installation program finishes or before attempting to use the program.

## **New Users**

The program has been designed to be easy to use. However, an understanding of how the program works is critical to producing accurate results. It is suggested that a new user read Chapter 3 of the User's Manual and Chapters 2 and 3 in the Technical Reference Manual before attempting to start and use the program. Subsequently, start the program and construct the example application contained in Chapter 10 of the User's Manual. These chapters provide the fundamental instruction necessary to effectively use the program.

## **Experienced Users**

The User's Manual contains information about using each of the computational methods included in the program. A Technical Reference Manual is also available to describe the theoretical basis for the methods included in the program. It is recommended that experienced users read the topics, both in the User's Manual and Technical Reference Manual, for methods used frequently.

## **Closed Defects**

A total of 25 defects have been repaired since the release of Version 2.1.1. A brief description of each defect follows:

1. The non-recording gage option in the inverse distance precipitation model now works correctly. Previously, non-recording gages were processed as if they had zero precipitation for all time.
2. Stage-discharge curves specified at a hydrologic element are now copied when a basin model is copied.
3. Elevation data in reservoir elements are now correctly stored and retrieved. Previously, the data were corrupted when reading it from disk the first time.
4. User-specified gage weights could be incorrectly set when importing a HEC-1 file.
5. The program would crash during a compute if the specified s-graph for a subbasin did not exist.
6. Groundwater layers in the linear reservoir baseflow method were not deleted when their parameter data were deleted.
7. The program sometimes crashed when creating a new soil moisture accounting unit.

8. Evapotranspiration data were not saved until the second time it was entered.
9. The user-specified gage weights precipitation method did not correctly interpolate gage data if the time offset was different from the control specifications offset. An offset is used when, for example, 24-hour data are reported daily at 08:00.
10. The user-specified hyetograph precipitation method did not correctly interpolate gage data if the time offset was different from the control specifications offset.
11. The gage manager did not correctly display data in a table if the gage data had a time offset that was different from the current control specifications.
12. The inverse-distance precipitation method could enter infinite looping during a compute if the first value for a non-recording gage was missing.
13. The first soil moisture accounting unit was deleted when loading a project if none of the units contained data.
14. Soil moisture accounting units could reappear after they were deleted.
15. The program could crash under some rare conditions while computing a run that used a meteorologic model with a user-specified gage weights precipitation method.
16. The program crashed after switching the subbasin transform method to kinematic wave if the soil moisture accounting loss rate method was also selected.
17. The gage manager used the wrong unit system for displaying data in tables and graphs if the data were originally created in English units.
18. The modified Puls reach routing method used the wrong initial condition if an outflow was specified.
19. Unit labels were incorrect in the printed reservoir summary table. Labels were correct in the display shown on the screen.
20. The diversion element diversion flow was incorrect in the last time interval before the maximum diversion volume was reached.
21. The program could crash while closing the optimization manager if the selected trial had no parameter data.
22. The program would crash during a compute if the maximum tension storage in the soil moisture accounting method was specified as zero.
23. The program attempted to route flow through reservoir elements even if the specified initial condition was beyond the range of the data in the elevation-storage-outflow data.
24. Meteorologic models were not imported correctly.
25. Changing the duration of a frequency storm precipitation method did not always result in changes during a subsequent compute.

## Open Defects

A total of 2 major defects are currently open and undergoing investigation and repair. Additional minor defects are currently open and will be repaired after completion of priority items. The following major defects are open:

1. The program may crash under some conditions when attempting to graph element results. The crash may occur before the graph has finished drawing, while moving or resizing the graph, or when closing a graph. The crashes occur whenever diversion flow from a diversion element is connected downstream to another element in the basin model. The crashes do not occur if the diversion flow *is not* connected downstream. The exact cause of the problem is unknown.
2. Optimization results will be lost if any of the hydrologic elements used in an optimization trial are renamed in the supporting basin model. Affected are the optimization location and any elements with parameters selected for optimization. The supporting basin model and other components can be renamed without affecting the optimization results; it is only the elements within the components that should not be renamed.

## Future Plans

Planning is under way for two versions beyond the current release. Planning and design of future versions is a dynamic process and features scheduled for inclusion in each version do change over time in response to funding and field requests. The following descriptions should be used as a general outline when anticipating new features.

Improved reservoir modeling will be the focus of the first version. Specification of pressure flow through an outlet structure will be included in the reservoir element definition. Spillway structures such as broad-crested and ogee weirs will also be included. Additionally, dam break capabilities similar to HEC-1 will be added. Additional reservoir features including a wider variety of outlet structures will be included in later versions.

Efficiency tools for planning studies, where the product is a frequency curve, will be the focus of the second version. Additional visualization capabilities will create graphs and tables of results from several elements or simulation runs. Report tools will be added to create appendix-quality records of basin or meteorologic model data. This version will also implement a brand-new user interface.

A comprehensive program validation guide is currently under development and will be published when complete. The guide gives detailed information about the tests used to determine the accuracy of the mathematical models included in the program, for example, the SCS curve number loss method. The section for precipitation methods is currently complete in draft form. Sections for junctions, sinks, diversions, reservoirs, and some reach routing and loss rate methods are also complete in draft form. It was found that HEC-HMS accurately implements all features in the tested methods.

## Documentation

The *Hydrologic Modeling System HEC-HMS: User's Manual* contains extensive information on installing and using the program. An example application is included to illustrate the steps necessary to produce results.

The *Hydrologic Modeling System HEC-HMS: Technical Reference Manual* contains information on how to use the various methods included in the program. The scientific origin and equation derivations are presented for each method. Specific solution algorithms for a method are discussed when necessary for a complete understanding. Application and parameter estimation for each method is also included.

The online help system within the program contains topics describing each screen of the graphical user interface.

## Support Policy

Technical support for program users within the Corps of Engineers is provided through an annual subscription service. Subscribing offices can expect full support from HEC staff in the routine application of the program. Users are strongly urged to consult with HEC staff on the technical feasibility of using the program before beginning a project with unique requirements such as grid-cell hydrology, snow melt, or continuous simulation. Extended support for large or complex projects can be arranged under a separate reimbursable project agreement.

Support can not be provided to users outside the Corps of Engineers. Domestic and foreign vendors are available that provide fee-for-service support similar to the support provided to subscribing Corps offices. Such service agreements are between the user and the vendor and do not include HEC staff. Vendors do contact HEC on behalf of their users when unusual problems or errors are encountered.

Reporting of suspected program errors is unrestricted. We are continuously working to improve the program and possible bugs should always be reported. Reports should include a written description of the steps that lead to the problem and the effects that result from it. We will reply to all correspondence concerning program errors.

Request support or report program errors through the following channels:

- Call +1-530-756-1104, 7:30 am to 4:30 pm PT Monday through Friday.
- Fax +1-530-756-8250 any time.
- Write to U.S. Army Corps of Engineers, Hydrologic Engineering Center, 609 Second Street, Davis, CA 95616-4687 USA.
- Send email to [hms@usace.army.mil](mailto:hms@usace.army.mil) on the internet.
- Visit our web site at <http://www.hec.usace.army.mil>.