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Hydrologic Engineering Center

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# **Hydrologic Modeling System HEC-HMS**

## ***Release Notes***

Version 3.3  
September 2008

## Hydrologic Modeling System HEC-HMS, Release Notes

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## Introduction

Version 3.2 of the Hydrologic Modeling System (HEC-HMS) was completed in April 2008 and released for general use shortly thereafter. Two new simulation features have been added to the program since that time. These include a new option in the SCS unit hydrograph transform method and a simple reservoir evaporation option. The development team has also continued careful and systematic testing of the program since the last release. The results of that testing in combination with reports from users has allowed the identification and repair of various problems. Some of these affected simulation results and are described in detail later in this document. Some problems that did not affect results but caused problems in the program interface have been repaired without being specifically documented. The result is this Version 3.3 release. It is currently available for the Microsoft Windows® operating system, the Sun Microsystems Solaris™ operating system, and also the Linux operating system.

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 the *Quick Start Guide* (Version 3.3 September 2008). The guide briefly describes the basic features of the program in enough detail to begin using it. The guide also includes a step-by-step tutorial.

## Installation

The installation program and all documentation are available on the HEC website at <http://www.hec.usace.army.mil/>. This new release is installed independently of any previous versions of the program so you will need to remove Version 3.2 if you do not want to use it anymore. However, you may keep different versions of the program installed for parallel use or testing if you choose to do so. This new version will automatically open projects developed with any previous version of the program. However, once a project has been opened in Version 3.3, it may not be possible to open it with older versions of the program.

The new installation package is designed to be easy to use. It will take you through the steps of selecting a directory for the program files and making other settings. Use the following steps to install the program on the Microsoft Windows® operating system:

1. Download the installation package from the HEC website to a temporary folder on the computer. If the software was provided to you on a CD-ROM or other media, insert it in the appropriate drive.
2. Run the installation program. In Windows Explorer, double-click the icon for the installation program. You must have administrator privileges to run the installer.
3. Follow the on-screen prompts to install the program.

Instructions for installing the program on the Sun Microsystems Solaris™ operating system can be found in Chapter 2 of the User's Manual.

## New Capabilities

The SCS unit hydrograph transform method has always included the standard shape for the unitgraph. This version adds the option to also use the so-called DelMarVa shape.

An evaporation method has been added to the reservoir element. The new capability can be used in conjunction with the outlet structures routing method. The user may specify the depth of evaporation for each month of the year. The surface area of the reservoir is multiplied by the evaporation rate for each time step to determine the evaporation volume. Additional methods for calculating evaporation will be considered in the future.

## Changes in Operation

The previous program version automatically determined the decimal separator based on the locale setting of the computer. The separator is now selected in the *Program Settings* instead of automatically from the locale setting. The user can choose between entering data and viewing results with the period or comma.

## Problems Repaired

The development team continues to test the software even after a new release is made. The last version released was no exception. The team found and repaired a number of problems. Problems were also repaired after they were reported by users. The issues ranged from relatively minor cosmetic problems in the interface to computation errors. The following descriptions focus on the major issues that affect accuracy of results or other significant issues.

The total flow at a junction would not be calculated if one of the inflows was the diverted flow from a reach. Connecting the diverted flow calculated at a diversion element is optional. In the case it was connected back into the element network, the total flow would not be calculated. Instead the simulation would stop with an error. The total flow is now calculated correctly.

Excess precipitation was not calculated correctly for some time steps when using the temperature index snowmelt method. The problem occurred when precipitation happened, there was no accumulated snow, and the temperature was above the PX temperature. The precipitation is now calculated correctly under all these combinations of conditions.

A basin model would not copy correctly if it included a subbasin using the linear reservoir baseflow method with two reservoirs. The problem is now corrected.

Canopy data was not loaded correctly for the soil moisture accounting loss method when it was combined with the kinematic wave transform method. The data for the first canopy was lost and both canopy objects contained the same parameter data, that of the second canopy. Both canopies now store and retrieve parameter data correctly.

## Future Plans

Land surface erosion and channel sediment transport is under development. Initially two simple methods will be provided for simulating land surface erosion as part of subbasin calculations. Eventually more complex methods will be added to the subbasin. A simplified channel transport capability will be added to reach elements. It will handle erosion and deposition within the channel in addition to transport down the channel, all in a simplified approach appropriate for hydrologic simulation. It is not anticipated to include a movable bed. Additional components will also be provided at source, diversion, and reservoir elements to include the movement of sediment throughout the element network.

Several features will be added to the reservoir element. Methods for simulating direct precipitation are being considered, along with percolation. Capability will be developed to specify a new type of spillway gate using a family of elevation-discharge curves. Plans are also underway to provide additional options for controlling the opening and closing of spillway gates. Finally, we are investigating ways to simulate the infiltration-runoff response of exposed ground when the pool is drawn down.

Significant upgrades to the basin map are also in the planning stage. An option is being developed to represent subbasins and reservoirs with polygons instead of a simple icon. Similarly, the reach would be represented with a line that follows the actual stream location. This will increase the spatial context of the basin model and create opportunities for visualizing parameter data or simulation results directly in the map through color-coded animations of the polygons.

## Documentation

The *Hydrologic Modeling System HEC-HMS: Quick Start Guide* (Version 3.3 September 2008) provides a brief description of the program for new users. It describes the different parts of the interface and the basic steps necessary to obtain simulation results. A tutorial takes the user through the creation of a new project and shows how to obtain results. The guide has been updated to reflect changes in the interface.

The *Hydrologic Modeling System HEC-HMS: User's Manual* (Version 3.3 September 2008) contains extensive information on installing and using the program. Details on the use of each of the features and capabilities in the program are included. The manual has been updated with information describing new features added to the program for this Version 3.3 release. The updates are generally confined to Chapter 6 in select locations describing the SCS unit hydrograph transform method and the reservoir element.

The *Hydrologic Modeling System HEC-HMS: Technical Reference Manual* (March 2000) continues to accurately describe the mathematical models included in the program. New simulation capabilities have been added to the program and are not included in the manual. The manual is currently undergoing a major revision to expand documentation of existing mathematical models and fully describe the newly added models.

The *Hydrologic Modeling System HEC-HMS: Applications Guide* (March 2008) also continues to accurately describe how to apply the program to various engineering problems. However, the guide is undergoing revision to add guidance on how to use new features of the program to more efficiently solve problems.

## 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. Several companies and organizations offer varying levels of support, some through a 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 can be located through internet searches.

Reporting of suspected program errors is unrestricted and we will reply to all correspondence concerning such errors. 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. If we cannot reproduce the reported problem, we may ask you to send a copy of your project.

Request support or report program errors through the following channels:

- Call 530.756.1104, 7:30 am to 4:30 pm PT Monday through Friday.
- Fax 530.756.8250 any time.
- Write to U.S. Army Corps of Engineers, Institute for Water Resources, Hydrologic Engineering Center, 609 Second Street, Davis, CA 95616 USA.
- Send email to *hec.hms@usace.army.mil* on the internet.
- Visit our web site at <http://www.hec.usace.army.mil>.