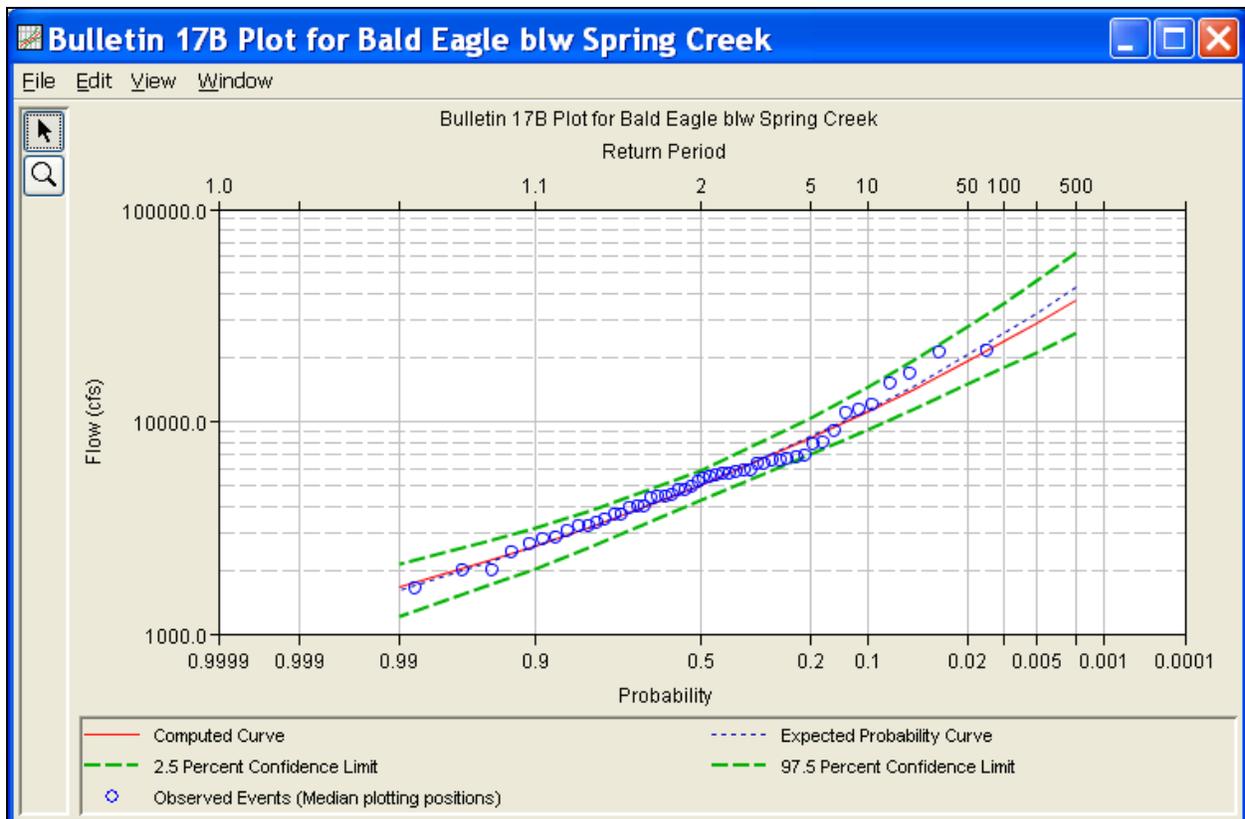




**US Army Corps  
of Engineers**  
Hydrologic Engineering Center

# HEC-SSP Statistical Software Package



## Release Notes

Version 1.1  
April 2009

Approved for Public Release. Distribution Unlimited.



**Statistical Software Package, HEC-SSP  
Software Distribution and Availability Statement**

The HEC-SSP executable code and documentation are public domain and were developed by the Hydrologic Engineering Center for the U.S. Army Corps of Engineers. The software was developed with United States Federal Government resources, and is therefore in the public domain. This software can be downloaded for free from the HEC internet site ([www.hec.usace.army.mil](http://www.hec.usace.army.mil)). HEC does not provide technical support for this software to non-Corps users. However, we will respond to all documented instances of program errors. Documented errors are bugs in the software due to programming mistakes not model problems due to user-entered data.



## Introduction

Version 1.0 of the Statistical Software Package (HEC-SSP) was completed in August 2008 and released for general use shortly thereafter. Several new features have been added and improvements to existing features have been completed to the program since that time. These include improvements to importing data into a study, adding an option to edit existing data, improved customization of report graphs, and the addition of a new type of summary report. A number of enhancements were added to the volume-duration frequency analysis so that outliers and historical data are now accounted for when computing the analytical frequency curves.

The HEC-SSP development team has also continued careful and systematic testing of the program since the last release. The results of this testing in combination with reports from users have allowed the identification and repair of various bugs. Some of the bugs that were fixed are described in this document.

## Installation

The installation program and all documentation are available on the HEC web site 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 1.0 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 1.1, 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.

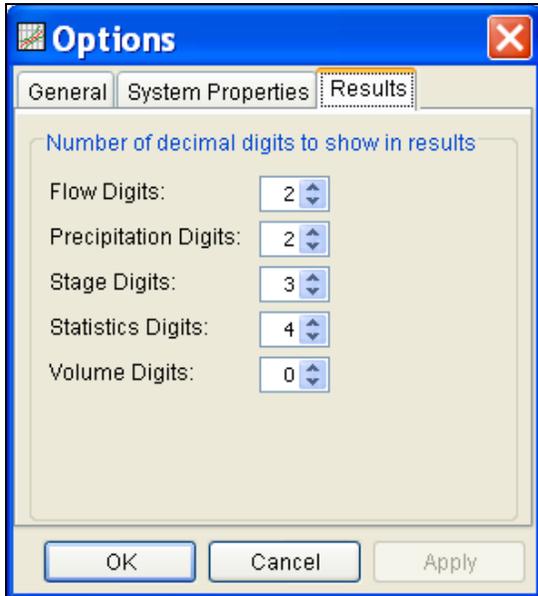
## New Capabilities

In Version 1.1, the user has the option to set the number of decimal digits shown in result tables and summary reports. Select the **Tools→Options** menu option and then open the Results tab. Figure 1 shows the editor for controlling the number of decimal digits.

The Data Editor was renamed to the Data Importer, and the Metadata Editor was created. These and other improvements were made to make it easier to import data into a study and to view/edit metadata. These improvements include:

- a) The manually data entry editor was improved so that data can be easily pasted into the table.
- b) The USGS data importer lets the user choose flow or stage data, and the importer adds the USGS quality codes to the study tree if they are available.

- c) The Excel data importer is more flexible, so that data other than flow data can be imported.
- d) A text file importer was added that allows the user to import data from a comma delimited text file.
- e) The Metadata Editor was added to allow the user to view, define, and edit metadata after the data was already imported into the study. The Metadata Editor is very similar to the Details tab on the Data Importer. To open the Metadata Editor, click the right mouse button on top of a data set in the Data folder. Choose the **Edit Metadata** option from the shortcut menu.



**Figure 1. Editor for Setting the Number of Decimal Digits.**

In Version 1.0, the user could not edit data values once they were imported into a study. An edit option is available in Version 1.1. After opening data table (click the right mouse button while the data is selected in the study tree and select the tabulate option), select the **Edit→Allow Editing** menu option. To save any edits, select the **File→Save** menu option.

A new summary report has been added that combines all the statistical results and frequency curve ordinates from selected analyses into one summary table, as shown in Figure 2. The report only groups analyses of the same type; it will not group Bulletin 17B and General Frequency analyses into the same report. To open a summary table, first select multiple analyses in the study tree and then select the **Results→Summary Report** menu option.

The following new features were added to result graphs:

- a) The user can now add a point to the graph. To add a point, place the mouse anywhere in the plot area and click the right mouse button. Then select **Add Marker Point** to add a point. The program requires the user to define the probability and magnitude of the point before it is added to the plot. Draw properties can be edited for these user-defined points by placing the mouse on top of the point and clicking the right mouse button. Select the **Edit Properties** option in the pop-up menu.

- b) It is more straight-forward to add a line to the graph. In Version 1.0, the program would add a line based on where the mouse was located when the **Add Marker** menu options was selected. Now the program asks the user to define the magnitude or probability of the line before it is added to the graph.
- c) The user can now edit the range of the x-axis. To do this, open a plot and place the mouse pointer anywhere along the x-axis. Click the right mouse button and choose the **Edit Properties** menu option. Then uncheck the Maximum and/or Minimum boxes and edit the range of the x-axis, as shown in Figure 3.

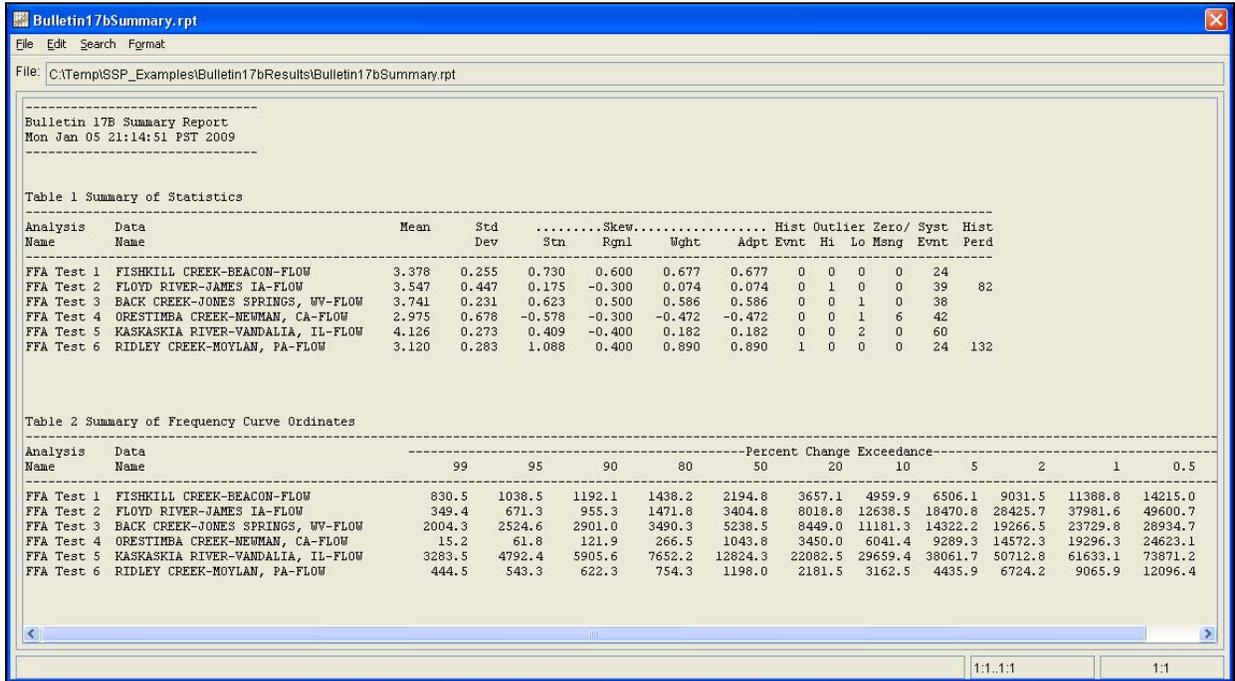
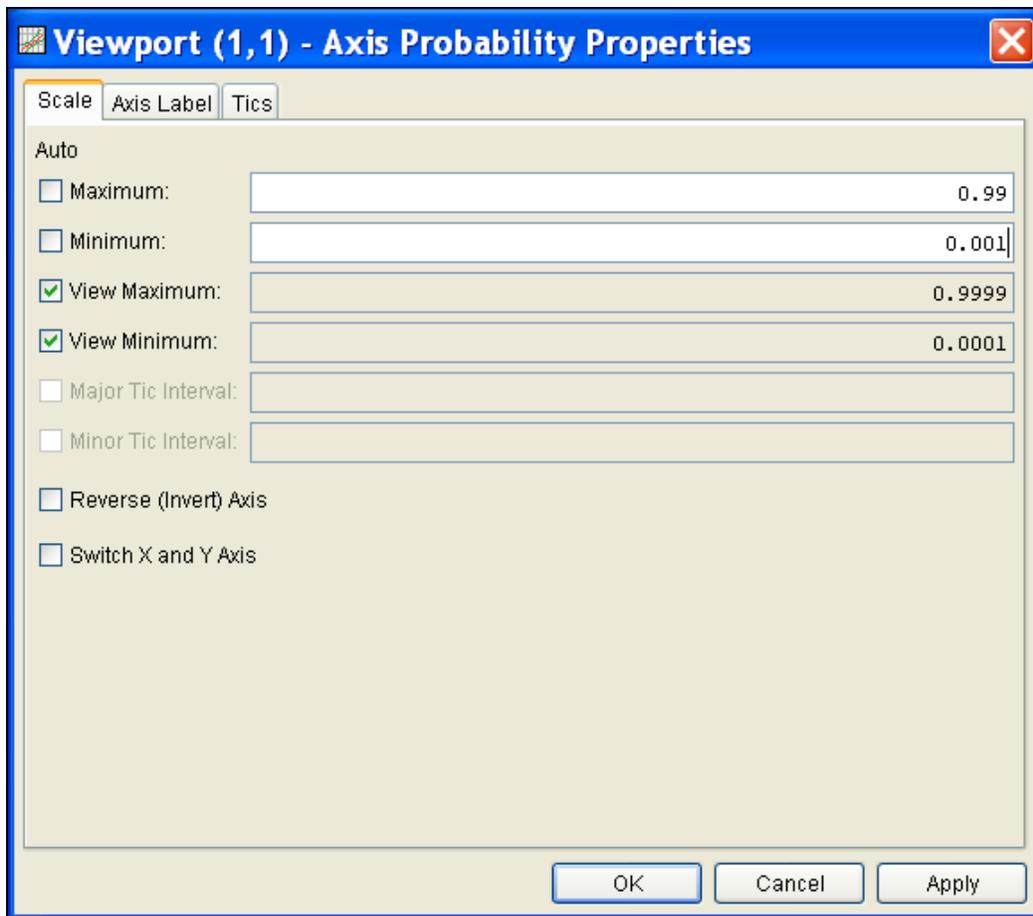
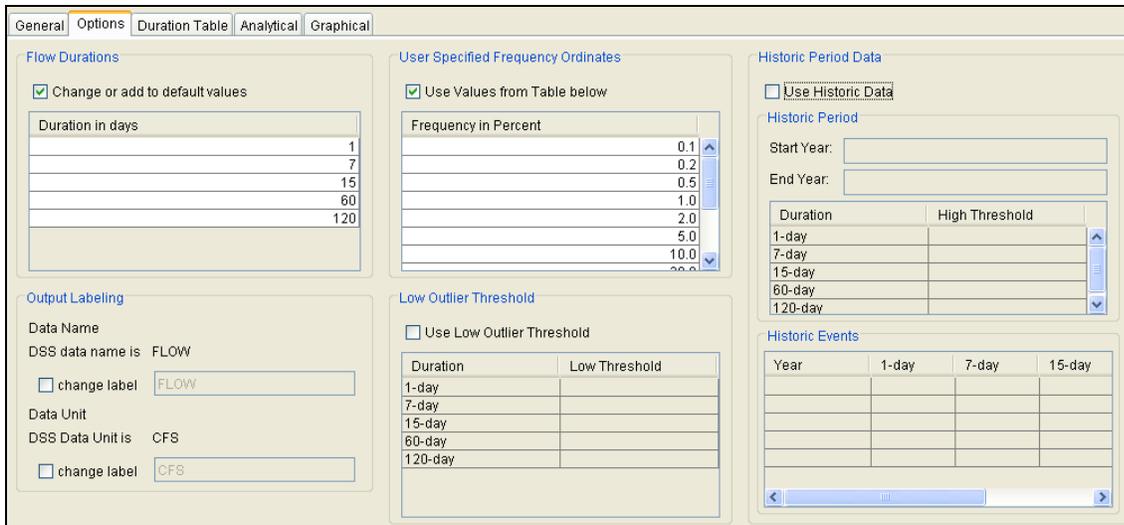


Figure 2. Example Summary Report.



**Figure 3. Axis Properties Dialog Used for Customizing the Range of the X-Axis.**

New capabilities were added to the volume-duration frequency analysis to incorporate outliers and historic data when computing the data statistics. Figure 4 shows the new Options tab in the volume-duration frequency editor. This figure shows that the user can define a **Low Outlier Threshold** for each duration as well as use **Historic Data**. High and low outlier tests are based on the procedures outlined in Bulletin 17B and are applied in the same manner in the Volume-Duration Frequency Analysis. In addition, HEC-SSP uses historic data as recommended in Bulletin 17B. The program will update the text and calculation procedure based on whether Analyze Maximums or Analyze Minimums is selected on the General tab.



**Figure 4. New Options Tab in the Volume-Duration Frequency Analysis.**

When computing a volume-duration frequency analysis, the program will issue a warning message if any of the maximum/minimum flows occur a specific number of days after the beginning of the year. The number of days is determined by the duration plus 5 days. For example, for a 15-day duration, the program issues a warning if the maximum/minimum is within 20 days after the beginning of the year. If water year is chosen, then the program issues a warning if the maximum/minimum occurs between October 1 – October 20. This warning is an attempt to let the user know if a maximum or minimum flow is generated by an event that began in the previous year. The goal is to prevent a scenario in which the same flow event causes maximum/minimum flows in consecutive years.

One way to determine when the year should begin is to plot each year of record on top of each another, as shown in Figure 5. A new feature was added in which the program will create a graph like the one shown in Figure 5. Simply click the **Plot Yearly Data** button located on the General tab of the volume-duration frequency analysis editor.

When computing a volume-duration frequency analysis, the program now flags the number of years with at least one day of missing flow. This information is included on the Tabular Results tab. The table contains “# Zero/Missing,” which is the number of years with no data and “# Years with Missing Data” which is the number of years with at least one day of missing flow data.

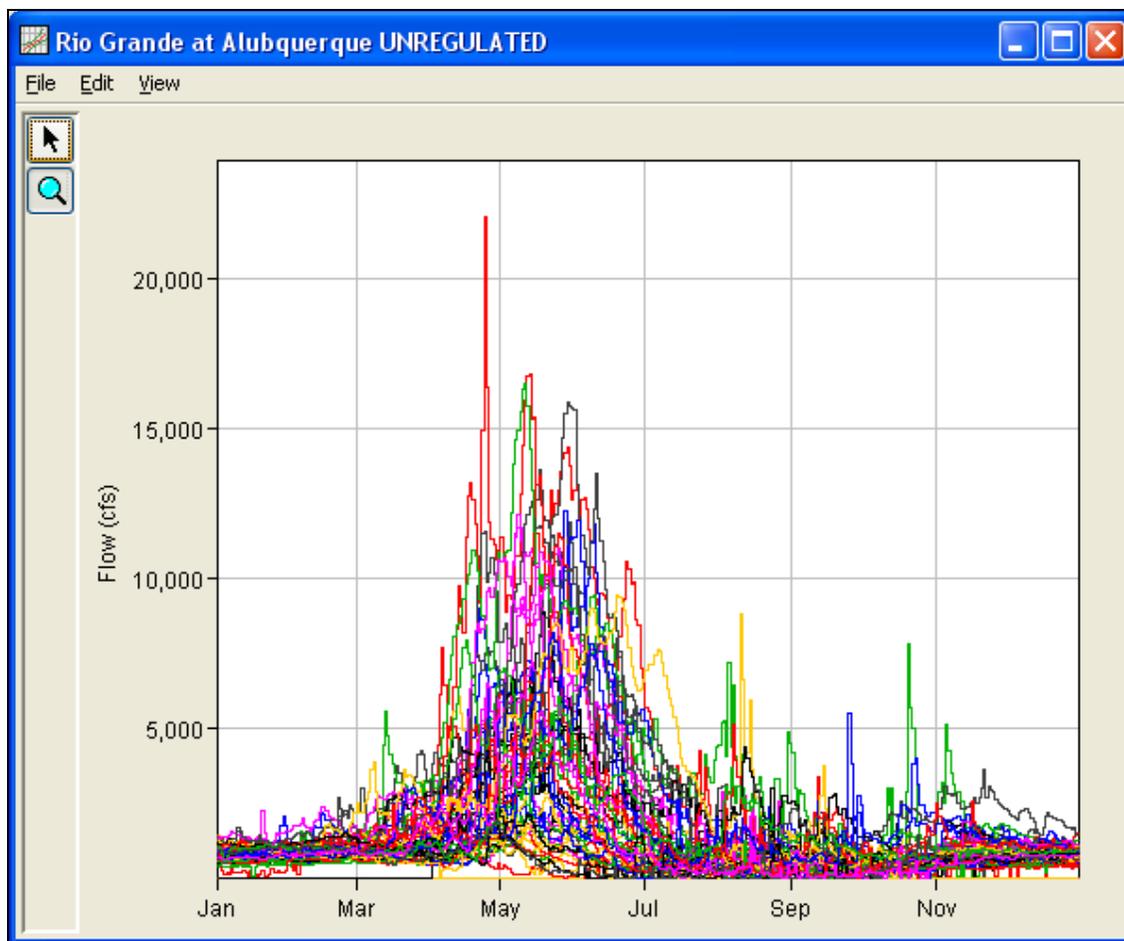


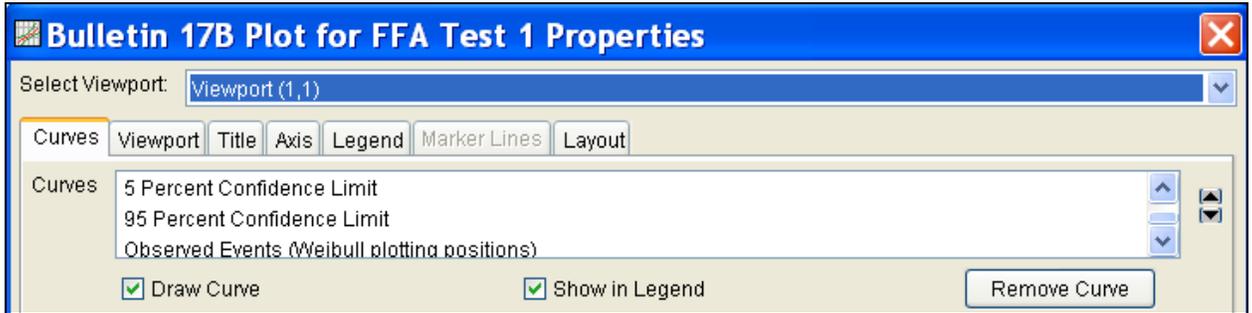
Figure 5. New Plot Generated by the Volume-Duration Frequency Analysis Editor.

## Bug Fixes

The development team continues to test the software even after a new release is made. The team found and repaired a number of bugs since the release of Version 1.0. The following list describes the bug fixes:

- 1) The study unit system is set by the user when a new study is created (Create New Study dialog). Besides setting the units for the study, the user can also set the display units (**View→Set Study Display Units**). The display units are used for summary tables and plots. You can create a new study using English units and then set the display units to SI. In Version 1.0, the display units were set by default to English units even if the study units were set to SI. This was causing some confusion when users examined result tables and graphs. Now, the program will automatically set the display units to the same unit system as defined when the project is created.
- 2) The user defined ordinates, defined on the Curve Input tab (Volume-Duration Frequency Analysis editor), were not plotted correctly in the graphical curve plot when a minimum flow analysis was computed. The program now correctly plots the user-defined curve when performing a minimum flow analysis.

- 3) The program would crash when plot buttons were pressed if the analysis had not been computed. Now the program does not crash when the plot buttons are pressed if the analysis has not been computed.
- 4) All plots can be customized using the Plot Properties editor. This editor can be opened by selecting the **Edit→Plot Properties** menu options on a plot window. In Version 1.0, some of the curves in a plot were not visible in the Plot Properties curve list. Now, all curves in the plot are visible in the Plot Properties curve list, as shown below.



- 5) Curve properties can be edited by hovering the mouse over a line in the graph or legend and clicking the right mouse button. In the shortcut menu, choose the Edit Properties menu option. In Version 1.0, the program did not automatically highlight the curve that was selected when the Properties editor was opened. Now, this curve is automatically selected when the Properties editor is opened.
- 6) The number of Historic Period years should be empty in the Number of Events table on the Tabular Results tab if the Use Historic Data box is not checked on the Options tab. This was not always the case in Version 1.0. Now, the program leaves the Historic Period field empty if the Use Historic Data box is not checked.
- 7) Menu options are disabled and enabled based on what is selected in the study tree. For example, the **Results→Graph** menu option is disabled if no Bulletin 17B, General Frequency, or Volume-Duration Frequency analysis is selected in the study tree. Also, some menu options need to be disabled if no study is open. Not all menu options were correctly following this behavior and have been fixed. These menu options include: File→Export, Maps→Map Window Settings, Maps→Zoom to Entire Map Window Extents, Maps→Import, Maps→Export, Analysis→New, and all items on the Windows menu.
- 8) The program took longer and longer to import data into a study as the number of data sets increased. Data importing was improved for Version 1.1 so that it does not take as long to import a data set even if a large number of data sets have already been imported into the study.
- 9) The General Frequency Analysis editor was only saving Data Values in the graphical curve table if the graphical analysis was computed. Now, the program saves values in the graphical curve table without the user having to compute the graphical analysis.

- 10) The Compute Manager can be used to compute multiple analyses. To open the Compute Manager, select the **Analysis→Compute Manager** menu option. Then select all analyses to be computed and click the compute button. In Version 1.0, the analysis report was not being generated when the analysis was computed by the Compute Manager. Now, the program generates the analysis report when the analysis is computed by the Compute Manager.

## Documentation

The Statistical Software Package HEC-SSP: User's Manual contains extensive information on installing and using the program. Details on the use of each feature and capabilities in the program are included. The manual has been updated with information describing new features added to the program for this Version 1.1 release.

## Bug Reports and Suggestions

HEC does not provide technical support for this software to non-Corps users; however, we will respond to all documented instances of program errors. If you encounter a problem, then please take the time to send us a bug report. The report must be written and should be submitted directly to the HEC-SSP team at: [hec.ssp@usace.army.mil](mailto:hec.ssp@usace.army.mil)  
The bug report should include the following information:

1. Contact Information: Name, Phone, and E-mail address.
2. What version of the software are you using?
3. What operating system are you using?
4. An explanation of the problem.
5. If the problem is reproducible, please list the steps required to cause it.  
(example : "1. Create a new file. 2. Insert some text ...")
6. If the problem is not reproducible (only happened once, or occasionally for no apparent reason) please describe the circumstances in which it occurred and the symptoms observed (note : it is much harder for us to fix non-reproducible bugs).
7. If the problem causes any error messages to appear, please write down the exact text displayed.

Note: Please attach your data files if possible. This will assist in debugging the problem.

If you have any suggestions or ideas for enhancing HEC-SSP, please e-mail your suggestions to [hec.ssp@usace.army.mil](mailto:hec.ssp@usace.army.mil).