USERS MANUAL FOR ANNIE, A COMPUTER PROGRAM FOR INTERACTIVE HYDROLOGIC ANALYSES AND DATA MANAGEMENT

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USERS MANUAL FOR ANNIE, A COMPUTER PROGRAM FOR INTERACTIVE HYDROLOGIC ANALYSES AND DATA MANAGEMENT

By Alan M. Lumb[1], John L. Kittle, Jr.[2], and Kathleen M. Flynn[1]

ABSTRACT

ANNIE is an interactive computer program written in Fortran and designed for portability to mainframe computers, minicomputers, and microcomputers. ANNIE helps users interactively store, retrieve, list, plot, check, and update spatial, parametric, and time-series data for hydrologic models and analyses. A binary, direct-access file is used to store data in a logical, well-defined structure and is called a Watershed Data Management (WDM) file. Many hydrologic and water-quality models and analyses developed by the U.S. Geological Survey and the U.S. Environmental Protection Agency currently use either the WDM file or ANNIE or both. The WDM file provides the user with a common data base for many applications, thus eliminating the need to reformat data from one application to another. Furthermore, the ANNIE and WDM file system offers its users and application programmers an expanding library of subroutines for graphics, user interaction, and data storage and retrieval. This library helps programmers to efficiently create software for highly specialized applications.

This document is the users guide for the February 1990 version of ANNIE. It describes what ANNIE can do and how to use ANNIE and the WDM file. Detailed examples of many ANNIE options show what the user will see on the screen, the responses to be entered, and the results produced.

OVERVIEW

WHAT ANNIE CAN DO

INTRODUCTION

ANNIE contains a set of procedures to organize, manipulate, and analyze data needed for hydrologic modeling and analysis. You can interactively perform tasks related to data management, tabular and graphical presentation, statistical analysis, and input preparation for hydrologic models. The relation of ANNIE to other files and systems is shown in figure 1.

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MANAGE DATA

The data-management functions are the most extensively developed component of the ANNIE system. The focal point of data-management activities is the Watershed Data Management (WDM) file, a direct-access data library designed to allow efficient storage and retrieval of data needed by hydrologic models that continuously simulate water quantity and quality and by hydrologic analyses such as generalized least squares. ANNIE enables the user to interactively perform the following data-management operations:

- Create a WDM file on the disk.
- Add, modify, or delete attributes defining the data to be stored in each data set in the WDM file.
- Add, modify, or delete time-series data for data sets.
- Copy all or part of the data in one data set to another data set within the same WDM file.
- Update the WDM file by deleting or renumbering data sets.
- Export data sets from a WDM file to an ASCII file.
- Import data sets from an ASCII file to a WDM file.
- Input time series in U.S. Geological Survey WATSTORE (Hutchinson, 1975) and Hydrological Simulation Program-Fortran (HSPF) (Johanson, 1984) sequential file formats into WDM files.
- Perform selected numerical transformations on one or two time series to produce a new time series.
- Adjust the time coordinates of time-series data.

LIST or TABLE DATA

As an aid to both data management and data analysis, ANNIE allows the user to display selected information from the WDM file in list or tabular format. Display capabilities include:

- Display a summary of data sets in a WDM file.
- Display user-selected data-set attributes in list or tabular format.
- List values in a time-series data set that are within a specified time span and value range. Annual, monthly, or daily totals are optional as appropriate for the time step of the data.
- List values in a time-series data set that are within a specified time span but outside of a value range.
- List data sets that exhibit user-specified attributes.
- Table a year of time-series data by month and day, includes monthly total, mean, minimum, and maximum for each month.

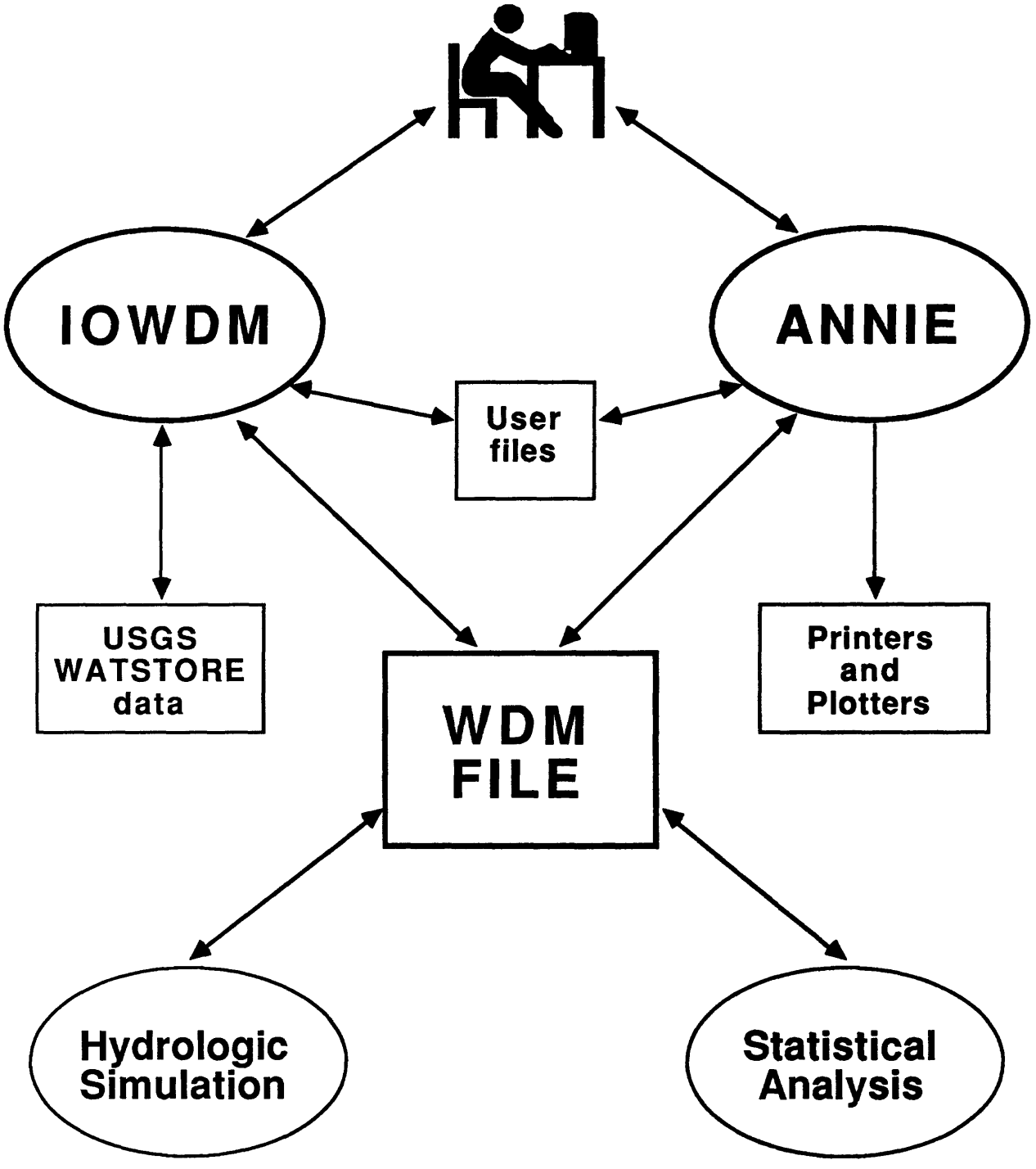


Figure 1.--ANNIE and WDM system interactions and functions.

PLOT DATA

Graphics capabilities in ANNIE include time plots, x-y plots, and probability plots; and these plots can meet Geological Survey publication standards. Graphics routines use the American National Standards Institute, Graphical Kernel System (GKS) (ANSI, 1985). Thus, the number and type of output devices depend on only the implementation of GKS on the users system. The following options are available:

- Plot one or more time series over a specified time span, from a WDM file, a formatted file, or the terminal.
- Produce x-y plots for time-matched values from two data sets in a WDM file, a formatted file, or the terminal.
- Produce x-y plots of attribute pairs for all data sets or a selected subset of the data sets in a WDM file.
- Produce probability plots from ANNIE frequency analysis or flow-duration analysis.

ANALYZE DATA

ANNIE contains the following statistical capabilities to support water-quantity and water-quality modeling:

- Perform flow-duration analysis using values from a time-series data set.
- Compute absolute errors, standard errors, and an error matrix for two time-series data sets.
- Compute an n-day high or low annual time series from a daily time series.
- Perform frequency analysis of peak flows according to generalized procedures of Water Resources Council (WRC) Bulletin 17B (U.S. Geological Survey, 1982).
- Perform frequency analysis of any annual time series using the Log-Pearson Type III distribution.
- Perform Kendall Tau analysis for trend in annual time series.

PREPARE DATA FOR MODELS

ANNIE was designed and developed to assist the user in all aspects of watershed model application. Consequently, the system's capabilities are not restricted to time-series data management and analysis. The ANNIE library of routines has also been used to create custom programs to aid the modeler in developing input files for watershed parameter information needed by specific hydrologic, hydraulic, or water-quality models. Some custom applications programs are available, or a modeler can write their own program. For each custom program developed, the user is prompted for parameter values and options. The custom programs provide default values and check each of the users entries against an acceptable range. Contact one of the authors for a list of the available custom programs.

ACKNOWLEDGMENTS

The ANNIE user interaction and utilities and the file structure WDM have been developed, used, and modified over the past 6 years. During that time many users, agencies, and developers have made significant contributions.

Paul Hummel, Aqua Terra Consultants, is acknowledged for providing several new routines and modifications to many more. John Imhoff, Aqua Terra Consultants is acknowledged for his efforts to rewrite earlier drafts of this manual into the current format.

The Environmental Protection Agency, Environmental Research Lab, Athens, Georgia, has provided some of the funding for the development of ANNIE. Tom Barnwell is acknowledged for his continued support throughout the project. The excellent cooperation between the Environmental Protection Agency and the Geological Survey is attributable to Tom. Larry Burns, Environmental Protection Agency, has provided ideas and assisted with the coordination between the two agencies.

The U.S. Soil Conservation Service provided some of the funding for the initial design of the WDM file. Roger Cronshey is acknowledged for his ideas and support.

HOW ANNIE WORKS

MENUS

ANNIE uses menus to prompt you for a response to select the data and processing to be done. Each menu has associated help information and, where applicable, default values and a range of acceptable values. Decimal or integer input are checked against the acceptable range.

ANNIE is organized as a set of options or menus in a tree structure. Each selection moves you further down the tree structure. On any particular branch ANNIE may issue prompts in one of three formats: (1) a question requiring a **single** response; (2) a **multiple**-responses format in which a heading is written across the screen and responses are made at locations beneath the heading; or (3) a **table** format with use of the full screen to input or update values in rows and columns. When updating existing information, ANNIE may display the heading and the previous or default values, and you enter only items in the set that need to be changed. Although there are hundreds of options in ANNIE, you usually choose from fewer than seven options, and only those menus needed to accomplish the function of a branch are presented. When processing on a particular branch is complete, you usually enter "DONE" and are returned to the menu one level up. One or more "DONE" responses are entered until you reach the desired level to specify another ANNIE operation.

MECHANICS of MENU RESPONSES

The mechanics of responding to a menu are slightly different for each of the three menu types. In all cases a question mark, "?", can be entered for help information. For alphanumeric responses that are used to select options, only sufficient characters are needed to distinguish that option from the other options. For example, questions that require a "LIST" or "LINE" response can be answered with a "LIS", "LIST", or "LIN", "LINE".

single

For the single response, you enter the response on the line below the question and then press the return key. A question mark followed by pressing the return key displays the help information.

multiple

For the multiple response, you press the space bar until the field that requires a response is reached. The tab key and arrow keys cannot be used. Responses must be under or between the less than (<) and greater than (>) characters for the respective fields. An alternate approach is to enter all responses in order and separated by commas. When commas are used, the responses do not need to be within the designated fields. To proceed to the next menu, you must press the return key with the cursor in column 1.

table

For the table response, a table is placed on the screen with the following command line at the bottom:

```
Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
```

VIEW can be used to scroll the table up and down if there are more lines in the table than can be displayed on the screen. The usual response is EDIT or E, which changes the command line to the following:

```
Commands:DONE,RIGHT,LEFT,TOP,BOTTOM,GO
```

RIGHT, LEFT, TOP, and BOTTOM define a window for editing which may be useful if only a few rows or a few fields are to be modified. The default window includes all rows and columns. To begin editing, GO must be entered followed by pressing the return key. For most small tables, you can enter EG, for EDIT and GO, and press the return key. The cursor is then moved to the first field of the first row. You then press the return key until the field and row that needs changing is reached. Pressing the return key at the last field of the last row returns the cursor to the command line. At any location in the table you can enter ">", "<", or "%" followed by pressing the return key to move to the next field, last field, or command line, respectively. When on the command line, DONE (or D, DO, DON) must be entered followed by pressing the return key to go to the next menu. If the table heading gets shifted off the screen, enter VIEW followed by REFRESH on the command line to realign the table on the screen.

OPTION TREE

The option tree for the current version of ANNIE is illustrated in figure 2. Initially, you may find the option tree figure a useful tool for guiding your interactive sessions.

LOG FILES and COMMAND FILES

A file named ANNIE.LOG is automatically created at the start of each ANNIE session to store all your responses for the session. The last prompt of a session will ask you if you want to save the ANNIE.LOG file with another file name. If the file is not saved, it will be over-written when you begin the next ANNIE session. Part or all of the saved log file may then become a command file used as responses for subsequent ANNIE sessions. Command files are usually created by editing a saved log file.

To use the command file in an ANNIE session, enter "@" followed on the same line by the name of the command file. Use of command files offers several advantages. Responses from an incomplete or interrupted session are saved and can be reused, so you are not required to repeat those responses already given to the system. Command files can also be utilized as "templates" for repeating ANNIE sessions where only one or two responses differ from session to session (for example, annual hydrograph plots where only the data-set number and station number change).

When ANNIE is instructed to use the contents of a command file, all responses will automatically come from the command file until the end of the command file is reached. At that point you can respond with either an answer or the name of another command file. For the careful and experienced user, a command file may contain the name of another command file.

Occasionally, a command file being read by ANNIE will get out of sync. When this happens, the session should be terminated and the command file should be edited to correctly order the responses. Most often the cause for a command file out of sync is the opening of an output file. The second time the output file name is read, the output file exists so an additional question is asked "Do you want to write over the file?". This question puts the rest of the responses out of sync.

THE WDM FILE

FILE STRUCTURE and MAINTENANCE

The Watershed Data Management (WDM) file is a binary, direct-access file used by ANNIE to store hydrologic, hydraulic, meteorologic, water-quality, and physiographic data. The WDM file is organized into data sets. Each data set contains a specific type of data such as stream-flow at a specific site or air temperature at a weather station. Each data set contains attributes that describe the data, such as station identification number, time step of data, latitude, and longitude. The WDM file can contain up to 32,000 data sets. Each data set may be

described by either a few attributes or by hundreds of attributes. The WDM file may contain data for all data-collection stations for a basin, for a State, or for any other grouping selected by the user.

Disk space for the WDM file is allocated as needed in 40,960-byte increments (20 2,048-byte records). Data can be added, deleted, and modified without restructuring the data in the file. Space from deleted data sets within a WDM file is reused. Thus, the WDM file requires no special maintenance processing.

TYPES OF DATA

The current release of ANNIE fully supports WDM time-series data sets. Four additional data-set types (table, space time, schematic, and raster) are being tested for future releases. These data sets will allow storage, manipulation, and retrieval of data, such as channel cross sections and flow properties, channel profiles, channel and watershed boundary coordinates, digital elevation grids, upstream-downstream connection of watershed components, and time series for one-dimensional and two-dimensional flow models. Table data sets are used in the current release only for the WATSTORE peak-flow file and Bulletin 17B flood-frequency analysis.

TIME-SERIES DATA SETS

Time-series data can have time steps from 1 second to 1 year and can be grouped in periods of 1 hour to 1 century. Data are grouped for more rapid access. Data may be tagged with a quality flag to indicate missing records, estimated data, historic flood, and so forth.

TIME-SERIES DATA COMPRESSION

Time-series data are stored in a data set in one of two forms: compressed or uncompressed. The uncompressed form stores a value for every time step. The compressed form stores a value for every time step only when adjacent values are not the same or differ by more than a preset tolerance (see attribute TOLR). For adjacent values that are the same or less than the tolerance, the value and the number of time steps with that value are stored.

DATA-SET ATTRIBUTES

Before data are added to a WDM file, you must assign a unique data-set number (DSN) and values for required attributes that describe how the data are stored. Once data have been added, the required attributes can no longer be modified. An extensive list of optional attributes is available for further characterization of data contained in a WDM data set. The current list of required and optional data-set attributes is provided in Appendix B of this document. Optional attributes can be added to a data set at any time, but it is good practice to add them when the data set is created.

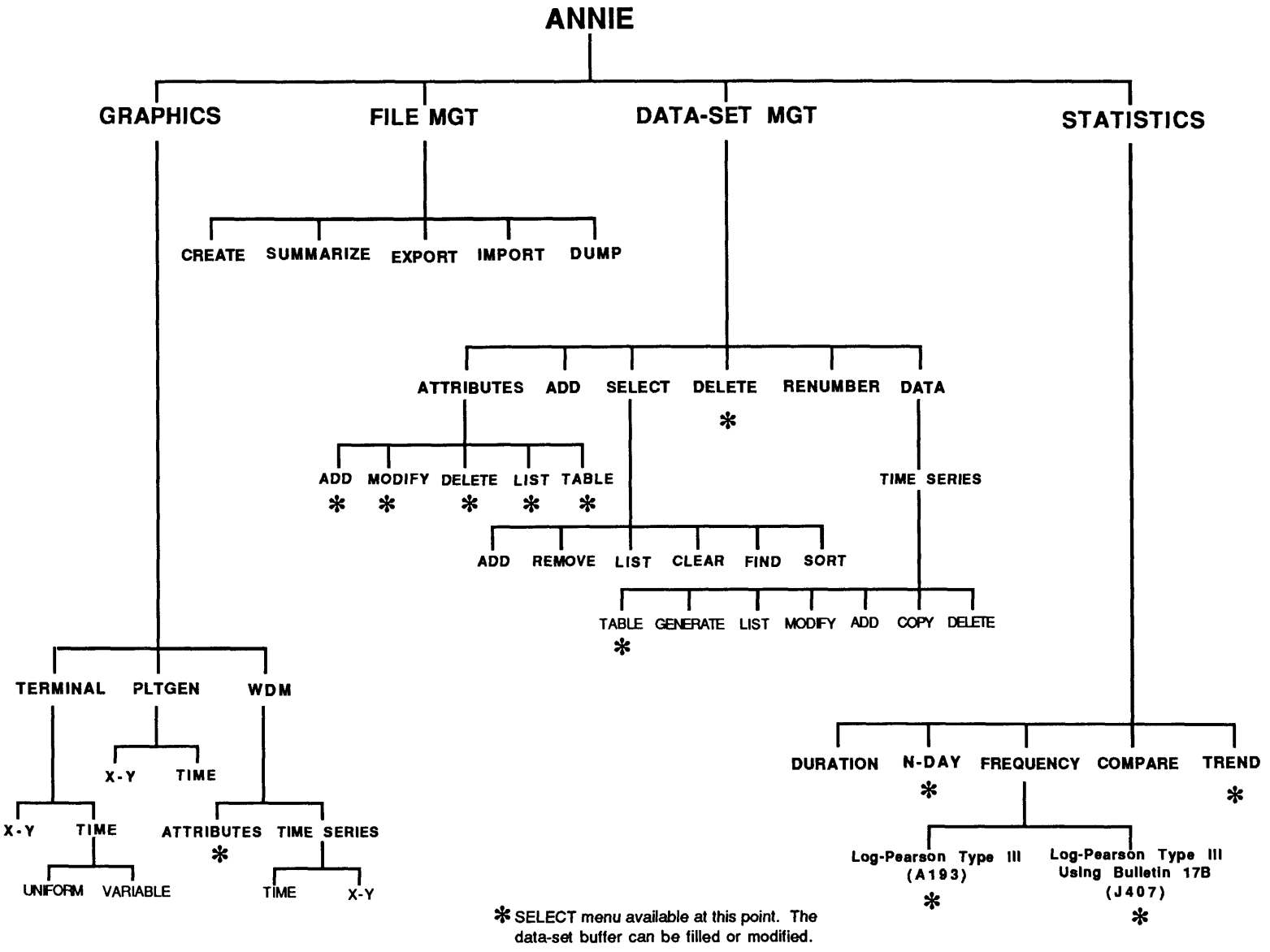


Figure 2.--Upper-level branches of the ANNIE option tree.

SPECIAL TIME-SERIES ATTRIBUTES

COMPFG
TOLR
VBTIME
TCODE
TSSTEP
TGROUP
TSBYR
TSBMO

Time-series data may be stored in several different patterns that affect the efficiency of data storage and retrieval. To minimize storage requirements, the attribute COMPFG should be set to 1 for data compression. If only strings of identical values are to be compressed, the attribute TOLR is not needed, otherwise a small, nonzero value for TOLR should be stored.

If the data has a constant time step, the attribute VBTIME should be set to 1 and TSSTEP and TCODE set to the time step and units, respectively. This can reduce data retrieval time by a factor of 3 or more. However, if the time step changes one or more times for a data set, VBTIME must be set to 2.

The attribute TGROUP can be used to minimize retrieval times. TGROUP establishes how the data are grouped in a data set. The ANNIE software can readily locate the beginning of a group but must read sequentially within a group for the values to be retrieved. An additional consideration is there can be only 100 groups in a data set (although this can be increased with ANNIE when a data set is created). With the above considerations, table 1 has been constructed as a guide to select a value for TGROUP.

For data with daily or shorter time steps and a period of record in excess of 100 years but less than 200 years, it would be better to reset the number of groups than use centuries for groups. Attributes for the beginning year and month of the data, TSBYR and TSBMO, default to 1900 and 1, respectively. They may need to be defined if the record will contain data before 1900 or months or days is used for the TGROUP attribute.

Table 1.--Recommended values for TGROUP for time series of a given time step and record length

Time step	Length of record	recommended TGROUP
daily	<=100 years	6 (years)
5 minute - daily	<=8 years	5 (months)
5 minute - daily	>8 years	6 (years)
monthly	<=100 years	6 (years)
monthly	>100 years	7 (centuries)
annual	<=10,000 years	7 (centuries)
1 second-1 minute	<=100 days	4 (days)

SELECTING DATA SETS

ANNIE uses data-set numbers to identify data sets to be processed. Depending on the process, you may select data sets by number or by using the **SELECT** option to identify data sets with attribute values that meet selected search criteria. Search criteria include: equal to, less than, greater than, not, and, and or. Each time a data set is found that has attributes satisfying the search criteria, the data-set number is added to a buffer. The buffer is simply a list of data-set numbers. As data-set numbers are found, they are continually added to the buffer until the entire buffer is full. Most implementations of ANNIE set the buffer capacity at 300. During the selection process, you can delete, list, or numerically sort data sets in the buffer.

Processing options in ANNIE such as **LIST**, **MODIFY**, **TABLE**, and **STATISTICS** look in the buffer for data sets to be used. When data-set numbers are present in the buffer, you will be asked if they should be used or the buffer cleared. If no data-set numbers are found in the buffer, you are asked to select them. If you know which data-set numbers you wish to use for an analysis, use the **ADD** option to put the numbers in the buffer; if not, you should use the **FIND** option to use search criteria to locate and enter the data-set numbers. Further details on the use of search criteria for selecting data sets based on attribute values are provided in the description of the **SELECT-FIND** option later in this document.

In conjunction with subsequent instructions, the above discussions should provide the user with sufficient understanding of the WDM file structure and operation. A more detailed discussion is presented in the paper entitled "Data Management for Water-Quality Modeling" (Lumb, 1988).

STEPS TO USE ANNIE ON A PROJECT

STEP 1. Are ANNIE and the WDM file needed?

If a hydrologic or water-quality model or statistical analysis that reads data from or writes data to a WDM file is to be used on the project, ANNIE is required. If large volumes of time-series data are to be managed for the project, ANNIE and the WDM file might be appropriate. WDM files have been used on projects to store over 60 megabytes of data in a single file. Smaller volumes of data can often be managed more effectively with spread sheets, relational data bases, or the data management functions associated with statistical packages. ANNIE might also be used in a project to produce graphics that meet Geological Survey publication standards.

STEP 2. Retrieve data and convert formats if needed

Review the program IOWDM in Appendix A for the available formats. Some user-defined format capabilities are available. If data exists in another WDM file, use ANNIE to EXPORT data sets from other WDM files and IMPORT data sets to your project WDM file. ANNIE can be used to input data from the terminal, but that is the hard way, unless command files of the data have been created. Hydrologic and meteorologic data retrieved from a CD-ROM can be put in formats that IOWDM can read. Special programs are available to read files from some data loggers.

STEP 3. Create WDM file

The shell of a WDM file must be created before data can be added. WDM files can be created with ANNIE or IOWDM.

STEP 4. Create data sets and add data

Data sets must be created with a unique data-set number before data can be added. The IMPORT option of ANNIE and the input formats for IOWDM create data sets automatically. If they are not created automatically, you must create them with ANNIE. When creating time-series data sets, it is very important to correctly set the attributes TGROUP, COMPFG, VBTIME, TSSTEP, TCODE, and TSBYR (see sections SPECIAL TIME-SERIES ATTRIBUTES, ADD data sets, IOWDM). Data in WATSTORE and HSPF formats can be added with the program IOWDM. Data from another WDM file can be added with ANNIE using the EXPORT and IMPORT options. Data in a free field format might be added using the ADD time series option in ANNIE.

STEP 5. Verify data

Listing, tabling, and plotting can be used to view and verify the data added to your project WDM file. The LIST option for time series can be used to find and list time-series values that do not meet selected criteria. Plotting data is always a good way to quickly check for bad values. When plotting, do not pick the option to ignore values off the scale. Numeric attributes of the data, such as drainage area, station elevation, latitude, and longitude can be plotted one against another for all stations to identify possible erroneous values.

STEP 6. Correct or update data

The MODIFY option for data-set attributes and time series can be used to correct the data. If, however, time-series data are compressed (COMPFG = 1), then you must use the COPY/UPDATE option to correct the compressed portions of the data. The add time series option in ANNIE should only be used to add data to the end of existing data, since any subsequent data in the data set is deleted.

STEP 7. Use data

Data in a WDM file can be used with several hydrologic models and analyses. Most of the models are run separate from ANNIE and several can put computed time series on the WDM file. These computed time series can be tabled, listed, plotted, and analyzed with ANNIE as a model post-processing tool. For most of the models, you must create data sets with ANNIE before the model can put time series on the WDM file. Some projects may use only the statistical analyses available in ANNIE.

STEP 8. Archive the WDM file

The EXPORT option can be used to put all or part of a WDM file on a formatted ASCII file or set of files for archiving. Such files can be read by editors and printed using operating system commands and should be independent of operation systems and computers. These files are often quite long and generally should not be modified.

ANNIE OPTIONS AND EXAMPLES

ORGANIZATION

The following section provides a reference guide for using individual ANNIE data management and analysis options. ANNIE options are organized in alphabetical order according to the actual menu keywords used in interactive sessions. The guidance provided for each option is contained in two parts, a description of the option and a sample session.

The description contains a discussion of the capabilities of the option, steps to follow, and a discussion of the sample session. All pages for an option contain a header consisting of a large print keyword and a qualifier within a double line box. Since several keywords are used in more than one menu, the qualifier is used to differentiate (for example, ADD Attributes, ADD Data sets, and ADD Time-series data). In the extreme left column of the first part, a "response branch" is provided. This contains the most direct sequence of menu responses that the user can select to progress from the initial ANNIE menu to the point in the option tree where the selected option may be performed.

The examples contain a portion of an ANNIE session beginning after the last keyword in the "response branch." Each sample session illustrates a successful application of an ANNIE option. It should be noted that ANNIE offers additional capabilities for some options, which are not illustrated in the sample sessions. When the option includes a table menu, the initial table and the final table are shown. All table menus are contained within boxes. Actual use of the table menus cannot be illustrated effectively on printed media. If an option includes print files or graphics, they are included after the interactive session. A pointing finger () has been used in the examples to indicate the user's responses to single and multiple type questions.

DATA-SET MGT
ATTRIBUTES
ADD

The ADD option in the menu below ATTRIBUTES is used to add additional attributes to existing WDM data sets. You are prompted for the name of each attribute to be added. Valid names are listed in Appendix B. Within ANNIE you can enter HELP after the prompt to get a list of valid attribute names. See HELP attribute section for more information. After a valid attribute has been entered, you are prompted for the value of the attribute for each data-set number in the buffer. Note that once data have been added to a data set, attributes describing how the data is stored cannot be modified or added.

[1] Select data sets to be used.

[2] Select an attribute to be added or modified.

[3] Enter the value of the attribute for each data set when prompted.

[4] Repeat steps [2] and [3] for additional attributes.

The example added the attributes STANAM, station name, and DAREA, drainage area, to the four data sets in the buffer, 68, 69, 70, and 71.

ADD attributes ADD

```
Enter ADD, MODIFY, DELETE, LIST, or TABLE.
(Use return for DONE)
☞ ADD

  4 data sets are currently in the buffer.
  You are now in the SELECT option

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  4 data sets are currently in the buffer.
  You are now in the SELECT option

     68       69       70       71

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
Which attribute (or DONE)?
☞ STANAM
ADD/MODIFY attribute for DSN. 68
Enter STANAM, Station name (48 characters).
☞ Sanderson Gulch Tributary at Lakewood, CO
ADD/MODIFY attribute for DSN. 69
Enter STANAM, Station name (48 characters).
☞ Cherry Creek Lake, CO
ADD/MODIFY attribute for DSN. 70
Enter STANAM, Station name (48 characters).
☞ Sanderson Gulch Tributary at Lakewood, CO
ADD/MODIFY attribute for DSN. 71
Enter STANAM, Station name (48 characters).
☞ Sanderson Gulch Tributary at Lakewood, CO
Which attribute (or DONE)?
☞ DAREA
ADD/MODIFY attribute for DSN. 68
Enter DAREA, Drainage area.
(Use return for 0.)
☞ .377
ADD/MODIFY attribute for DSN. 69
Enter DAREA, Drainage area.
(Use return for 0.)
☞ .377
ADD/MODIFY attribute for DSN. 70
Enter DAREA, Drainage area.
(Use return for 0.)
☞ .377
ADD/MODIFY attribute for DSN. 71
Enter DAREA, Drainage area.
(Use return for 0.)
☞ .377
Which attribute (or DONE)?
☞ DONE
```

DATA-SET MGT ADD

The ADD option in the menu below DATASET MGT is used to create a new data set and specify initial attributes. If the new data set has many of the same attribute values as an existing data set, the attributes of an existing data set can be used to make the new data set. If the new data set is not similar to an existing data set, you must enter values for the required attributes. Included in this category are TSTYPE, ISTAID or STAID, STANAM, TCODE, TSBYR, TSSTEP, TGROUP, TSFORM, VBTIME, and COMPFG. You must be familiar with these attributes as discussed in the section at the beginning of this report on SPECIAL TIME-SERIES ATTRIBUTES. After these attributes have been entered, you may enter any optional attributes (see Appendix B for a complete list of required and optional attributes). Note that once data have been added to the data set, the required attributes that define data storage cannot be modified. All others can be modified at any time.

[1] Enter a unique data-set number.

[2] Select a similar data set by number or enter the required attributes.

[3] Enter optional attributes or modify required attributes.

In the example two data sets were added to the WDM file. The first data set, number 400, was added using the same attributes as data-set number 4. The second data set, number 500, was not like an existing data set, so the required attributes were entered. Note that no time-series data have actually been entered into the data sets at this point. In the example, no optional attributes were added. See the ADD attributes option for an example of the addition of optional attributes.

```
     ATTRIBUTES, DATA, SELECT, ADD, DELETE, or RENUMBER.
     (Use return for DONE)
☞    ADD
     WDM file data-set number?
☞    400
     Is new data set like any OLD data sets?
     (Use return for NO)
☞    Y
     Old data-set number?
☞    4
     COPY complete, entering MODIFY mode for the new data set.
     Which attribute for processing (or DONE)?
☞    DONE
     ATTRIBUTES, DATA, SELECT, ADD, DELETE, or RENUMBER.
     (Use return for DONE)
☞    ADD
     WDM file data-set number?
☞    500
     Is new data set like any old data sets?
     (Use return for NO)
☞    NO
     What type is the new data set?
     (Use return for TIME SERIES)
☞    TIME SERIES
     Use default dataset space allocations?
     (Use return for YES)
☞    YES

     General description attributes for data set
      TS-  station id
      TYPE (ISTAID/STAID) station name and/or location (STANAM)
      <--><-------------><-------------------------------------------->
                                                                      CURRENT
☞    CLDC,DAVID CREEK,DAVID'S LITTLE CREEK IN OAKTON VA
      CLDC DAVID CREEK    DAVID'S LITTLE CREEK IN OAKTON VA           CURRENT
☞

     Modify time specification attributes as needed.

     time   time  group  base form of time step compression
     step  units pointer year   data    option      flag
     <--><-----><------><---><------><---------><--------->
        1   none    none    1    none       none       none MINIMUM
     1440   none    none 2000    none       none       none MAXIMUM
        1    DAY    YEAR 1900    MEAN   VARIABLE        YES DEFAULT
        1  MONTH    YEAR 1900    MEAN   CONSTANT        YES CURRENT
☞       1  DAY      YEAR 1890           CONSTANT
        1    DAY    YEAR 1890    MEAN   CONSTANT        YES CURRENT
☞
     Which attribute for processing (or DONE)?
☞    DONE
     Are modifications required?
     (Use return for NO)
☞    NO
```

ADD time-series data ADD

DATA-SET MGT
DATA
TIME SERIES
ADD

The ADD option in the menu below TIME SERIES is used to add data in "free field" format to a WDM data set by either manual entry or from a command file. Before adding the data, you will select a data-set number and starting date. If data exists in the data set, the starting date must be at or after the end of the existing data. If data are to be added before the end of the existing data, the MODIFY or COPY option should be used.

Specification for the quality code, time step, and time units are needed to properly store the data. Quality codes are usually set to zero unless you want to flag the data for a specific application. If the data are in a file without any extra alphanumeric characters, the data can be entered as a command file (type "@" followed by the name of the file). Data must be separated by commas or blanks. The notation "n*" can be used for repeating a value "n" times. You will be prompted until the number of requested values have been entered.

[1] Enter the data-set number, starting date, number of values, quality code, time step, and time units.

[2] Enter the values to be added from the terminal or by using a command file. You will be prompted until you have entered the specified number of values.

[3] Enter NO if you are finished adding data for the specified data set, otherwise you will loop back to enter a new starting date.

In the example, streamflow data was added to data set number 700. The starting date of the new data was January 1, 1978. Twenty-four daily values were added from the terminal, each with the quality code of 1. Twenty values were entered, counting the five values of 10.5 entered using the "n*" notation. The program prompted for the remaining 4 values which were entered. Additional data were not added.

ADD time-series data ADD

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
ADD
Which WDM data-set number?
700
 Attributes of data-set 700
 ISTAID :    11520500
 TSTYPE :          FLOW
 TCODE  :             4
 TSSTEP :             1
 STANAM :          Klamath River near Seiad Valley, CA.

   Data available between the following dates:
1912 OCT 1 - 1977 DEC 31 24:00:00

Enter starting date
<= STARTING DATE =>
year mo dy hr mi sc
<--><-><-><-><-><->
1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0 DEFAULT
1978  1  1  0  0  0 CURRENT
1978  1  1  0  0  0
1978  1  1  0  0  0 CURRENT


For the time-series data to be added:
 number of  quality
 values to  of new  time  time
  be added   data   step  units
 <-------><-------><---><----->
         1        0    1   none MINIMUM
       366       30 1440   none MAXIMUM
        24        0    1    DAY DEFAULT
        24        0    1    DAY CURRENT
        24        1
        24        1    1    DAY CURRENT

Enter data values.
 (Separate by blank or comma, max 132 char/line.)
23 45 67.8 23 54 12 23 45 96 34.9 12.8 5*10.5 43.9 24.8 45 34
4 more.
23 87 45.9 32.0
Input complete.
More input for this dataset?
(Use return for YES)
N
Finished adding data.
```

DATA-SET MGT
DATA
TIME SERIES
COPY

The COPY option in the menu below TIME SERIES is used to make a copy of an already existing WDM data set. The number of the source data set and the target data set are required. If the target data set does not exist, it will be added as part of the copy operation. Beginning and ending dates can be selected to copy all or a portion of the source data set. As part of the COPY operation, an update may be performed using either data stored in an external file or data entered from the terminal. The format for the file is:

Column	Item
1-6	year
7-9	month
10-12	day
13-15	hour
16-18	minute
19-21	second
22-27	time steps
28-34	time units (1-sec, 2-min, 3-hr, 4-day, 5-mo, 6-yr)
35-45	value (decimal number)
46-52	quality flag (0-30)

After all the new values are entered or read, ANNIE merges data from the source data set and update file and writes to the target data set. The COPY operation is commonly used to retain the raw data as well as the corrected data. The COPY operation is the only way to update data stored with data compression. Because data used to modify the original data set may be of a different quality, all data updates may set the quality flag to a value different from the original data.

[1] Enter the source and target data-set number and whether updates are to be read from a file or terminal.

[2] If the target data set does not exist, either select option to copy attributes from the source data set or enter the attributes requested.

[3] Use the CURRENT time span from the source data set or subset the time span by entering a later starting date, earlier ending date, or both.

[4] If updates are to be read from a file, enter the name of the file. If updates are to be entered from the terminal, enter the value, quality code, date, time step, and time units for each value.

COPY time-series data COPY

The example illustrates the copying of all available streamflow data in data-set number 2 to data-set numbers 700 and 800. The attributes for the target data set were the same as the source data set. The data were copied to data-set number 700 with no updates. The data were copied to data-set number 800 with three values updated. The update consists of the daily streamflow values for June 10-12, 1970. The input values were 2070, 3000, and 3654, and the data quality was rated as "1" on a scale of 0 to 30. After giving the update information on the final day, a "0" was entered for the year and the COPY option was performed.

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ COPY

For the TIME SERIES COPY-UPDATE operation:
                enter
 source target updates
   dsn    dsn    from
 <----><-----><------->
      0      0     none MINIMUM
  32000  32000     none MAXIMUM
      0      0     NONE DEFAULT
      0      0     NONE CURRENT
☞ 2,700,NONE
      2    700     NONE CURRENT
☞
Target data set does not exist, copy source attributes?
(Use return for YES)
☞ YES

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1912 10  1  0  0  0   1982  9 30 24  0  0 CURRENT
☞
  Starting copy.
  Copy complete, return code: 0
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ COPY
```

```
For the TIME SERIES COPY-UPDATE operation:
                enter
 source target updates
   dsn    dsn    from
 <----><-----><-------->
      0      0     none MINIMUM
  32000  32000     none MAXIMUM
      0      0     NONE DEFAULT
      0      0     NONE CURRENT
2,800,TERMINAL
      2    800 TERMINAL CURRENT

Target data set does not exist, copy source attributes?
(Use return for YES)
YES

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1912 10  1  0  0  0   1982  9 30 24  0  0 CURRENT

To end input of UPDATEs, enter a 0 for the year.
   updated quality < start of time step><--- time -->
    value    code    year mo dy hr mi sc steps  units
 <--------><------><----><-><-><-><-><-><-><----><----->
       none       0     0  1  1  0  0  0     1   none MINIMUM
       none      30  2020 12 31 24 59 59    60   none MAXIMUM
         0.       0     0  1  1  0  0  0     1    DAY DEFAULT
         0.       0  1912 10  1  0  0  0     1    DAY CURRENT
2070,1,1970,6,10
      2070.       1  1970  6 10  0  0  0     1    DAY CURRENT

To end input of UPDATEs, enter a 0 for the year.
   updated quality < start of time step><--- time -->
    value    code    year mo dy hr mi sc steps  units
 <--------><------><----><-><-><-><-><-><-><----><----->
       none       0     0  1  1  0  0  0     1   none MINIMUM
       none      30  2020 12 31 24 59 59    60   none MAXIMUM
         0.       0     0  1  1  0  0  0     1    DAY DEFAULT
      2070.       1  1970  6 11  0  0  0     1    DAY CURRENT
3000
      3000.       1  1970  6 11  0  0  0     1    DAY CURRENT
```

```
To end input of UPDATEs, enter a 0 for the year.
   updated quality < start of time step><--- time -->
    value    code    year mo dy hr mi sc steps  units
<-------><------><----><-><-><-><-><-><----><----->
      none       0     0  1  1  0  0  0     1   none MINIMUM
      none      30  2020 12 31 24 59 59    60   none MAXIMUM
        0.       0     0  1  1  0  0  0     1    DAY DEFAULT
     3000.       1  1970  6 12  0  0  0     1    DAY CURRENT
☞ 3654
     3654.       1  1970  6 12  0  0  0     1    DAY CURRENT
☞

To end input of UPDATEs, enter a 0 for the year.
   updated quality < start of time step><--- time -->
    value    code    year mo dy hr mi sc steps  units
<-------><------><----><-><-><-><-><-><----><----->
      none       0     0  1  1  0  0  0     1   none MINIMUM
      none      30  2020 12 31 24 59 59    60   none MAXIMUM
        0.       0     0  1  1  0  0  0     1    DAY DEFAULT
     3654.       1  1970  6 13  0  0  0     1    DAY CURRENT
☞                    0
     3654.       1     0  6 13  0  0  0     1    DAY CURRENT

 Starting copy.
 Copy complete, return code: 0
```

FILE MGT CREATE

Use the CREATE option in the menu below the FILE MGT keyword to create the WDM file. Once created, the WDM file will automatically be enlarged as its original space allocation is filled. Hence, you are not expected to understand or specify data storage requirements. There are no restrictions on WDM file names. Any name that is valid on the computer being used is acceptable. However, the suffix WDM is suggested to make the files easy to identify by all users.

[1] Enter the name for your WDM file.

As indicated by the example, the only input needed to create a WDM file is the file name. Once the WDM file has been created, it is ready for use.

```
Enter CREATE, SUMMARIZE, IMPORT, EXPORT, or DUMP.
(Use return for DONE)
☞ CREATE
Name for your WDM file?
☞ TEST02.WDM
Your WDM file has been created and is ready for use.
```

DELETE attributes DELETE

DATA-SET MGT ATTRIBUTES DELETE

The DELETE option in the menu below ATTRIBUTES is used to eliminate one or more of the optional attribute values assigned to a data set. Note that only "optional" attributes can be deleted. (See Appendix B to determine whether the attribute that you wish to delete is optional or required.) Only two pieces of information are needed by ANNIE to perform an attribute delete: the data-set number and the attribute name.

[1] Select the data sets for this operation.

[2] Select the attribute to be deleted for all selected data sets.

In this session the optional attribute drainage area (DAREA) was deleted for the data set in the buffer. ANNIE indicates that the DELETE operation was successful.

```
Enter ADD, MODIFY, DELETE, LIST, or TABLE.
(Use return for DONE)
☞ DELETE

  1 data set is currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DO
Which attribute for processing (or DONE)?
☞ DAREA
Attribute successfully deleted from data-set number 69.
Which attribute for processing (or DONE)?
☞ DONE
```

DATA-SET MGT DELETE

The DELETE option in the menu below DATA-SET MGT is used to delete an entire data set including data and attributes. Once a data set has been deleted, it cannot be recovered. Space used by the deleted data set becomes available for additional data sets. The only input needed is the data-set number to be deleted. Because the data set cannot be recovered, ANNIE provides an "Are you sure?" prompt and awaits an affirmative response before the delete is actually performed.

[1] Select data sets to be deleted.

[2] Respond with YES to confirm the deletion of each data set selected.

In the example, data-set numbers 400 and 500 were added to the data-set buffer. Data-set number 400 was deleted, but data-set number 500 was not.

```
ATTRIBUTES, DATA, SELECT, ADD, DELETE, or RENUMBER.
(Use return for DONE)
☞ DELETE

  NO datasets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 400
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 500
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE

 Attributes of data-set 400:

 ISTAID  :   11519500
 TSTYPE  :        FLOW
 TCODE   :          4
 TSSTEP  :          1
 STANAM  :        Scott River near Fort Jones, CA.

Are you sure you want to delete this data set?
(Use return for NO)
☞ YES
Delete complete.

 Attributes of data-set 500:

 TSTYPE  :        CLDC
 STAID   :         DAVID CREEK
 STANAM  :        DAVID'S LITTLE CREEK IN OAKTON VA
 TCODE   :          4
 TSSTEP  :          1

Are you sure you want to delete this data set?
(Use return for NO)
☞ NO
Delete not done.
```

DELETE time-series data DELETE

DATA-SET MGT
DATA
TIME SERIES
DELETE

The DELETE option in the menu below TIME SERIES is used to delete all or part of the time-series data in a data set. Input required is a data-set number and a date after which all data are to be deleted. The end date of the existing data is provided as the CURRENT date in the menu. Because the data cannot be recovered, ANNIE provides an "Are you sure you want to delete the specified data?" prompt. After an affirmative response the delete is performed.

[1] Select time-series data set.

[2] Select the date to begin the deletion of data.

[3] Respond with YES to confirm the deletion of data in each data set selected.

[4] Enter another time-series data-set number or 0 to end the DELETE option.

The example illustrates the deletion of all values from data-set number 700 after January 1, 1978. YES was entered to confirm the deletion of the data. The return code of "0" on the last line indicates that the delete operation was successful.

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ DELETE
Delete data from which data set (0 to stop)?
(Use return for 0)
☞ 700
Delete all data after what date?


Enter date
<==  DATE/TIME  ==>
year mo dy hr mi sc
<-->-><->-><->-><->
1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0 DEFAULT
1982  9 30 24  0  0 CURRENT
☞ 1978  1  1  0  0  0
1978  1  1  0  0  0 CURRENT
☞
Are you sure you want to delete the specified data?
(Use return for NO)
☞ YES
Delete complete, return code: 0
Delete data from which data set (0 to stop)?
(Use return for 0)
☞ 0
```

FILE MGT EXPORT

The EXPORT option is used to export WDM data sets to ASCII files so that the data may be subsequently imported into a second WDM file. This is the easiest way to transfer WDM files between different types of computers or data sets from one WDM file to another. The name of the WDM file that contains the data sets to be exported and the name of the file to be produced are the basic input. One or more lines of comments may be entered to more fully document the output file. All of the data sets in the WDM file or selected data sets may be exported. Attributes, data, or both may be exported for each data set. Required attributes are always exported. For time-series data sets, a common time period may be specified for the export of data. If not, all data are exported.

[1] Enter names of your WDM file and output file.

[2] Enter comment lines.

[3] Select data sets.

[4] Select the parts of the data set to export and the time period for time-series data sets.

The example illustrates the export of one data set from a WDM file named DAVID.WDM to a file named TEST02.EXP. A comment was added for the output file, and both the attributes and the time-series data were selected for export. Since changes were not made to the line indicating the starting and ending dates of the data in data set 68, all time-series data were exported. A listing of the output file is found following the example of the user interaction.

```
    Enter CREATE, SUMMARIZE, IMPORT, EXPORT, or DUMP.
    (Use return for DONE)
☞   EXPORT
    Name of your WDM file?
☞   DAVID.WDM
    Name of output file?
☞   TEST02.EXP
    Comment line for export file (cr to end)?
☞   DAILY PRECIPITATION FOR SANDERSON GULCH TRIBUTARY AT LAKEWOOD, CO
    Comment line for export file (cr to end)?
☞
    Archive SELECTED or ALL data sets in the WDM?
    (Use return for SELECTED)
☞   SELECTED
```

```
       NO data sets are currently in the buffer.
       You are now in the SELECT option.

     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    ADD
     WDM file data-set number?
☞    68
     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    DONE

     Export what parts of the data set?
      attributes data
      <--------><--->
            none none MINIMUM
            none none MAXIMUM
             YES  YES DEFAULT
             YES  YES CURRENT
☞    YES,YES
             YES  YES CURRENT
☞
     Export same time period for all datasets?
     (Use return for YES)
☞    YES

     Enter beginning and ending dates
     <= STARTING DATE =>   <=  ENDING DATE  =>
     year mo dy hr mi sc   year mo dy hr mi sc
     <--><-><-><-><-><-><-----><-><-><-><-><->
     1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
     2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
     none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
     1973  5  1  0  0  0   1974  7 31 24  0  0 CURRENT
☞
     Completed export of DSN no. 68
```

```
Listing of output file TEST02.EXP:
DATE
WDMSFL
SYSTEM
COMMENT
  DAILY PRECIPITATION FOR SANDERSON GULCH TRIBUTARY AT LAKEWOOD, CO
END COMMENT
DSN          68    TYPE  TIME   NDN   1   NUP   1   NSA  35   NSP  70   NDP 100
  LABEL
    ISTAID   6714310
    TSTYPE  PREC
    TCODE          4
    TSSTEP         1
    TSFILL        0.
    TGROUP         6
    TSFORM         1
    VBTIME         2
    COMPFG         1
    TSBYR       1973
  END LABEL
  DATA       STARTS: 1973  5  1  0  0  0  ENDS: 1974  7 31 24  0  0
```

```
    1973  4 30 24  0  0     4  1  0     2  0          0.0000       6.0000E-02
    1973  5  2 24  0  0     4  1  0     2  1          0.0000
    1973  5  4 24  0  0     4  1  0     3  0          0.3900        4.000
     1.0000E-02
    1973  5  7 24  0  0     4  1  0    12  1          0.0000
    1973  5 19 24  0  0     4  1  0     5  0          1.0000E-02   0.1200
     0.2900       0.0000       5.0000E-02
    1973  5 24 24  0  0     4  1  0     4  1          0.0000
    1973  5 28 24  0  0     4  1  0     2  0          1.0000E-02   0.7900
    1973  5 30 24  0  0     4  1  0     3  1          0.0000
    1973  6  2 24  0  0     4  1  0     3  0          6.0000E-02   7.0000E-02
     1.0000E-02
    1973  6  5 24  0  0     4  1  0     2  1          0.0000
    1973  6  7 24  0  0     4  1  0     1  0          1.0000E-02
    1973  6  8 24  0  0     4  1  0     5  1          0.0000
    1973  6 13 24  0  0     4  1  0     1  0          2.0000E-02
    1973  6 14 24  0  0     4  1  0    29  1          0.0000
    1973  7 13 24  0  0     4  1  0     2  0          3.0000E-02   1.0000E-02
    1973  7 15 24  0  0     4  1  0     2  1          0.0000
    1973  7 17 24  0  0     4  1  0     4  0          1.0000E-02   0.0000
     0.1200       3.0000E-02
    1973  7 21 24  0  0     4  1  0     3  1          0.0000
    1973  7 24 24  0  0     4  1  0     1  0          1.0000E-02
    1973  7 25 24  0  0     4  1  0     3  1          0.0000
    1973  7 28 24  0  0     4  1  0     1  0          1.0000E-02
    1973  7 29 24  0  0     4  1  0     6  1          0.0000
    1973  8  4 24  0  0     4  1  0     1  0          1.0000E-02
    1973  8  5 24  0  0     4  1  0   148  1          0.0000
    1973 12 31 24  0  0     4  1  0   123  1          0.0000
    1974  5  3 24  0  0     4  1  0     1  0          1.0000E-02
    1974  5  4 24  0  0     4  1  0    32  1          0.0000
    1974  6  5 24  0  0     4  1  0     4  0          1.0000E-02   2.0000E-02
     0.8900       1.0000E-02
    1974  6  9 24  0  0     4  1  0     3  1          0.0000
    1974  6 12 24  0  0     4  1  0     1  0          1.0000E-02
    1974  6 13 24  0  0     4  1  0    27  1          0.0000
    1974  7 10 24  0  0     4  1  0     2  0          0.1500       0.1600
    1974  7 12 24  0  0     4  1  0     2  1          0.0000
    1974  7 14 24  0  0     4  1  0     1  0          4.0000E-02
    1974  7 15 24  0  0     4  1  0     9  1          0.0000
    1974  7 24 24  0  0     4  1  0     2  1          1.0000E-02
    1974  7 26 24  0  0     4  1  0     5  1          0.0000
  END DATA
END DSN
```

GENERATE time series, math function GENERATE

DATA-SET MGT
DATA
TIME SERIES
GENERATE
MATH

The GENERATE option is used to generate one time series based on one or two other time series. Over 20 different types of transformations are available. For all GENERATE options, a data-set number for the output time series and at least one data-set number for input time series is required. Two input data sets are required for some transformations. Table 2 contains a list of the available mathematical transformations and their required inputs.

[1] Select the math function, target and input data-set numbers, and any constants needed for the selected math function.

[2] Create the output time-series data set if it does not exist.

[3] Select the period of record for the generate operation.

In the example, data from data-set number 6 were multiplied by the constant 0.0555 and placed in data-set number 200. The attributes from data-set number 6 were used for the new data set. The entire period of record was transformed.

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ GENERATE
What type of time-series generation?
(Use return for DONE)
☞ MATH
What math function do you want?
(Use return for DONE)
☞ *C
You are using the following equation:
  T = T1 * C                C can be any non-zero number

Enter the data-set numbers:
 data-set numbers
 ----------------
  target   input  constant
    T        T1      C1
 <------><------><--------->
       1       1       none MINIMUM
   32000   32000       none MAXIMUM
    none    none         0. DEFAULT
    none    none         0. CURRENT
☞ 200,6,0.0555
     200       6    0.0555 CURRENT
☞
```

```
  Output data-set number 200 does not exist.
Copy attributes from input time series?
(Use return for YES)
☞ YES

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<-->-><->-><->-><->-><----->-><->-><->-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞

 Generate completed.
```

Table 2--Mathematical functions available in GENERATE option

Name	Description	Comments
+C	T = T1 + C	C can be any number
*C	T = T1 * C	C can be any non-zero number
ADD	T = T1 + T2	
SUB	T = T1 - T2	
MULT	T = T1 * T2	
DIV	T = T1 / T2	if T2 = 0, T = 10.0E35
MEAN	T = (T1 + T2) / 2	
WGHT	T = C1 * T1 + C2 * T2	must have C1 + C2 = 1.0
LINE	T = C1 * T1 + C2	C1 and C2 can be any number
**C	T = T1 ** C	C may be any non-zero number
C**	T = C ** T1	C may be any non-zero number
POW	T = T1 ** T2	if T1 = 0 and T2 < 0, then T = 0
E**	T = e ** T1	if T1 > 80.5, then T = 10.0E35
LG10	T = log(T1)	IF T1 <= 0, then T = 10.0e35
LGE	T = ln(T1)	IF T1 <= 0, then T = 10.0e35
ABS	T = abs(T1)	
Z-	T = T1 if T1 >= C1 T = C2 if T1 < C1	
Z+	T = T1 IF T1 <= C1 T = C2 if T1 > C1	
MIN	T = min(T1,T2)	
MAX	T = max(T1,T2)	
SUM	$T_n = T1_1 + T1_2 + ... + T1_n$	
SIGF	T = C significant digits of T1	
TABL	T = table look-up	

DATA-SET MGT
DATA
TIME SERIES
GENERATE
TIME CHANGE
SHIFT

The shift option under generate is used to create a new time-series data set from an existing data set and a time shift. Shifts may be needed to correct for errors in recording clocks, daylight savings time, or time zone. Besides the number of the new and existing data sets, the starting time for the existing data set and equivalent starting time for the new data set are required.

1. Select the new (target) and existing (input) data set numbers.

2. Create the new data set and modify attributes as needed. If the data set has been created, this step is not needed.

3. Enter the time period on the existing data set for generation and the starting time to use on the new data set.

In the example, the data contained in data-set number 6 were shifted in time and added to data-set number 275. The attributes from data-set number 6 were used for the new data set, with the attribute STANAM modified to describe the changes made to the data. The entire period of record was shifted by 3 days.

```
What type of time-series generation?
(Use return for DONE)
☞ TIME CHANGE
What type of time change?
(Use return for DONE)
☞ SHIFT

Enter the data-set numbers:
 data-set numbers
 ----------------
  target   input
    T        T1
 <------><------>
        1       1 MINIMUM
    32000   32000 MAXIMUM
     none    none DEFAULT
     none    none CURRENT
☞ 275,6
      275       6 CURRENT
☞
```

```
  Output data-set number 275 does not exist.
Copy attributes from input time series?
(Use return for YES)
☞ YES

 Attributes successfully copied.  Modify as required.  You
 may want to change TSSTEP, TCODE, TGROUP and/or STANAM.
Which attribute for processing (or DONE)?
☞ STANAM
ADD/MODIFY attribute for DSN. 275
Enter STANAM, Station name (48 characters).
☞ CANE BRANCH FLOW - TIME SHIFT 3 DAYS
Which attribute for processing (or DONE)?
☞ DONE

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞
Shifted start time

Enter starting date
<= STARTING DATE =>
year mo dy hr mi sc
<--><-><-><-><-><->
1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0 DEFAULT
1957  4  1  0  0  0 CURRENT
☞ 1956,1,4
1956  1  4  0  0  0 CURRENT
☞

 Generate completed.
```

DATA-SET MGT
DATA
TIME SERIES
GENERATE
TIME CHANGE
TRANSFORM

The TIME CHANGE option can be used for simple aggregation and disaggregation of time-series data. The time change is based on the time interval attributes of the existing (input) data set and new (target) data set. When the time interval of the input data is larger, the transformations DIVIDE or SAME may be selected. When the time interval of the input data is smaller, the transformations SUM or AVERAGE may be selected. In either case, the larger time interval must be an even multiple of the smaller time interval.

[1] Select the new (target) and existing (input) data-set numbers.

[2] Create the new data set and modify attributes as needed.

[3] Select the transformation function.

For the example, data from data-set number 10, at a 15-minute time step, were transformed to a 1-day time step and added to data-set number 250. Since that data set did not previously exist, it was added using the attributes from data-set number 10, with the time step changed appropriately (TSSTEP=1, TCODE=4). For the transformation SUM was chosen to sum the data over the time step. Note that the default period of record started at 1:30 am and ended at 4:30 pm. This is incompatible with the 1-day time step selected for the output data set. The example was then repeated, entering the first and last full days for the period of record, and the transformation was successful.

GENERATE time change, transform GENERATE

```
What type of time series generation?
(Use return for DONE)
☞ TIME CHANGE
What type of time change?
(Use return for DONE)
☞ TRANSFORM

Enter the data-set numbers:
 data-set numbers
 ----------------
  target   input
    T        T1
 <------><------>
        1       1 MINIMUM
    32000   32000 MAXIMUM
     none    none DEFAULT
     none    none CURRENT
☞ 250,10
      250      10 CURRENT
☞

  Output data-set number 250 does not exist.
Copy attributes from input time series?
(Use return for YES)
☞ YES

 Attributes successfully copied.  Modify as required.  You
 may want to change TSSTEP, TCODE, TGROUP and/or STANAM.
Which attribute for processing (or DONE)?
☞ TSSTEP

ADD/MODIFY attribute for DSN. 250
Enter TSSTEP, Primary time step, in TCODE units.
(Use return for 15)
☞ 1
Which attribute for processing (or DONE)?
☞ TCODE
ADD/MODIFY attribute for DSN. 250
Enter TCODE, Time units code.
(Use return for 2)
☞ 4
Which attribute for processing (or DONE)?
☞ TGROUP
ADD/MODIFY attribute for DSN. 250
Enter TGROUP, Unit for group pointers.
(Use return for 5)
☞ 6
Which attribute for processing (or DONE)?
☞ DONE
What aggregate transformation
(Use return for AVERAGE)
☞ SUM
```

```
Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  2 17  1 30  0   1957  4  8 16 30  0 CURRENT
☞

  Start date is incompatible with the requested output
  time step.

What type of time change?
(Use return for DONE)
☞ TRANSFORM

Enter the data-set numbers:
 data-set numbers
 ----------------
  target   input
    T        T1
 <------><------>
        1       1 MINIMUM
    32000   32000 MAXIMUM
     none    none DEFAULT
     none    none CURRENT
☞ 250,10
      250      10 CURRENT
☞
What aggregate transformation
(Use return for AVERAGE)
☞ SUM

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  2 17  1 30  0   1957  4  8 16 30  0 CURRENT
☞       18  0  0  0            7  0  0
1956  2 18  0  0  0   1957  4  7  0  0  0 CURRENT
☞

 Generate completed.
```

GRAPHICS PLTGEN

PLTGEN files are formatted, sequential, ASCII files produced by the watershed models PRMS, DR3M, and HSPF. The files contain time series, usually observed data and simulated data, at a given time interval. The file is documented in the HSPF users manual. The first 26 records of the file contain information descriptive of the contents of the remaining records. Starting with record 27, succeeding records should have a date and time followed by values for up to 10 time series. ANNIE reads the 26 header records and asks you which time series to plot. Either time plots or x-y plots can be selected.

[1] Enter the name of the PLTGEN file and select time series (columns) in the file to be plotted.

[2] Enter the starting and ending date and time step for the plot.

[3] Select the axes types and titles.

[4] Select the characteristics of each line and location of the legend if more than one curve.

[5] Select the scale for the axes and action to take if any points are located outside the plot area.

[6] Modify values for the size and location of the plot if needed.

[7] Make selection to plot or to revise items previously selected in steps [3] to [6].

The example illustrates a time plot where all four time series in the PLTGEN file named IOWA.PLT are used. Time conventions for PLTGEN records are end of time-step for sums or averages over the time step. The graph and a partial listing of the IOWA.PLTGEN file follow the example.

```
Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
(Use return for WDM)
☞ PLTGEN
Name of input PLTGEN file?
☞ IOWA.PLT
```

```
 CFS
Press return if Y-axis OK or enter new title. (max 80 char)
☞
 Variable is :SIM GROUNDWATER
Do you want to plot the above time series?
(Use return for NO)
☞ Y
SIM GROUNDWATER
Press return if label OK or enter new label. (max 20 char)
☞
 Variable is :SIM INTERFLOW
Do you want to plot the above time series?
(Use return for NO)
☞ Y
SIM INTERFLOW
Press return if label OK or enter new label. (max 20 char)
☞
 Variable is :SIM TOTAL RUNOFF
Do you want to plot the above time series?
(Use return for NO)
☞ Y
SIM TOTAL RUNOFF
Press return if label OK or enter new label. (max 20 char)
☞
 Variable is :OBS TOTAL RUNOFF
Do you want to plot the above time series?
(Use return for NO)
☞ Y
OBS TOTAL RUNOFF
Press return if label OK or enter new label. (max 20 char)
☞

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1975 12 31 24  0  0   none 12 31  0  0  0 CURRENT
☞ 1976,1,1,0,0,0,1976,12,31,24,0,0
1976  1  1  0  0  0   1976 12 31 24  0  0 CURRENT
☞
Plot at a DAILY or MONTHLY time step?
(Use return for DAILY)
☞ DAILY
366 Points are to be retrieved.
Data file being read.
 Still reading PLTGEN file. 1976 APR 8 24:00:00
 Still reading PLTGEN file. 1976 JUL 17 24:00:00
 Still reading PLTGEN file. 1976 OCT 25 24:00:00

Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
☞ SCREEN
```

```
Enter or modify as needed.
          left    right    aux
 x-axis  y-axis  y-axis   axis
<------><------><------><------>
    none    none    none    none MINIMUM
    none    none    none    none MAXIMUM
    TIME   ARITH    NONE      NO DEFAULT
    TIME   ARITH    NONE      NO CURRENT
☞ TIME,LOG
    TIME     LOG    NONE      NO CURRENT
☞
   SIMULATED FLOW


Do you want to replace the above title?
(Use return for NO)
☞ NO
 CFS
Do you want to replace the above title for the y-axis?
(Use return for NO)
☞ NO
```

```
Enter or modify specifications for each line.
                                  MEAN
  line                    shade    or     which
  type    color  symbol  pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7--------> FIELD
  SOLID   BLACK    NONE    NONE    MEAN    LEFT SIM GROUNDWATER      CURV  1
  SOLID   BLACK    NONE    NONE    MEAN    LEFT SIM INTERFLOW        CURV  2
  SOLID   BLACK    NONE    NONE    MEAN    LEFT SIM TOTAL RUNOFF     CURV  3
  SOLID   BLACK    NONE    NONE    MEAN    LEFT OBS TOTAL RUNOFF     CURV  4


   none    none    none    none    none    none                     MINIMUM
   none    none    none    none    none    none                     MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

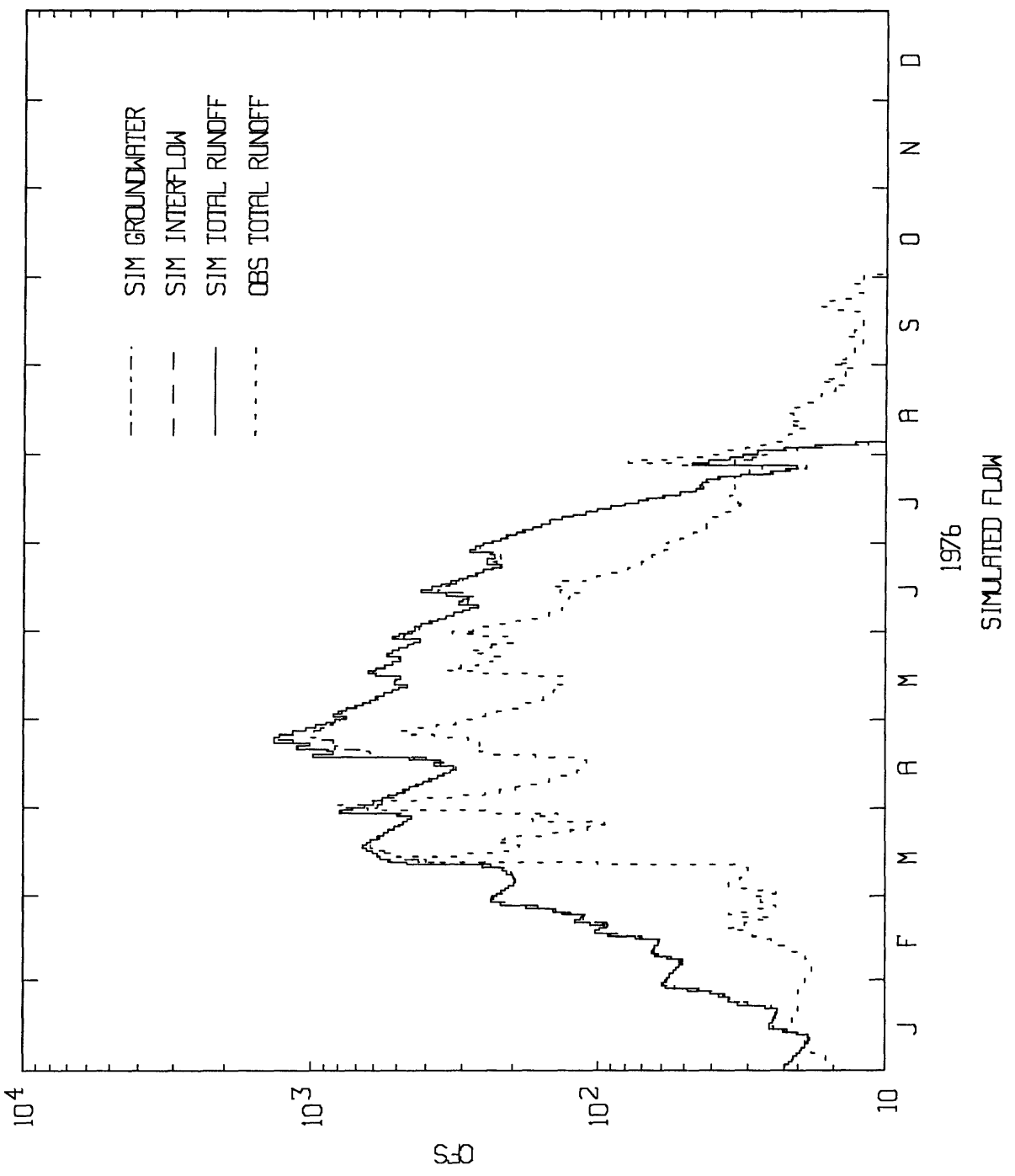
```
Enter or modify specifications for each line.
                                  MEAN
  line                    shade    or     which
  type    color  symbol  pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7--------> FIELD
  MIXED   BLACK    NONE    NONE    MEAN    LEFT SIM GROUNDWATER      CURV  1
   DASH   GREEN    NONE    NONE    MEAN    LEFT SIM INTERFLOW        CURV  2
  SOLID     RED    NONE    NONE    MEAN    LEFT SIM TOTAL RUNOFF     CURV  3
    DOT    BLUE    NONE    NONE    MEAN    LEFT OBS TOTAL RUNOFF     CURV  4


   none    none    none    none    none    none                     MINIMUM
   none    none    none    none    none    none                     MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Change transformations if needed.
                          Axis                          trans-
  Variable name           type   minimum  maximum   formation
<---------1-------><----2---><----3---><----4---><----5---> FIELD
SIM GROUNDWATER         left Y        0.    998.11       LOG VAR   1
SIM INTERFLOW           left Y        0.    1347.9       LOG VAR   2
SIM TOTAL RUNOFF        left Y        0.    1354.6       LOG VAR   3
OBS TOTAL RUNOFF        left Y        0.      810.       LOG VAR   4


                                                        none MINIMUM
                                                        none MAXIMUM
                                                       ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Should legend location be DEFAULT, SPECIFIED or NONE?
(Use return for DEFAULT)
☞ SPECIFIED

Location of upper left hand corner of legend?
      X            Y
 COORDINATE  COORDINATE
<---------><---------->
          0.          0. MINIMUM
          1.          1. MAXIMUM
         0.1         0.8 DEFAULT
         -1.         -1. CURRENT
☞ .6,.9
         0.6         0.9 CURRENT
☞

       Variable          Minimum    Maximum
------------------- ---------- ----------
 SIM GROUNDWATER              0.     998.11       LEFT Y-AXIS
 SIM INTERFLOW                0.     1347.9       LEFT Y-AXIS
 SIM TOTAL RUNOFF             0.     1354.6       LEFT Y-AXIS
 OBS TOTAL RUNOFF             0.       810.       LEFT Y-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
       0.         0. DEFAULT
     0.001    10000. CURRENT
☞ 10,10000
        10.    10000. CURRENT
☞

  Note: values off bottom of plot.
```

```
Select plotting action to take for values off plot?
   Top    Bottom
 of plot of plot
<------><------>
    none    none MINIMUM
    none    none MAXIMUM
    CLIP    CLIP DEFAULT
    CLIP    CLIP CURRENT
☞ CLIP,CLIP
    CLIP    CLIP CURRENT
☞
Do you want to add any text to the plot?
(Use return for NO)
☞ NO
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space    space   Y-axis   X-axis   letter  location location
    (y)      (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.44     7.83     0.13   1.7675      1.8 CURRENT
☞
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot is drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```

GRAPHICS	PLTGEN time plot	GRAPHICS



```
Partial listing of input file IOWA.PLT:
SIMU HSPF FILE FOR DRIVING SEPARATE PLOT PROGRAM
SIMU Time interval: 1440 mins          Last month in printout year:  9
SIMU No. of curves plotted:  Point-valued:  0   Mean-valued:  4   Total  4
SIMU Label flag:  0          Pivl:   24          Idelt:   60
SIMU Plot title:   SIMULATED FLOW
SIMU Y-axis label: CFS
SIMU Scale info:  Ymin:  0.00000              Threshold:-0.10000E+31
SIMU              Ymax:   1500.0
SIMU              Time:   20.000     intervals/inch
SIMU Data for each curve (Point-valued first, then mean-valued):
SIMU Label                    LINTYP     INTEQ    COLCOD      TRAN   TRANCOD
SIMU SIM GROUNDWATER               0         5         1      AVER         2
SIMU SIM INTERFLOW                 0         4         1      AVER         2
SIMU SIM TOTAL RUNOFF              1         1         1      AVER         2
SIMU OBS TOTAL RUNOFF              2         8         2      AVER         2
SIMU
SIMU
SIMU
SIMU
SIMU
SIMU
SIMU Time series (pt-valued, then mean-valued):
SIMU
SIMU Date/time                          Values
SIMU
SIMU  1975 12 31 24  0  -0.10000E+31  -0.10000E+31  -0.10000E+31  -0.10000E+31
SIMU  1976  1  1 24  0    22.694         22.694         22.703         15.000
SIMU  1976  1  2 24  0    22.205         22.205         22.205         15.000
SIMU  1976  1  3 24  0    21.725         21.725         21.725         15.000
SIMU  1976  1  4 24  0    21.256         21.256         21.256         16.000
SIMU  1976  1  5 24  0    20.799         20.799         20.799         16.000
SIMU  1976  1  6 24  0    20.352         20.352         20.352         17.000
SIMU  1976  1  7 24  0    19.915         19.915         19.915         18.000
SIMU  1976  1  8 24  0    19.489         19.489         19.489         18.000
SIMU  1976  1  9 24  0    19.073         19.073         19.073         19.000
SIMU  1976  1 10 24  0    18.666         18.666         18.666         19.000
SIMU  1976  1 11 24  0    18.362         18.362         18.374         20.000
SIMU  1976  1 12 24  0    18.441         18.441         18.581         20.000
SIMU  1976  1 13 24  0    19.718         19.718         20.276         20.000
SIMU  1976  1 14 24  0    22.113         22.147         22.936         21.000
SIMU  1976  1 15 24  0    24.534         24.598         25.499         21.000
SIMU  1976  1 16 24  0    25.356         25.408         25.408         21.000
SIMU  1976  1 17 24  0    24.805         24.846         24.846         21.000
SIMU  1976  1 18 24  0    24.399         24.435         24.464         21.000
SIMU  1976  1 19 24  0    24.098         24.130         24.136         21.000
SIMU  1976  1 20 24  0    23.892         23.918         24.006         20.000
SIMU  1976  1 21 24  0    23.732         23.753         23.753         20.000
SIMU  1976  1 22 24  0    25.105         25.157         26.085         20.000
SIMU  1976  1 23 24  0    29.967         30.229         32.690         20.000
SIMU  1976  1 24 24  0    34.126         34.547         35.115         20.000
SIMU  1976  1 25 24  0    34.539         34.865         34.865         20.000
SIMU  1976  1 26 24  0    35.984         36.376         38.039         20.000
SIMU  1976  1 27 24  0    39.426         39.905         40.646         20.000
SIMU  1976  1 28 24  0    44.416         45.162         48.623         20.000
SIMU  1976  1 29 24  0    54.184         55.443         58.784         20.000
SIMU  1976  1 30 24  0    59.228         60.373         60.373         20.000
SIMU  1976  1 31 24  0    57.806         58.545         58.545         19.000
SIMU  1976  2  1 24  0    56.748         57.255         57.440         19.000
```

GRAPHICS TERMINAL TIME

For time-series data at a constant time step, data may be entered from the terminal. Additional options are available for constant time-step plots with data from a WDM file or PLTGEN file. Input will usually be a flat file created with an editor, another program, or a statistical package. Unlike the variable time-step plot, data for the constant time-step plot is entered one variable at a time in a free field format.

[1] Enter the starting and ending dates, YES for constant time step, and the time step. The number of values to enter is computed from the dates and time step.

[2] Enter the number of variables.

[3] Enter the data for each variable with values separated by a blank or comma. Data may be entered from a command file or the terminal. You will be prompted for data until the computed number of values has been entered.

[4] Enter the output device, axes types, titles, specifications for each line, scales for the axes, and plot sizes as needed.

In the example, two hydrographs are drawn for August 6, 1982. There are 24 values at a one hour time step . The files HYDR1 and HYDR2 were used as command files to enter the data. The hydrographs were plotted as step functions because the default specification MEAN was used. If POINT were selected the values would have been connected with straight line segments.

```
    Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
    (Use return for WDM)
☞   TERMINAL
    Is data for an XY plot or TIME-series plot?
    (Use return for XY)
☞   TIME

    Enter beginning and ending dates
    <= STARTING DATE =>    <=  ENDING DATE  =>
    year mo dy hr mi sc    year mo dy hr mi sc
    <-->-><->-><->-><->-><----->-><->-><->-><->
    1492  1  1  0  0  0    1492  1  1  0  0  0 MINIMUM
    2020 12 31 24 59 59    2020 12 31 24 59 59 MAXIMUM
    none  1  1  0  0  0    none 12 31  0  0  0 DEFAULT
    none  1  1  0  0  0    none 12 31  0  0  0 CURRENT
☞   1982,8,6,0,0,0,1982,8,6,24,0,0
    1982  8  6  0  0  0    1982  8  6 24  0  0 CURRENT
☞
```

GRAPHICS terminal, constant time step GRAPHICS

```
Is data on a constant time step?
(Use return for YES)
☞ YES

Enter time step and time units
TIME  TIME
STEP  UNITS
<--><------>
   1   none MINIMUM
3600   none MAXIMUM
   1    DAY DEFAULT
   1    DAY CURRENT
☞ 1,HOUR
   1   HOUR CURRENT
☞
Number of values is 24.
Enter number of variables.
(Use return for 1)
☞ 2
Enter name of variable.
☞ Simulated flow
Enter values for curve 1
 (Separate by blank or comma, max 132 char/line.)
☞ @HYDR1
        0.0       0.0       7.9      99.6
20 more.
      320.1     502.9     615.4     664.4
16 more.
      647.2     544.5     437.6     370.8
12 more.
      306.9     241.1     184.2     139.5
8 more.
      105.7      80.0      60.6      45.9
4 more.
       34.8      26.4      20.0      15.1
Input complete.
Enter name of variable.
☞ Measured flow
Enter values for curve 2
 (Separate by blank or comma, max 132 char/line.)
☞ @HYDR2
        0.0       0.0       0.0      33.0
20 more.
     155.0     236.0     230.0     215.0
16 more.
     206.0     168.0      98.0      58.0
12 more.
      42.0      27.0      20.0      15.0
8 more.
      13.0      11.0       9.0       7.0
4 more.
       6.0       4.0       3.0       2.0
Input complete.

Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
☞ SCREEN
```

GRAPHICS terminal, constant time step GRAPHICS

```
Enter or modify as needed.
          left    right    aux
 x-axis  y-axis  y-axis   axis
<------><------><------><------>
    none    none    none    none MINIMUM
    none    none    none    none MAXIMUM
    TIME   ARITH    NONE      NO DEFAULT
    TIME   ARITH    NONE      NO CURRENT
TIME,ARITH,NONE,NO
    TIME   ARITH    NONE      NO CURRENT

Enter the first line of the title.
Comparison of simulated and measured hydrographs, Sand Creek
Enter the second line of the title

Enter the third line of the title.

Enter first of 2 lines of title for Y-axis. (40 char)
STREAMFLOW, IN CUBIC FEET PER SECOND
Enter second line of axis title. (39 char)
```

```
Enter or modify specifications for each line.
                                MEAN
  line                    shade    or     which
  type    color  symbol   pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7--------> FIELD
  SOLID   BLACK    NONE    NONE    MEAN    LEFT Simulated flow       CURV  1
  SOLID   BLACK    NONE    NONE    MEAN    LEFT Measured flow        CURV  2


   none    none    none    none    none    none                     MINIMUM
   none    none    none    none    none    none                     MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter or modify specifications for each line.
                                MEAN
  line                    shade    or     which
  type    color  symbol   pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7--------> FIELD
   DASH   BLACK    NONE    NONE    MEAN    LEFT Simulated flow       CURV  1
  SOLID   BLACK    NONE    NONE    MEAN    LEFT Measured flow        CURV  2


   none    none    none    none    none    none                     MINIMUM
   none    none    none    none    none    none                     MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

GRAPHICS terminal, constant time step GRAPHICS

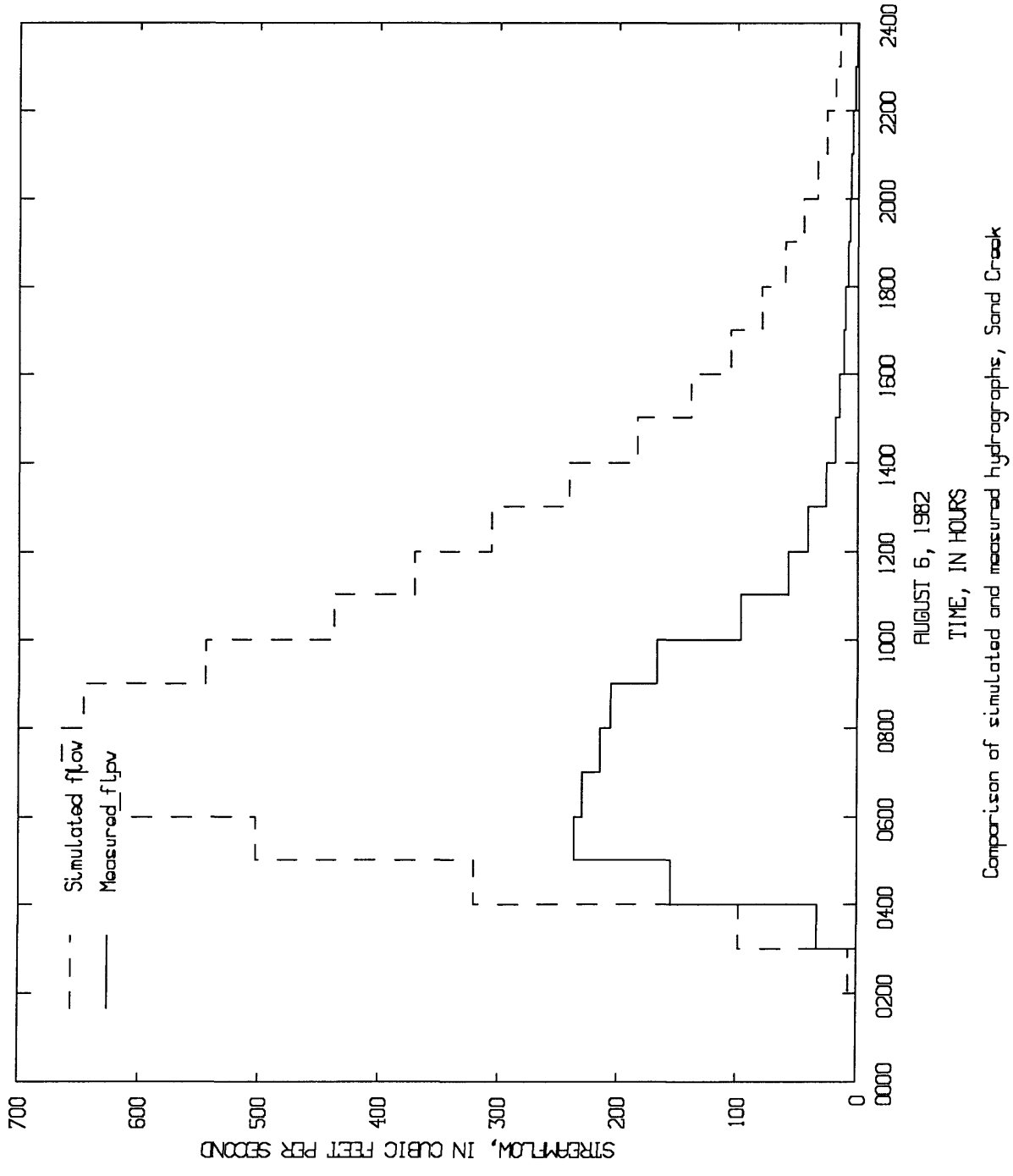
```
Change transformations if needed.
                          Axis                              trans-
  Variable name           type    minimum  maximum          formation
<---------1--------><----2---><----3---><----4---><----5---> FIELD
Simulated flow          left Y        0.     664.4      ARITH VAR   1
Measured flow           left Y        0.      236.      ARITH VAR   2


                                                          none MINIMUM
                                                          none MAXIMUM
                                                         ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Should legend location be DEFAULT, SPECIFIED or NONE?
(Use return for DEFAULT)
☞ DEFAULT

       Variable          Minimum     Maximum
-------------------- ---------- ----------
 Simulated flow               0.       664.4       LEFT Y-AXIS
 Measured flow                0.        236.       LEFT Y-AXIS

Enter values for scale.
                    NUMBER OF
  MINIMUM    MAXIMUM INTERVALS
<---------><---------><--------->
   -10.E+9    -10.E+9          1 MINIMUM
    10.E+9     10.E+9         20 MAXIMUM
        0.         0.         10 DEFAULT
        0.       800.         10 CURRENT
☞ 0.0,700.,7
        0.       700.          7 CURRENT
☞
Do you want to add any text to the plot?
(Use return for NO)
☞ NO
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
          horizontal 10.
          vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space     space   Y-axis   X-axis   letter  location location
    (y)       (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><-------->
       1.        1.       1.       1.     0.01       1.       1. MINIMUM
      38.       38.      38.      38.       3.      36.      36. MAXIMUM
       8.        10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.        10.     5.24     8.01     0.11   1.5725      1.6 CURRENT
☞
```

GRAPHICS terminal, constant time step GRAPHICS

```
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```

GRAPHICS terminal, constant time step GRAPHICS



GRAPHICS TERMINAL TIME

For time-series data at irregular intervals, time plots can be made only by entering data from the terminal or a command file. This type of data often comes from irregularly timed water-quality samples, "smart" data loggers, or tipping-bucket rain gages. Software has not been completed for ANNIE to fully manage this data in a WDM file.

Input will usually be a command file created by the user with an editor, another program or a statistical package. Each record represents a point in time. For data that is the average or sum over a time interval, the time should be the end of the interval. The columnar location of the date, time, and values on the record are supplied by entering the starting position on the record and the length of the field. Note that this means that the positions on the records are fixed for each value and the date.

[1] Enter the starting and ending dates which define the axes and NO for constant time step.

[2] Enter the number of variables to plot.

[3] Enter on the first table menu the amount of date and time information and where that information is to be found on the records of the command file or the line of your input. Enter on the second table the position of each variable. On both menus, the position is defined by a starting column and a length. If any of the fields overlap, you will need to reenter the starting columns and lengths of both dates and variables.

[4] Enter the name of a command file with the data or enter the data from the terminal. Note a blank line on the file will end the input or press the return key when the cursor is on column 1.

[5] Enter the output device, axes types, titles, specifications for each line, axes scales, and plot sizes as needed.

The data used in this example was for illustration purposes only, and may not represent realistic values.

GRAPHICS terminal, variable time step GRAPHICS

```
Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
(Use return for WDM)
☞ TERMINAL
Is data for an XY plot or TIME-series plot?
(Use return for XY)
☞ TIME

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><->-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
none  1  1  0  0  0   none 12 31  0  0  0 CURRENT
☞ 1985                1985
1985  1  1  0  0  0   1985 12 31  0  0  0 CURRENT
☞
Is data on a constant time step?
(Use return for YES)
☞ NO
Enter number of variables.
(Use return for 1)
☞ 3
```

```
Enter locations of DATE fields selected.
  1 - year     4 - hour
  2 - month    5 - minute
  3 - day      6 - second

  included
   on your  starting
    file?    column    length
 <---1---><----2---><----3---> FIELD
       NO          1          5 DATE  1
       NO          6          5 DATE  2
       NO         11          5 DATE  3
       NO         16          5 DATE  4
       NO         21          5 DATE  5
      YES         26          5 DATE  6


     none          1          1 MINIMUM
     none        132        132 MAXIMUM
      YES          1         10 DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter locations of DATE fields selected.
  1 - year     4 - hour
  2 - month    5 - minute
  3 - day      6 - second

  included
   on your  starting
    file?    column    length
 <---1---><----2---><----3---> FIELD
      YES          6          5 DATE  1
      YES          1          5 DATE  2
      YES         11          5 DATE  3
      YES         16          5 DATE  4
      YES         21          5 DATE  5
       NO          1          1 DATE  6


     none          1          1 MINIMUM
     none        132        132 MAXIMUM
      YES          1         10 DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

GRAPHICS terminal, variable time step GRAPHICS

```
Enter the positions on the record of the variables.
 starting
  column    length    variable name
<----1---><----2---><---------3--------> FIELD
         1        10                     VAR   1
        11        20                     VAR   2
        21        30                     VAR   3


         1         1                     MINIMUM
       132       132                     MAXIMUM
        10        10                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter the positions on the record of the variables.
 starting
  column    length    variable name
<----1---><----2---><---------3--------> FIELD
        31        10AMMONIA              VAR   1
        41        10NITRATE              VAR   2
        51        10PHOSPHORUS           VAR   3


         1         1                     MINIMUM
       132       132                     MAXIMUM
        10        10                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Enter values or use command file of values.
Use blank line or return key to end input.

     <---><---><---><---><--->     <--------><--------><-------->
☞      2 1985   13    9   25           4.2       1.9       0.2

     <---><---><---><---><--->     <--------><--------><-------->
☞      3 1985    7   12   40           0.8       2.0      0.13

     <---><---><---><---><--->     <--------><--------><-------->
☞      5 1985   21   10   05           4.7       3.8      0.27

     <---><---><---><---><--->     <--------><--------><-------->
☞      6 1985   22   11   10           3.1       3.2      0.45

     <---><---><---><---><--->     <--------><--------><-------->
☞      7 1985   13    9   30           2.7       2.3      0.32

     <---><---><---><---><--->     <--------><--------><-------->
☞      8 1985   19    9   25           1.6       2.7      0.57
```

```
    <---><---><---><---><--->     <--------><--------><--------><--------><--------><--------><--------><--------><--------><--------><--------><-------->
☞      9 1985    3   12   30            1.8       2.2       0.3

    <---><---><---><---><--->     <--------><--------><--------><--------><--------><--------><--------><--------><--------><--------><--------><-------->
☞     11 1985   28   14   45            1.2       1.8      0.05

    <---><---><---><---><--->     <--------><--------><--------><--------><--------><--------><--------><--------><--------><--------><--------><-------->
☞
    Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
    (Use return for SCREEN)
☞   SCREEN

    Enter or modify as needed.
              left    right    aux
     x-axis  y-axis  y-axis   axis
    <------><------><------><------>
        none    none    none    none MINIMUM
        none    none    none    none MAXIMUM
        TIME   ARITH    NONE      NO DEFAULT
        TIME   ARITH    NONE      NO CURRENT
☞
    Enter the first line of the title.
☞   TIME PLOT WITH TERMINAL OUTPUT
    Enter the second line of the title.
☞
    Enter the third line of the title.
☞
    Enter first of 2 lines of title for Y-axis. (40 char)
☞   mg/l
    Enter second line of axis title. (39 char)
☞
```

```
Enter or modify specifications for each line.
                                    MEAN
  line                       shade    or     which
  type     color  symbol     pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7---------> FIELD
  SOLID   BLACK    NONE     NONE     MEAN    LEFT AMMONIA              CURV  1
  SOLID   BLACK    NONE     NONE     MEAN    LEFT NITRATE              CURV  2
  SOLID   BLACK    NONE     NONE     MEAN    LEFT PHOSPHORUS           CURV  3


   none    none    none     none     none    none                      MINIMUM
   none    none    none     none     none    none                      MAXIMUM
  SOLID   BLACK    NONE     NONE     MEAN    LEFT                      DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

GRAPHICS terminal, variable time step GRAPHICS

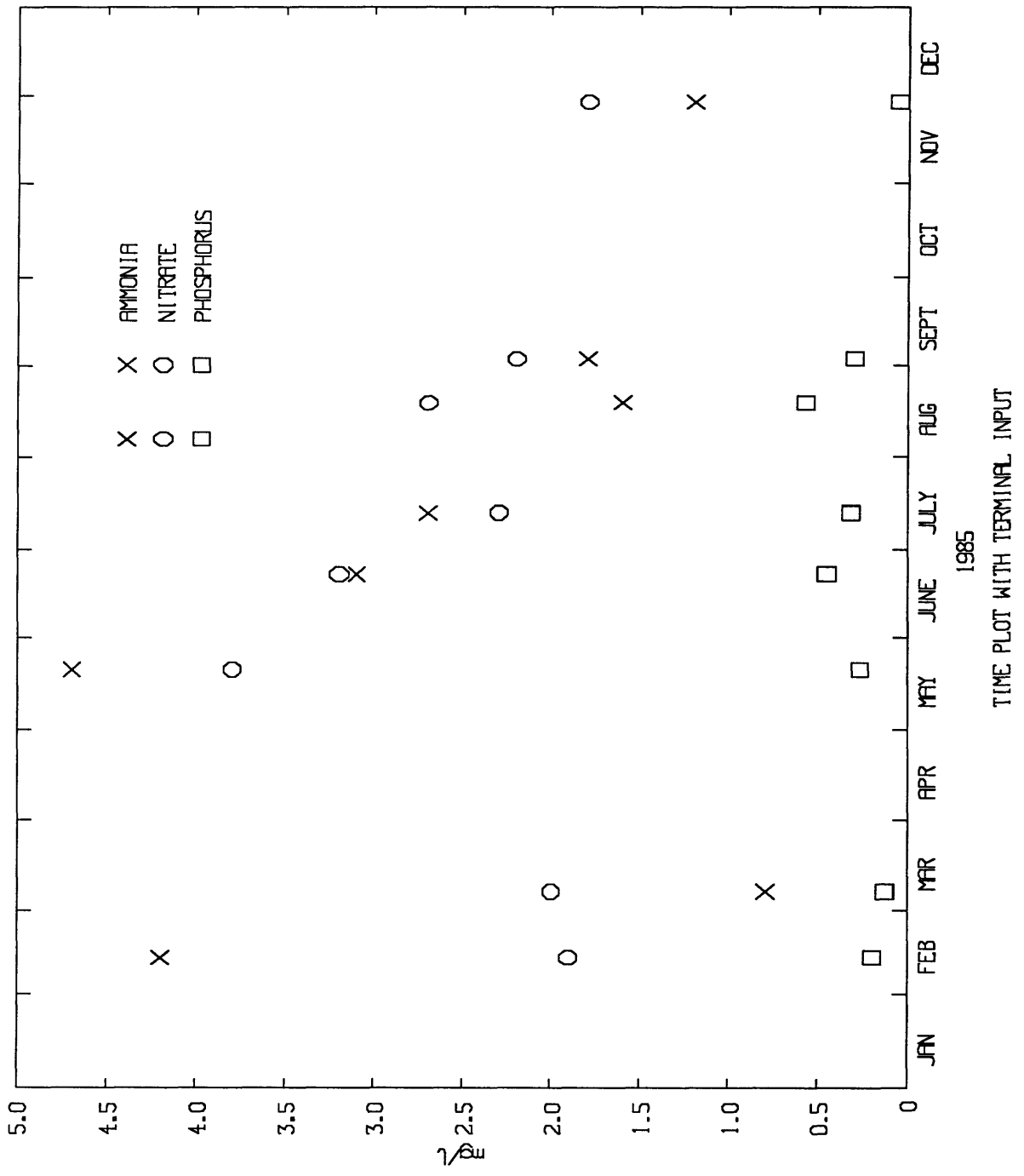
```
Enter or modify specifications for each line.
                                  MEAN
  line                    shade    or     which
  type    color  symbol   pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7--------> FIELD
   NONE   BLACK       X    NONE   POINT    LEFT AMMONIA              CURV  1
   NONE   BLACK       O    NONE   POINT    LEFT NITRATE              CURV  2
   NONE   BLACK       .    NONE   POINT    LEFT PHOSPHORUS           CURV  3


   none    none    none    none    none    none                      MINIMUM
   none    none    none    none    none    none                      MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                      DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Change transformations if needed.
                          Axis                          trans-
  Variable name           type   minimum  maximum   formation
<---------1--------><----2---><----3---><----4---><----5---> FIELD
AMMONIA                 left Y       0.8       4.7     ARITH VAR   1
NITRATE                 left Y       1.8       3.8     ARITH VAR   2
PHOSPHORUS              left Y      0.05      0.57     ARITH VAR   3


                                                      none MINIMUM
                                                      none MAXIMUM
                                                     ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Should legend location be DEFAULT, SPECIFIED or NONE?
(Use return for DEFAULT)
☞ SPECIFIED

Location of upper left hand corner of legend?
      X           Y
 COORDINATE  COORDINATE
<----------><---------->
          0.          0. MINIMUM
          1.          1. MAXIMUM
         0.1         0.8 DEFAULT
         -1.         -1. CURRENT
☞ .6,.9
         0.6         0.9 CURRENT
☞
```

```
       Variable          Minimum    Maximum
--------------------- ---------- ----------
 AMMONIA                     0.8        4.7       LEFT Y-AXIS
 NITRATE                     1.8        3.8       LEFT Y-AXIS
 PHOSPHORUS                 0.05       0.57       LEFT Y-AXIS

Enter values for scale.
                     NUMBER OF
  MINIMUM   MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9         1 MINIMUM
    10.E+9    10.E+9        20 MAXIMUM
        0.        0.        10 DEFAULT
        0.        5.        10 CURRENT
☞
Do you want to add any text to the plot?
(Use return for NO)
☞ NO
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space     space   Y-axis   X-axis   letter  location location
    (y)       (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><-------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.       6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.      5.24     8.01     0.11   1.5725      1.6 CURRENT
☞
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```

GRAPHICS terminal, variable time step GRAPHICS



GRAPHICS TERMINAL

Up to 18 variables or curves can be plotted. The data to be plotted can be input from the terminal or flat files and can be organized by variable or point. If the data are organized by variable, the data are entered as a free field format on as many records as required. A separate file or terminal entry is required for each variable because the data are entered by variable, **not** in pairs. This allows variable A to be plotted against variable B, C, and D by entering variable A only once. However, you must take special care that the order of values for each variable is correct. When you are prompted for the values, either the values are entered from the keyboard or the name of a command file is entered ("@" immediately precedes the name of the file). Values in the file or those entered from the terminal must be separated by one or more blanks or by a comma. A "/" in the file will terminate entry of values. If the file contains too many values, the remaining values on the record just read will be ignored and any subsequent records will be used as input to the next ANNIE question. If not enough values are in the file, ANNIE will prompt for more values from the terminal.

If the data are organized by point, the input is analogous to the input for variable time-step plot except the date and time are not entered. Refer to the variable time-step plot for an example of this type input.

[1] Enter the number of variables.

[2] For each variable, enter the name, number of points, and the values.

[3] Enter the output device, axes types, titles, specifications for each line, scales for the axes and plot sizes as needed.

This example was developed to test the implementation of GKS for line types, colors, and symbols. If they are not correct, they can be adjusted with the users TERM.DAT file as explained in Appendix C. Note that when the data values are entered the multiplier 6* is used instead of entering the same value 6 times.

```
Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
(Use return for WDM)
☞ TERMINAL
Is data for an XY plot or TIME-series plot?
(Use return for XY)
☞ XY
Is input organized by VARIABLE or POINT?
(Use return for VARIABLE)
☞ VARIABLE
Enter number of variables.
(Use return for 2)
☞ 10
Enter name of variable.
☞ A
Number of points?
(Use return for 50)
☞ 6
Enter values for variable 1
 (Separate by blank or comma, max 132 char/line.)
☞ 4 5 6 7 8 9
Input complete.
Enter name of variable.
☞ B
Number of points?
(Use return for 6)
☞ 6
Enter values for variable 2
 (Separate by blank or comma, max 132 char/line.)
☞ 6*9
Input complete.
Enter name of variable.
☞ C
Number of points?
(Use return for 6)
☞ 6
Enter values for variable 3
 (Separate by blank or comma, max 132 char/line.)
☞ 6*8
Input complete.
Enter name of variable.
☞ D
Number of points?
(Use return for 6)
☞ 6
Enter values for variable 4
 (Separate by blank or comma, max 132 char/line.)
☞ 6*7
Input complete.
Enter name of variable.
☞ E
Number of points?
(Use return for 6)
☞ 6
Enter values for variable 5
 (Separate by blank or comma, max 132 char/line.)
☞ 6*6
Input complete.
```

```
 Enter name of variable.
☞F
 Number of points?
 (Use return for 6)
☞6
 Enter values for variable 6
  (Separate by blank or comma, max 132 char/line.)
☞6*5
 Input complete.
 Enter name of variable.
☞G
 Number of points?
 (Use return for 6)
☞6
 Enter values for variable 7
  (Separate by blank or comma, max 132 char/line.)
☞6*4
 Input complete.
 Enter name of variable.
☞H
 Number of points?
 (Use return for 6)
☞6
 Enter values for variable 8
  (Separate by blank or comma, max 132 char/line.)
☞6*3
 Input complete.
 Enter name of variable.
☞I
 Number of points?
 (Use return for 6)
☞6
 Enter values for variable 9
  (Separate by blank or comma, max 132 char/line.)
☞6*2
 Input complete.
 Enter name of variable.
☞J
 Number of points?
 (Use return for 6)
☞6
 Enter values for variable 10
  (Separate by blank or comma, max 132 char/line.)
☞6*1
 Input complete.

 Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
 (Use return for SCREEN)
☞SCREEN

 Enter or modify as needed.
  x-axis  y-axis
 <------><------>
     none    none MINIMUM
     none    none MAXIMUM
    ARITH   ARITH DEFAULT
    ARITH   ARITH CURRENT
☞ARITH,ARITH
    ARITH   ARITH CURRENT
☞
```

```
 Enter the first line of the title.
☞ This is the title of the plot.  This plot is an example of the
 Enter the second line of the title.
☞ various types of lines and symbols available from the ANNIE
 Enter the third line of the title.
☞ program.  It also shows the placement of the legend and titles.
 Enter first of 2 lines of title for Y-axis. (40 char)
☞ TITLE FOR Y-AXIS IS LIMITED TO TWO LINES
 Enter second line of axis title. (39 char)
☞ THE FIRST 40 CHARACTERS, SECOND 39
 Enter first of 2 lines of title for X-axis. (40 char)
☞ X-AXIS TITLE LIMITED TO A LINE OF
 Enter second line of axis title. (39 char)
☞ 40 CHARACTERS AND ONE OF 39 CHARACTERS
 Number of curves?
 (Use return for 1)
☞ 9
  sequence
   number        name of variable
 ----------     --------------------
        1      A
        2      B
        3      C
        4      D
        5      E
        6      F
        7      G
        8      H
        9      I
       10      J

  ** You will need to use the above numbers in the table
  ** that follows.
  ** When ready, use RETURN to continue.
☞
```

```
Enter or modify appropriate items.
 sequence number
 from above for
----------------  line
 x-axis  y-axis   type    color  symbol   label for legend
<---1--><---2--><--3--> <--4--> <--5--> <---------6--------> FIELD
       1       2  SOLID   BLACK    NONE                      CURV  1
       1       2  SOLID   BLACK    NONE                      CURV  2
       1       2  SOLID   BLACK    NONE                      CURV  3
       1       2  SOLID   BLACK    NONE                      CURV  4
       1       2  SOLID   BLACK    NONE                      CURV  5
       1       2  SOLID   BLACK    NONE                      CURV  6
       1       2  SOLID   BLACK    NONE                      CURV  7
       1       2  SOLID   BLACK    NONE                      CURV  8
       1       2  SOLID   BLACK    NONE                      CURV  9


       1       1   none    none    none                     MINIMUM
      18      18   none    none    none                     MAXIMUM
       1       2   NONE   BLACK       0                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter or modify appropriate items.
 sequence number
 from above for
----------------  line
 x-axis  y-axis   type    color  symbol   label for legend
<---1--><---2--><--3--> <--4--> <--5--> <---------6--------> FIELD
      1       2  MIXED   BLACK    NONE MIXED-BLACK          CURV  1
      1       3    DOT     RED    NONE DOT-RED              CURV  2
      1       4   DASH   GREEN    NONE DASH-GREEN           CURV  3
      1       5  SOLID    BLUE    NONE SOLID-BLUE           CURV  4
      1       6   NONE     RED       . RED-DOT              CURV  5
      1       7   NONE   GREEN       X X-GREEN              CURV  6
      1       8   NONE    BLUE       O O-BLUE               CURV  7
      1       9   NONE   BLACK       + +-BLACK              CURV  8
      1      10   NONE   BLACK    STAR STAR-BLACK           CURV  9


      1       1   none    none    none                      MINIMUM
     18      18   none    none    none                      MAXIMUM
      1       2   NONE   BLACK       O                      DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Change transformations if needed.
                          Axis                          trans-
  Variable name           type   minimum  maximum   formation
<---------1--------><----2---><----3---><----4---><----5---> FIELD
A                    bottom X        4.        9.     ARITH VAR   1
B                      left Y        9.        9.     ARITH VAR   2
C                      left Y        8.        8.     ARITH VAR   3
D                      left Y        7.        7.     ARITH VAR   4
E                      left Y        6.        6.     ARITH VAR   5
F                      left Y        5.        5.     ARITH VAR   6
G                      left Y        4.        4.     ARITH VAR   7
H                      left Y        3.        3.     ARITH VAR   8
I                      left Y        2.        2.     ARITH VAR   9
J                      left Y        1.        1.     ARITH VAR  10


                                                       none MINIMUM
                                                       none MAXIMUM
                                                      ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Should legend location be DEFAULT, SPECIFIED or NONE?
(Use return for DEFAULT)
☞ DEFAULT
```

```
       Variable          Minimum    Maximum
-------------------- ---------- ----------
 B                           9.          9.       LEFT Y-AXIS
 C                           8.          8.       LEFT Y-AXIS
 D                           7.          7.       LEFT Y-AXIS
 E                           6.          6.       LEFT Y-AXIS
 F                           5.          5.       LEFT Y-AXIS
 G                           4.          4.       LEFT Y-AXIS
 H                           3.          3.       LEFT Y-AXIS
 I                           2.          2.       LEFT Y-AXIS
 J                           1.          1.       LEFT Y-AXIS

Enter values for scale.
                      NUMBER OF
  MINIMUM    MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9          1 MINIMUM
    10.E+9    10.E+9         20 MAXIMUM
        0.        0.         10 DEFAULT
        0.       10.         10 CURRENT
```

☞

```
       Variable          Minimum    Maximum
-------------------- ---------- ----------
 A                           4.          9.       X-AXIS

Enter values for scale.
                      NUMBER OF
  MINIMUM    MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9          1 MINIMUM
    10.E+9    10.E+9         20 MAXIMUM
        0.        0.         10 DEFAULT
        0.       10.         10 CURRENT
```

☞

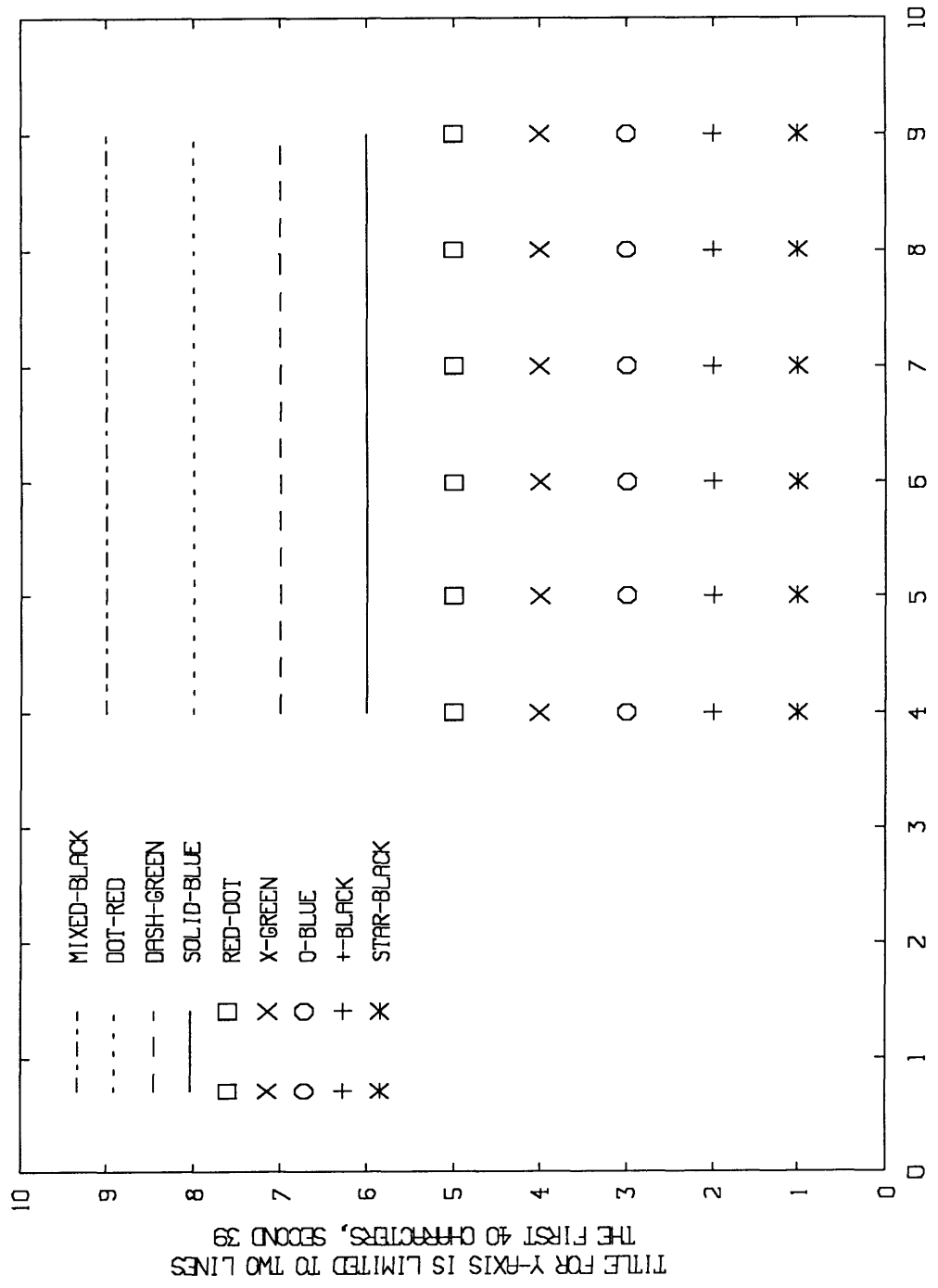
```
Should all the plot area be used?
(Use return for YES)
```

☞ YES

```
Do you want to add any text to the plot?
(Use return for NO)
```

☞ NO

```
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space     space   Y-axis   X-axis   letter  location location
    (y)       (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><-------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.24     8.01     0.11   1.5725      1.6 CURRENT
☞
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot is drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```


MIXED-BLACK
DOT-RED
DASH-GREEN
SOLID-BLUE
RED-DOT
X-GREEN
O-BLUE
+-BLACK
STAR-BLACK
TITLE FOR Y-AXIS IS LIMITED TO TWO LINES
THE FIRST 40 CHARACTERS, SECOND 39
X-AXIS TITLE LIMITED TO A LINE OF
40 CHARACTERS AND ONE OF 39 CHARACTERS
This is the title of the plot. This plot is an example of the
various types of lines and symbols available from the ANNIE
program. It also shows the placement of the legend and titles.

GRAPHICS WDM ATTRIBUTE

WDM data-set attributes that have decimal or integer values can be used to create an x-y plot. You SELECT both data sets and attributes. There are several uses for this option. Attribute plots can be made to explore possible relationships between attributes or to identify outliers. Plotting the latitude and longitude, with appropriate scaling, provides a rough overlay of station locations for a map. This could be useful for checking the data. If latitude and longitude are plotted, the values for the minimum and maximum longitude must be reversed for the western hemisphere.

[1] Enter the name of your WDM file.

[2] SELECT the data sets to be used.

[3] Enter up to 18 attributes to plot.

[4] Enter the axes types, titles, number of curves (pairs of attributes), specifications for each curve, scales for the axes and sizes for the plot.

In the example, data-set numbers 16 to 46 are selected that have a TSTYPE value of PEAK. Thirty-one data sets met the criteria. For those data sets, the value of the 100-year peak flow, P100, is plotted against the drainage area, DAREA. The values are plotted with the symbol CIRCLE on logarithmic axes.

```
    Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
    (Use return for WDM)
☞   WDM
    Name of your WDM file?
☞   DAVID.WDM
    Plot TIME SERIES or ATTRIBUTES?
    (Use return for TIME SERIES)
☞   ATTR

      NO data sets are currently in the buffer.
      You are now in the SELECT option.

    FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
    (Use return for DONE)
☞   FIND
    Limit search to dsn RANGE or TYPE, or a SUBSET of dsn buffer
    (Use return for TYPE)
☞   RANGE
```

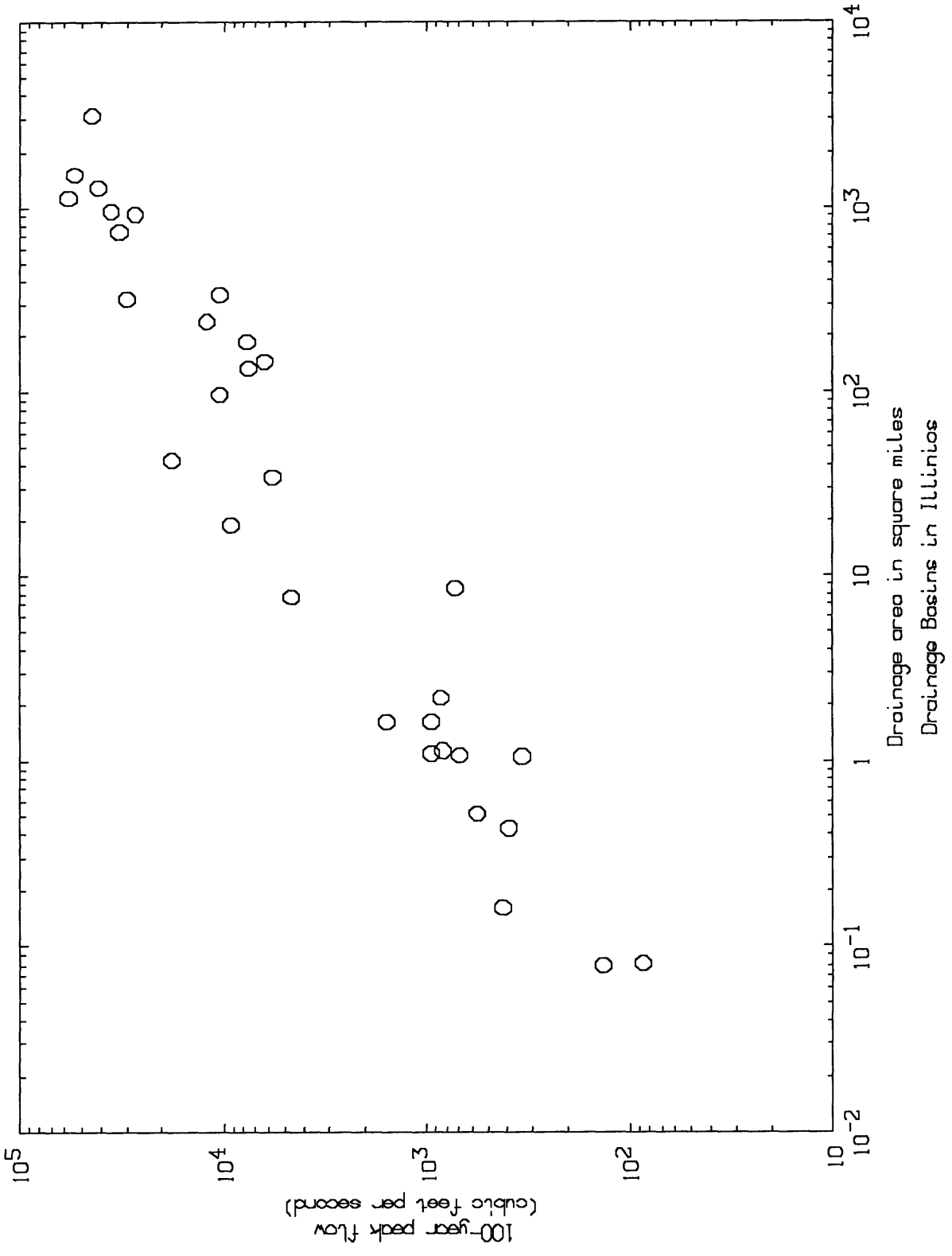
```
     Minimum DSN to search?
     (Use return for 1)
☞    16
     Maximum DSN to search?
     (Use return for 32000)
☞    46
     Which attribute for processing (or DONE)?
☞    TSTYPE
     Value for this attribute?
☞    PEAK
     Select data set if conditions is TRUE or FALSE?
     (Use return for TRUE)
☞    TRUE
     Use more search attributes?
     (Use return for NO)
☞    NO
     Select additional data sets with an 'OR' condition?
     (Use return for NO)
☞    NO
     Finding data sets from 16 to 46.
     Search criteria:
                    TSTYPE  = PEAK
     Do you wand to cancel this find operation?
     (Use return for NO)
☞    NO
      31 data sets checked.
      31 data sets matching and added to buffer.
     Find more data sets?
     (Use return for NO)
☞    NO
     FIND, ADD, LIST, SORT, REMOVE or CLEAR data set numbers?
     (Use return for DONE)
☞    DONE

     Now, select attributes(variables) for plotting.
     Which attribute for processing (or DONE)?
☞    P100
     Which attribute for processing (or DONE)?
☞    DAREA
     Which attribute for processing (or DONE)?
☞    DONE
     Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
     (Use return for SCREEN)
☞    SCREEN

     Enter or modify as needed.
      x-axis  y-axis
     <------><------>
         none    none MINIMUM
         none    none MAXIMUM
        ARITH   ARITH DEFAULT
        ARITH   ARITH CURRENT
☞    LOG,LOG
          LOG     LOG CURRENT
☞
```

```
 Enter the first line of the title.
☞ Drainage Basins in Illinios
 Enter the second line of the title.
☞
 Enter the third line of the title.
☞
 Enter first of 2 lines of title for Y-axis. (40 char)
☞ 100-year peak flow
 Enter second line of axis title. (39 char)
☞ (cubic feet per second)
 Enter first of 2 lines of title for X-axis. (40 char)
☞ Drainage area in square miles
 Enter second line of axis title. (39 char)
☞
 Number of curves?
 (Use return for 1)
☞ 1
  sequence
   number       name of variable
 ----------    --------------------
        1     P100.
        2     DAREA

  ** You will need to use the above numbers in the table
  ** that follows.
  ** When ready, use RETURN to continue.
☞
 Enter or modify appropriate items.
  sequence number
  from above for
 ----------------  line
  x-axis  y-axis   type    color  symbol
 <------><------><-----> <-----> <------>
        1       1   none    none    none MINIMUM
       18      18   none    none    none MAXIMUM
        1       2   NONE   BLACK       0 DEFAULT
        1       2   NONE   BLACK       0 CURRENT
☞ 2,1
        2       1   NONE   BLACK       0 CURRENT
☞
 Change transformations if needed.
                          Axis                          trans-
   Variable name          type   minimum  maximum   formation
 <---------1--------><----2---><----3---><----4---><----5---> FIELD
 P100.                  left Y       87.   5.79E+4       LOG VAR   1
 DAREA                bottom X      0.08     3102.       LOG VAR   2


                                                        none MINIMUM
                                                        none MAXIMUM
                                                       ARITH DEFAULT


 Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
 command? DONE
```

```
       Variable          Minimum    Maximum
------------------- ---------- ----------
 P100.                     87.    5.79E+4       LEFT Y-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
       10.    10.E+4 CURRENT
☞ 10,100000
       10.    10.E+4 CURRENT
☞

       Variable          Minimum    Maximum
------------------- ---------- ----------
 DAREA                    0.08      3102.       X-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
      0.01    10000. CURRENT
☞ .01,10000
      0.01    10000. CURRENT
☞
Should all the plot area be used?
(Use return for YES)
☞ NO

Enter fractions to specify rectangle.
  MINIMUM   MAXIMUM   MINIMUM   MAXIMUM
     X         X         Y         Y
<--------><--------><--------><-------->
        0.        0.        0.        0. MINIMUM
        1.        1.        1.        1. MAXIMUM
        0.      0.05        0.      0.05 DEFAULT
        0.      0.05        0.      0.05 CURRENT
☞ 0,.04,0,.05
        0.      0.04        0.      0.05 CURRENT
☞
Do you want to add any text to the plot?
(Use return for NO)
☞ NO
```

```
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space     space   Y-axis   X-axis   letter  location location
    (y)       (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.       6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.24     7.79     0.11   1.5725      1.6 CURRENT
☞
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```

GRAPHICS **WDM attribute plot** **GRAPHICS**



GRAPHICS WDM

Time series from a WDM file can be plotted at any time interval and for any time period. Up to 18 time series can be plotted. A total of 6,000 points for all time series can be plotted. Under the current implementation of GKS, four types of lines, six colors, and five symbols can be used. The TERM.DAT file can be used to add special lines, symbols, or colors if available with the GKS implementation. A special feature of time-series plots is an auxiliary plot at the top that is usually used for precipitation when plotting streamflow. Logarithmic or arithmetic axes can be used on the main plot, but only arithmetic axes are available for the auxiliary plot. Time series also can be plotted with two scales, one for the left y-axis and another for the right y-axis. As illustrated, three axes are useful for plotting streamflow, evaporation, and precipitation for a watershed. An option is available to place additional text on the plot. This feature is limited to 120 characters which can be placed in one or more lines.

[1] Enter the name of your WDM file.

[2] Enter the number of the data sets to be plotted. SELECT is not available for WDM time-plot option. Enter a label for each time series.

[3] Enter the starting and ending date for the plot and the time step for the curve for each data set.

[4] Enter the device type, axes types, titles, characteristics of each curve, scales for the y-axes, and size of the plot as needed.

The example plots data from Cane Branch for the 1957 water year. Three time series were selected, one for each axis, left y-axis, right y-axis, and auxiliary axis. Time is always plotted on the x-axis. On the table used to enter the characteristics of each curve, there is a field for MEAN or POINT. MEAN is used for time series that are an average or total over a time step and are plotted as a step function. POINT is used for time series of instantaneous values, and plots the data as points connected with straight lines. The scale of the right y-axis, evaporation, was modified so the curve would not cross the streamflow curve.

```
Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
(Use return for WDM)
☞ WDM
Name of your WDM file?
☞ DAVID.WDM
Plot TIME SERIES or ATTRIBUTES?
(Use return for TIME SERIES)
☞ TIME
Number of data sets to use?
(Use return for 2)
☞ 3
Which WDM data-set number?
☞ 5
 Attributes of data-set 5
 STAID  :          365205084265702
 TSTYPE :         PREC
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--precipitation

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
Which WDM data-set number?
☞ 6
 Attributes of data-set 6
 ISTAID :     3407100
 TSTYPE :         FLOW
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--discharge

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
Which WDM data-set number?
☞ 7
 Attributes of data-set 7
 STAID  :          365200085090000
 TSTYPE :         EVAP
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--pan evaporation

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
 For data-set 5.
Enter data-set label (name). (max 20 char)
☞ PRECIP
 For data-set 6.
Enter data-set label (name). (max 20 char)
☞ DISCHARGE
 For data-set 7.
Enter data-set label (name). (max 20 char)
☞ EVAPORATION
```

```
Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
1956,10,1,0,0,0,1957,9,30
1956 10  1  0  0  0   1957  9 30 24  0  0 CURRENT
```

```
Modify as needed.
                                        If needed
                                          time
 Data-set      Time       Time     Quality conver-
  number       step       unit       code   sion
<----1---><----2---><----3---><----4---><----5---> FIELD
         5          1        DAY         30   AVERAGE ROW   1
         6          1        DAY         30   AVERAGE ROW   2
         7          1        DAY         30   AVERAGE ROW   3


         1          1       none          0       none MINIMUM
     32000         60       none         30       none MAXIMUM
         1          1        DAY         30   AVERAGE DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Modify as needed.
                                        If needed
                                          time
 Data-set      Time       Time     Quality conver-
  number       step       unit       code   sion
<----1---><----2---><----3---><----4---><----5---> FIELD
         5          1        DAY         30   AVERAGE ROW   1
         6          1        DAY         30   AVERAGE ROW   2
         7          1      MONTH         30         SUM ROW   3


         1          1       none          0       none MINIMUM
     32000         60       none         30       none MAXIMUM
         1          1        DAY         30   AVERAGE DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
365 Points are to be retrieved.
365 Points are to be retrieved.
12 Points are to be retrieved.
```

```
Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
☞ SCREEN

Enter or modify as needed.
          left     right     aux
 x-axis  y-axis  y-axis    axis
<------><------><------><------>
    none     none     none     none MINIMUM
    none     none     none     none MAXIMUM
    TIME    ARITH     NONE       NO DEFAULT
    TIME    ARITH     NONE       NO CURRENT
☞ TIME,LOG,ARITH,YES
    TIME      LOG   ARITH      YES CURRENT
☞
Enter the first line of the title.
☞ Discharge, precipitation, and pan evaporation for
Enter the second line of the title.
☞ Cane Branch Watershed, Kentucky, for water year 1957.
Enter the third line of the title.
☞
Enter first of 2 lines of title for Y-axis. (40 char)
☞ DISCHARGE, IN CUBIC FEET PER SECOND
Enter second line of axis title. (39 char)
☞
Enter first of 3 lines of auxiliary axis title (12 char).
☞ PRECIPI-
Enter second of 3 lines of auxiliary axis title (12 char).
☞ TATION,
Enter third of 3 lines of auxiliary axis title (12 char).
☞ IN INCHES
Enter first of 2 lines of title for right Y-axis. (40 char)
☞ MONTHLY TOTAL PAN EVAPORATION,
Enter second line of axis title. (39 char)
☞ IN INCHES PER DAY
```

```
Enter or modify specifications for each line.
                                  MEAN
  line                     shade    or     which
  type    color  symbol    pattern POINT    axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7---------> FIELD
  SOLID   BLACK    NONE    NONE    MEAN    LEFT PRECIP                CURV  1
  SOLID   BLACK    NONE    NONE    MEAN    LEFT DISCHARGE             CURV  2
  SOLID   BLACK    NONE    NONE    MEAN    LEFT EVAPORATION           CURV  3


   none    none    none    none    none    none                       MINIMUM
   none    none    none    none    none    none                       MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                       DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

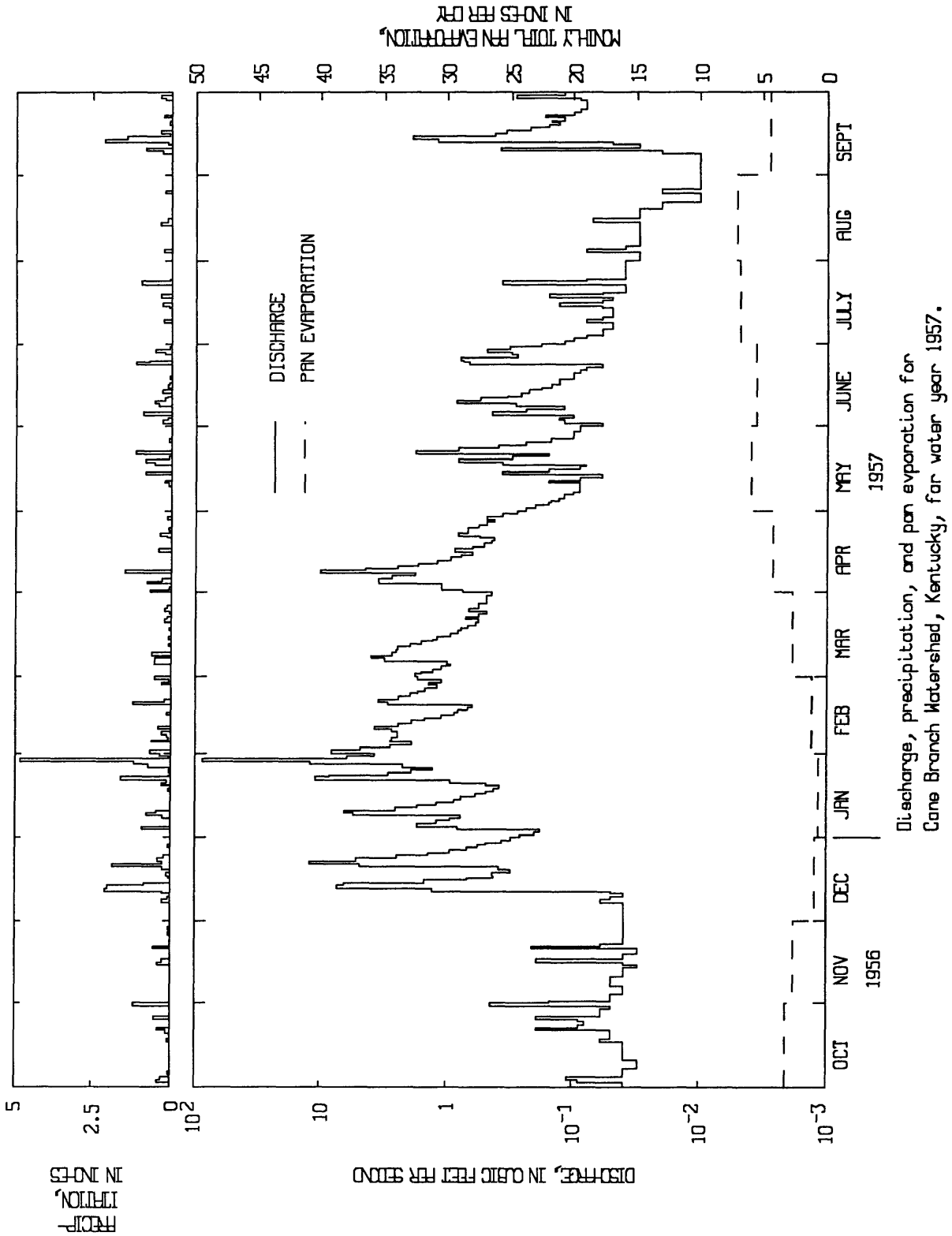
```
Enter or modify specifications for each line.
                                  MEAN
  line                    shade    or     which
  type    color  symbol   pattern POINT   axis     label for legend
<--1--> <--2--> <--3--> <--4--> <--5--> <--6--> <---------7--------> FIELD
  SOLID    BLUE    NONE    NONE    MEAN     AUX PRECIP                CURV  1
  SOLID   GREEN    NONE    NONE    MEAN    LEFT DISCHARGE             CURV  2
   DASH   BLACK    NONE    NONE    MEAN   RIGHT PAN EVAPORATION       CURV  3


   none    none    none    none    none    none                      MINIMUM
   none    none    none    none    none    none                      MAXIMUM
  SOLID   BLACK    NONE    NONE    MEAN    LEFT                      DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Change transformations if needed.
                        Axis                          trans-
  Variable name          type   minimum  maximum    formation
<---------1--------><----2---><----3---><----4---><----5---> FIELD
PRECIP                auxilary       0.     4.83      ARITH VAR   1
DISCHARGE               left Y     0.01      84.        LOG VAR   2
EVAPORATION            right Y     0.66     7.11      ARITH VAR   3


                                                      none MINIMUM
                                                      none MAXIMUM
                                                     ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Should legend location be DEFAULT, SPECIFIED or NONE?
(Use return for DEFAULT)
☞ SPECIFIED

Location of upper left hand corner of legend?
      X            Y
 COORDINATE  COORDINATE
<----------><---------->
          0.          0. MINIMUM
          1.          1. MAXIMUM
         0.1         0.8 DEFAULT
         -1.         -1. CURRENT
☞ .6,.9
         0.6         0.9 CURRENT
☞
```

```
       Variable          Minimum    Maximum
-------------------- ---------- ----------
 DISCHARGE                 0.01        84.       LEFT Y-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
     0.001      100. CURRENT
.001,100
     0.001      100. CURRENT


       Variable          Minimum    Maximum
-------------------- ---------- ----------
 PAN EVAPORATION            0.66       7.11       RIGHT Y-AXIS

Enter values for scale.
                     NUMBER OF
  MINIMUM   MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9         1 MINIMUM
    10.E+9    10.E+9        20 MAXIMUM
        0.        0.        10 DEFAULT
        0.        8.        10 CURRENT
0,50
        0.       50.        10 CURRENT


       Variable          Minimum    Maximum
-------------------- ---------- ----------
 PRECIP                       0.       4.83       AUXILARY AXIS

Enter values for scale.
                     NUMBER OF
  MINIMUM   MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9         1 MINIMUM
    10.E+9    10.E+9        20 MAXIMUM
        0.        0.        10 DEFAULT
        0.        5.         2 CURRENT
0,5
        0.        5.         2 CURRENT
```

```
Do you want to add any text to the plot?
(Use return for NO)
☞ NO
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.                                                auxiliary
   space     space   Y-axis   X-axis   letter  location location   axis
    (y)       (x)    length   length    size   Y-origin X-origin  length
 (inches)  (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><-------><-------->
       1.        1.       1.       1.     0.01       1.       1.      0.5
      38.       38.      38.      38.       3.      36.      36.       6.
       8.       10.      6.5      7.5      0.1      1.5      1.5       1.
       8.       10.      5.4      7.2      0.1    1.475      1.5       1.
☞
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

Plot is drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```


MONTHLY TOTAL PAN EVAPORATION, IN INCHES PER DAY
DISCHARGE
PAN EVAPORATION
DISCHARGE, IN CUBIC FEET PER SECOND
PRECIP-ITATION, IN INCHES
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
1956
1957
Discharge, precipitation, and pan evporation for
Cane Branch Watershed, Kentucky, for water year 1957.

GRAPHICS WDM

This option can be used to plot one time series against another. The plotting time step must be greater than or equal to the time step of the data. On occasion you may wish to specify a window in the plotting field. The specified window defines an area within which no points will be plotted. This might be used when text is to be added to the plotting field or when large numbers of points will be plotted at the same location. For precipitation data which may have lots of zero values, a window of (0,0), (0,0.05), (0.05,0.05), and (0.05,0) might be specified. These coordinates represent fractions of the x-axis and y-axis lengths.

[1] Enter the name of your WDM file.

[2] Enter the data-set numbers and label for the time series to be plotted.

[3] Enter the starting and ending data, time interval, and time conversion.

[4] Enter the device type, axes types, titles, number of curves, characteristics of the curves, scales for the axes, and sizes for the plot as needed.

For the example, monthly values of streamflow (data-set number 200) are plotted against monthly values of precipitation (data-set number 5).

```
Enter file type? (WDM,TSS,PLTGEN,META,TERMINAL)
(Use return for WDM)
☞ WDM
Name of your WDM file?
☞ DAVID.WDM
Plot TIME SERIES or ATTRIBUTES?
(Use return for TIME SERIES)
☞ TIME
Number of data sets to use?
(Use return for 2)
☞ 2
Which WDM data-set number?
200
 Attributes of data-set 200
 ISTAID :     3407100
 TSTYPE :         FLOW
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--discharge

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
Which WDM data-set number?
☞ 5

 Attributes of data-set 5
 STAID  :          365205084265702
 TSTYPE :         PREC
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--precipitation

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
 For data-set 200.
Enter data-set label (name). (max 20 char)
☞ RUNOFF IN INCHES
 For data-set 5.
Enter data-set label (name). (max 20 char)
☞ PRECIP IN INCHES

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<-->-><->-><->-><->-><----->-><->-><->-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞
```

```
Modify as needed.
                                          If needed
                                            time
 Data-set      Time       Time     Quality  conver-
  number       step       unit       code    sion
<----1---><----2---><----3---><----4---><----5---> FIELD
       200          1        DAY         30   AVERAGE ROW   1
         5          1        DAY         30   AVERAGE ROW   2


         1          1       none          0      none MINIMUM
     32000         60       none         30      none MAXIMUM
         1          1        DAY         30   AVERAGE DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Modify as needed.
                                          If needed
                                            time
 Data-set      Time       Time     Quality  conver-
  number       step       unit       code    sion
<----1---><----2---><----3---><----4---><----5---> FIELD
       200          1      MONTH         30       SUM ROW   1
         1          1      MONTH         30       SUM ROW   2


         1          1       none          0      none MINIMUM
     32000         60       none         30      none MAXIMUM
         1          1        DAY         30   AVERAGE DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
24 Points are to be retrieved.
24 Points are to be retrieved.
Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
☞ SCREEN

Enter or modify as needed.
          left     right     aux
 x-axis  y-axis  y-axis    axis
<------><------><------><------>
    none    none    none    none MINIMUM
    none    none    none    none MAXIMUM
    TIME   ARITH    NONE      NO DEFAULT
    TIME   ARITH    NONE      NO CURRENT
☞  ARITH
    ARITH   ARITH    NONE      NO CURRENT
☞
```

```
 Enter the first line of the title.
☞ CANE BRANCH, KY
 Enter the second line of the title.
☞
 Enter the third line of the title.
☞
 Enter first of 2 lines of title for Y-axis. (40 char)
☞ MONTHLY PRECIPITATION,
 Enter second line of axis title. (39 char)
☞ IN INCHES
 Enter first of 2 lines of title for X-axis. (40 char)
☞ MONTHLY RUNOFF,
 Enter second line of axis title. (39 char)
☞ IN INCHES
 Number of curves?
 (Use return for 1)
☞ 1
  sequence
   number       name of variable
 ----------    --------------------
        1     RUNOFF IN INCHES
        2     PRECIP IN INCHES

  ** You will need to use the above numbers in the table
  ** that follows.
  ** When ready, use RETURN to continue.
☞

 Enter or modify appropriate items.
  sequence number
  from above for
 ----------------  line
  x-axis  y-axis   type    color  symbol
 <------><------><-----> <-----> <------>
        1       1   none    none    none MINIMUM
       18      18   none    none    none MAXIMUM
        1       2   NONE   BLACK       0 DEFAULT
        1       2   NONE   BLACK       0 CURRENT
☞ 1,2,NONE,BLACK,0
        1       2   NONE   BLACK       0 CURRENT
☞
 Change transformations if needed.
                          Axis                          trans-
   Variable name          type   minimum  maximum   formation
 <---------1--------><----2---><----3---><----4---><----5---> FIELD
 RUNOFF IN INCHES      bottom X        0.   8.99988     ARITH VAR   1
 PRECIP IN INCHES        left Y        0.     11.76     ARITH VAR   2


                                                        none MINIMUM
                                                        none MAXIMUM
                                                       ARITH DEFAULT


 Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
 command? DONE
```

```
       Variable          Minimum    Maximum
------------------- ---------- ----------
 PRECIP IN INCHES             0.      11.76       LEFT Y-AXIS

Enter values for scale.
                    NUMBER OF
  MINIMUM   MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9         1 MINIMUM
    10.E+9    10.E+9        20 MAXIMUM
        0.        0.        10 DEFAULT
        0.       15.        10 CURRENT
```

☞

```
       Variable          Minimum    Maximum
------------------- ---------- ----------
 RUNOFF IN INCHES             0.    8.99988       X-AXIS

Enter values for scale.
                    NUMBER OF
  MINIMUM   MAXIMUM INTERVALS
<--------><--------><-------->
   -10.E+9   -10.E+9         1 MINIMUM
    10.E+9    10.E+9        20 MAXIMUM
        0.        0.        10 DEFAULT
        0.       10.        10 CURRENT
```

☞

```
Should all the plot area be used?
(Use return for YES)
```

☞ Y

```
Do you want to add any text to the plot?
(Use return for NO)
```

☞ N

```
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space    space   Y-axis   X-axis   letter  location location
    (y)      (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.02     7.79     0.11   1.5725      1.6 CURRENT
```

☞

```
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
```

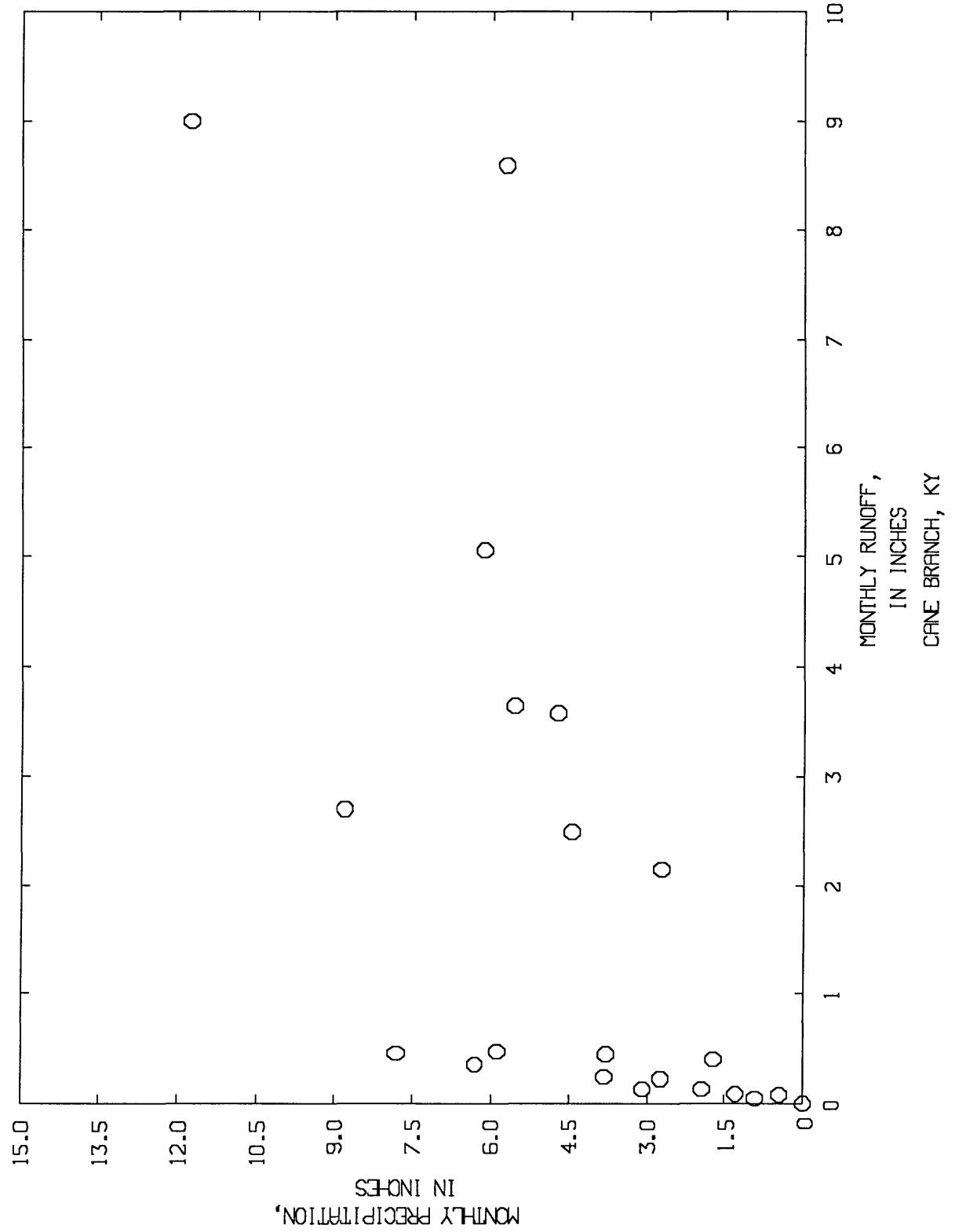
☞ PLOT

plot drawn here

```
Make a PLOT or REVISE input?
(Use return for DONE)
```

☞ DONE

GRAPHICS WDM, x-y time-series plot GRAPHICS



MULTIPLE PATHS

At any location in ANNIE, when you are asked to enter the name of an attribute, you can enter HELP to get a complete listing of the attributes. Once in the HELP> mode, smaller lists can be generated by entering only one or two characters when the characteristics do not uniquely define an attribute. A "D" was entered in the example to list all attributes that start with D. When sufficient characters are entered to uniquely define the attribute, the attribute number, a brief definition, length, type, and limits are provided. A limit of -999 indicates that there is no limit for the value. If length is greater than 1, the attribute is an array of numbers. The length for CHARACTER attributes is the number of characters, blanks included. See Appendix B for a complete list and description of the attributes.

The example provides information on the attribute DAREA. The attribute is for a REAL (decimal) number. The values for the attribute is a single number, not an array of numbers. The lower limit for drainage area is 0.0, but there is no upper limit.

HELP attributes HELP

```
Which attribute for processing (or DONE)?
☞ HELP
 ACODE,  AGENCY, ALL,    AQTYPE, AZMUTH, BASEQ,  BLNGTH, BRANCH, BSLOPE,
 CHEAT,  COCODE, COMPFG, CONTDA, DAREA,  DATE,   DATUM,  DCODE,  DEPH25,
 DEPTH,  DESCRP, DONE,   DSCODE, EL1085, EL5000, EL6000, ELEV,   END,
 FOREST, FROST,  GCODE,  GLACER, GRPNAM, GUCODE, H01002, H01005, H01010,
 H01020, H01025, H01050, H01100, H03002, H03005, H03010, H03020, H03025,
 H03050, H03100, H07002, H07005, H07010, H07020, H07025, H07050, H07100,
 H15002, H15005, H15010, H15020, H15025, H15050, H15100, H30002, H30005,
 H30010, H30020, H30025, H30050, H30100, HELP,   HUCODE, I24-2., I24010,
 I24025, I24050, I24100, ISTAID, J407BQ, J407BY, J407EY, J407GS, J407HO,
 J407HP, J407LO, J407NH, J407SE, J407SO, J407UR, JANAVE, JANMIN, JULAVE,
 JULMAX, KENPLV, KENSLP, KENTAU, L01002, L01010, L01020, L03002, L03010,
 L03020, L07002, L07005, L07010, L07020, L14002, L14010, L14020, L30002,
 L30010, L30020, L90002, L90010, L90020, LAKE,   LATCTR, LATDEG, LATDMS,
 LCODE,  LENGTH, LKEVAP, LNGCTR, LNGDEG, LNGDMS, LOESS,  MARMAX, MAXVAL,
 MEANND, MEANPK, MEANVL, MINVAL, NONZRO, NUMZRO, P1.25,  P10.,   P100.,
 P2.,    P200.,  P25.,   P5.,    P50.,   P500.,  PARMCD, PNEVAP, PRCAPR,
 PRCAUG, PRCDEC, PRCFEB, PRCJAN, PRCJUL, PRCJUN, PRCMAR, PRCMAY, PRCNOV,
 PRCOCT, PRCSEP, PRECIP, QANN,   QAPR,   QAUG,   QDEC,   QEX10P, QEX25P,
 QEX50P, QEX70P, QEX75P, QEX90P, QEX95P, QFEB,   QJAN,   QJUL,   QJUN,
 QMAR,   QMAY,   QNOV,   QOCT,   QSDANN, QSDAPR, QSDAUG, QSDDEC, QSDFEB,
 QSDJAN, QSDJUL, QSDJUN, QSDMAR, QSDMAY, QSDNOV, QSDOCT, QSDSEP, QSEP,
 RFOOT,  RMILE,  RWFLAG, SDND,   SDPK,   SEASBG, SEASND, SITECO, SKEWCF,
 SKWND,  SKWPK,  SLOPE,  SN002,  SN010,  SN025,  SN100,  SNOAPR, SNOFAL,
 SNOMAR, SOILIN, STAID,  STANAM, START,  STATCD, STCODE, STDDEV, STDIMX,
 STDIMY, STDIMZ, STDTYP, STFIPS, STORAG, SUBHUC, TCODE,  TGROUP, TMTOPK,
 TMZONE, TOLR,   TSBDY,  TSBHR,  TSBMO,  TSBYR,  TSFILL, TSFORM, TSPREC,
 TSPTAD, TSSTEP, TSTYPE, UBC024, UBC025, UBC026, UBC027, UBC028, UBC029,
 UBC030, UBC031, UBC038, UBC039, UBC040, UBC066, UBC067, UBC068, UBC069,
 UBC073, UBC074, UBC166, UBC167, UBC169, UBC170, UBC182, UBC183, UBC184,
 UBC185, UBC186, UBC187, UBC188, UBC189, UBC190, UBC191, UBC192, UBC193,
 UBC194, UBC195, UBC200, VALLGH, VBTIME, VCODE,  VLCODE, WELLDP, WEMAR2,
 WRCMN,  WRCSD,  WRCSKW, XSECLC, YRSDAY, YRSHPK, YRSLOW, YRSPK
HELP> Which attribute for details (or DONE)?
☞ D
DESCRP, DAREA,  DCODE,  DONE,   DSCODE, DATE,   DEPH25, DEPTH,  DATUM
Unknown attribute.  Try again.
HELP> Which attribute for details (or DONE)?
☞ DAREA
 Attribute no. 11, DAREA is Drainage area.
 Length is 1, type is REAL
 Min allowed value is 0., Max allowed value is -999..

HELP> Which attribute for details (or DONE)?
☞ DONE
Which attribute for processing (or DONE)?
☞ DONE
```

FILE MGT IMPORT

The IMPORT option is used as the second step in transferring one or more data sets from one WDM file to another. After attributes and/or data have been exported from the first WDM file to an external formatted sequential file, the IMPORT option is used to import the contents of the external file to another WDM file. As the IMPORT option executes, a message flagging the successful import of each data set contained within the external file is printed.

[1] Enter the name of your file that was created with the EXPORT option.

The example illustrates the import of one data set, including both attributes and time-series data, which exists in an external file named TEST02.IMP. The data set is added to the WDM file that was previously selected. A listing of the external file, TEST02.IMP, follows the example.

```
Enter CREATE, SUMMARIZE, IMPORT, EXPORT, or DUMP.
(Use return for DONE)
☞ IMPORT
Name of input file?
☞ TEST02.IMP
General information from the IMPORT file:
DATE
WDMSFL
SYSTEM
COMMENT
  DAILY PRECIPITATION FOR SANDERSON GULCH TRIBUTARY AT LAKEWOOD, CO
END COMMENT
Importing DSN no. 300

Import of WDM data sets complete.
```

```
Listing of input file TEST02.IMP:
DATE
WDMSFL
SYSTEM
COMMENT
  DAILY PRECIPITATION FOR SANDERSON GULCH TRIBUTARY AT LAKEWOOD, CO
END COMMENT
DSN          300    TYPE  TIME   NDN  10   NUP  20   NSA  20   NSP  50   NDP 100
  LABEL
    ISTAID   6714310
    TSTYPE   PREC
    TCODE          4
    TSSTEP         1
    TSFILL   -10.E+5
    TGROUP         6
    TSFORM         1
    VBTIME         2
    COMPFG         1
    TSBYR       1973
  END LABEL
  DATA       STARTS: 1973  5  1  0  0  0  ENDS: 1974  7 31 24  0  0
    1972 12 31 24  0  0     6  1 31     1  1        -1.0000E+06
    1973 12 31 24  0  0     4  1  0   121  1        -1.0000E+06
    1974  5  1 24  0  0     4  1  0     2  1         0.0000
    1974  5  3 24  0  0     4  1  0     1  0         1.0000E-02
    1974  5  4 24  0  0     4  1  0    32  1         0.0000
    1974  6  5 24  0  0     4  1  0     4  0         1.0000E-02  2.0000E-02
     0.8900      1.0000E-02
    1974  6  9 24  0  0     4  1  0     3  1         0.0000
    1974  6 12 24  0  0     4  1  0     1  0         1.0000E-02
    1974  6 13 24  0  0     4  1  0    27  1         0.0000
    1974  7 10 24  0  0     4  1  0     2  0         0.1500      0.1600
    1974  7 12 24  0  0     4  1  0     2  1         0.0000
    1974  7 14 24  0  0     4  1  0     1  0         4.0000E-02
    1974  7 15 24  0  0     4  1  0     6  1         0.0000
    1974  7 21 24  0  0     4  1  0     1  0        -1.0000E+06
    1974  7 22 24  0  0     4  1  0     2  1         0.0000
    1974  7 24 24  0  0     4  1  0     2  1         1.0000E-02
    1974  7 26 24  0  0     4  1  0     3  1         0.0000
    1974  7 29 24  0  0     4  1  0     2  0        -1.0000E+06  0.0000
  END DATA
END DSN
```

DATA-SET MGT ATTRIBUTES LIST

The LIST option in the menu below ATTRIBUTES is used to list all or some of the attributes of data sets in the buffer. The starting and ending dates for time-series data present in the data set also may be listed. You also may choose to list only some attributes. Values for the selected attributes for the selected data sets are listed one per line.

1 Select data sets for listing attributes.

2 Select ALL attributes or enter by name the attributes to be listed.

The example illustrates the use of the LIST option to list the attributes TSTYPE, STANAM, and DAREA and the period of available data for data-set numbers 68, 69, 70, and 71. Note that DAREA was not available for data-set number 69.

```
Enter ADD, MODIFY, DELETE, LIST, or TABLE.
(Use return for DONE)
☞ LIST

  4 data sets are currently in the buffer.
  You are now in the SELECT option

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DO
List data-set ATTRIBUTES, DATES, or BOTH?
(Use return for BOTH)
☞ BOTH
ALL or SOME attributes?
(Use return for ALL)
☞ SOME
Which attribute for processing (or DONE)?
☞ TSTYPE
Which attribute for processing (or DONE)?
☞ STANAM
Which attribute for processing (or DONE)?
☞ DAREA
Which attribute for processing (or DONE)?
☞ DONE
Attributes of DSN 68
 TSTYPE :         PREC
 STANAM :         Sanderson Gulch Tributary at Lakewood, CO
 DAREA  :       0.377

 Starts :         1973 MAY 1
 Ends   :         1974 JUL 31 24:00:00

Attributes of DSN 69
 TSTYPE :         EVAP
 STANAM :         Cherry Creek Lake, CO

 Starts :         1973 MAY 1
 Ends   :         1974 JUL 31 24:00:00

Attributes of DSN 70
 TSTYPE :         PREC
 STANAM :         Sanderson Gulch Tributary at Lakewood, CO
 DAREA  :       0.377

 Starts :         1973 JUL 12 18:00:00
 Ends   :         1974 DEC 31 24:00:00

Attributes of DSN 71
 TSTYPE :         FLOW
 STANAM :         Sanderson Gulch Tributary at Lakewood, CO
 DAREA  :       0.377

 Starts :         1973 JUL 12 18:00:00
 Ends   :         1974 DEC 31 24:00:00
```

LIST time-series data (list) LIST

DATA-SET MGT
DATA
TIME SERIES
LIST

The LIST option in the menu below TIME SERIES is used to list data values from one or more data sets over a specified period of record. This option can be used to put time-series data in a "flat file" format to be read by statistical packages and spread sheet software. You first specify the data-set number for each time series that is to be listed. For each data-set number you specify, a summary of the starting and ending dates and time step of each time series are listed. With that information you can specify the time step, whether the values are TOTALS or RATES so that values may be properly aggregated/disaggregated and the start and end date. You may also select summation options, the number of decimal places and the number of significant digits for the listing. A quality flag and minimum and maximum can be used to limit data for the listing.

[1] Select the number of data sets to be listed then select the data sets by number. Up to 12 data sets may be selected.

[2] For each data set indicate whether the time series are TOTALS or RATES.

[3] Enter the start and end date for the listing.

[4] Enter the output specifications and whether summaries are needed.

[5] Enter a range and quality code for selection of values to be listed.

The example illustrates the listing of daily flow, precipitation, and evaporation values from data set numbers 6, 5, and 7, for the period from January 1, 1956 to December 31, 1957. The listing was made to the terminal instead of a file. Only values between 0 and 1000 were requested. Values with a quality code greater than 30 were not listed. Values for January 1956 met the listing criteria. The listing stopped every 20 lines. The first time more data was requested to be listed but after the second 20 lines no more listing was requested.

LIST time-series data (list) LIST

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ LIST
How many data sets for each listing?
(Use return for 1)
☞ 3
Which WDM data-set number?
☞ 5
 Attributes of data-set 5
 STAID  :          365205084265702
 TSTYPE :         PREC
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--precipitation

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
Which WDM data-set number?
☞ 6
 Attributes of data-set 6
 ISTAID :     3407100
 TSTYPE :         FLOW
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--discharge

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00
Which WDM data-set number?
☞ 7
 Attributes of data-set 7
 STAID  :          365200085090000
 TSTYPE :         EVAP
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Cane Branch, KY--pan evaporation

   Data available between the following dates:
1956 JAN 1 - 1957 DEC 31 24:00:00

Enter time step and time units
TIME  TIME
STEP  UNITS
<--><----->
   1   none MINIMUM
3600   none MAXIMUM
   1    DAY DEFAULT
   1    DAY CURRENT
☞ 1,DAY
   1    DAY CURRENT
☞
```

```
For data-set number 5,
are the time-series values TOTALS or RATES?
(Use return for TOTALS)
☞ TOTALS
For data-set number 6,
are the time-series values TOTALS or RATES?
(Use return for TOTALS)
☞ RATES
For data-set number 7,
are the time-series values TOTALS or RATES?
(Use return for TOTALS)
☞ TOTALS
Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞

Output options
  output  lines  width
 <------><-----><-----><
     none      5     40 MINIMUM
     none 200000    250 MAXIMUM
 TERMINAL     20     80 DEFAULT
 TERMINAL     20     80 CURRENT
☞ TERM,20,80
 TERMINAL     20     80 CURRENT
☞

Do you want to SCREEN or LIST the data?
(Use return for LIST)
☞ LIST

Which summations should be made?
  GRAND    ANNUAL  MONTHLY
  TOTAL     SUM      SUM
<-------><-------><-------><
     none     none     none MINIMUM
     none     none     none MAXIMUM
       NO       NO       NO DEFAULT
       NO       NO       NO CURRENT
☞

Enter conditions for the listing.
                              <-- ouptut format -->
 <---- value is ----> quality  decimal  significant
  above  and  below     flag    places    digits
 <--------><--------><-------><-------><---------->
   -10.E+19  -10.E+19        0        -1          1 MINIMUM
    10.E+19   10.E+19       30         5          5 MAXIMUM
         0.      9.E+5       0         0          5 DEFAULT
         0.      9.E+5      30         2          5 CURRENT
☞ 0,1000
         0.     1000.       30         2          5 CURRENT

☞
```

LIST time-series data (list) LIST

731 Values will be checked.

(*) is for out-of-range data

Dataset number	5	6	7
Dataset name	PREC	3407100	EVAP
1956 FEB 1	0.00	5.00	0.03
1956 FEB 2	0.00	3.00	0.03
1956 FEB 3	0.00	11.00	0.03
1956 FEB 4	0.00	15.00	0.03
1956 FEB 5	0.00	3.80	0.03
1956 FEB 6	0.00	6.60	0.03
1956 FEB 7	0.00	3.70	0.03
1956 FEB 8	0.00	2.10	0.03
1956 FEB 9	0.00	1.20	0.04
1956 FEB 10	0.00	0.88	0.04
1956 FEB 11	0.00	1.70	0.04
1956 FEB 12	0.00	1.40	0.04
1956 FEB 13	0.00	1.20	0.04
1956 FEB 14	0.00	2.60	0.04
1956 FEB 15	0.00	6.00	0.04
1956 FEB 16	0.27	3.50	0.04

More?
(Use return for YES)
☞ YES

1956 FEB 17	2.71	25.00	0.04
1956 FEB 18	0.57	25.00	0.05
1956 FEB 19	0.58	7.40	0.05
1956 FEB 20	0.00	6.40	0.05
1956 FEB 21	0.00	2.60	0.05
1956 FEB 22	0.00	1.70	0.05
1956 FEB 23	0.00	1.10	0.05
1956 FEB 24	0.73	2.70	0.05
1956 FEB 25	0.52	5.00	0.05
1956 FEB 26	0.00	3.10	0.06
1956 FEB 27	0.35	2.40	0.06
1956 FEB 28	0.00	2.10	0.06
1956 FEB 29	0.00	1.70	0.06
1956 MAR 1	0.20	1.30	0.06
1956 MAR 2	0.25	2.00	0.06
1956 MAR 3	0.47	2.80	0.06
1956 MAR 4	0.00	2.70	0.07
1956 MAR 5	0.00	1.90	0.07
1956 MAR 6	0.00	1.50	0.07
1956 MAR 7	1.14	5.40	0.07

More?
(Use return for YES)
☞ NO
Finished listing data.

LIST time-series data (screen) LIST

DATA-SET MGT
DATA
TIME SERIES
LIST

Frequently, time-series data need to be screened for "outliers." Graphics is one method that can be used. Another is to use various rules for the computer to search for possible outliers. Four rules can be used for the screen option: (1) greater than a maximum, (2) less than a minimum, (3) percent change between adjacent time steps exceeds a maximum, and (4) absolute value of a change between adjacent time steps exceeds a maximum value. Threshold values for all rules are required, but you may enter very large or very small values to effectively eliminate a rule.

[1] Enter the number of data sets to use. Up to 12 may be entered; however, if the rules apply to any value of a time series, all values for that time step will be listed.

[2] Enter the time interval, type of time series (used only if the time interval of the data differs from the time interval you entered) and starting and ending date.

[3] Enter the specification for the listing. Output can go to a file or a terminal.

[4] Enter SCREEN, then thresholds for the rules.

In the example the flow in data-set number 1 was screened for values outside an acceptable range of 0 to 12000. Values were listed if the percent difference between adjacent values was greater than 150 or the absolute difference was greater than 4000. Any value with a quality flag greater than 30 will not be checked or printed. Twenty-one values meet the criteria and were listed.

LIST time-series data (screen) LIST

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
LIST
How many data sets for each listing?
(Use return for 1)
1
Which WDM data-set number?
1
 Attributes of data-set 1
 ISTAID :    11516530
 TSTYPE :         FLOW
 TCODE  :            4
 TSSTEP :            1
 STANAM :         Klamath River below Iron Gate Dam, CA.

   Data available between the following dates:
1960 OCT 1 - 1982 SEP 30 24:00:00

Enter time step and time units
TIME  TIME
STEP  UNITS
<--><----->
   1   none MINIMUM
3600   none MAXIMUM
   1    DAY DEFAULT
   1    DAY CURRENT
1,DAY
   1    DAY CURRENT

For data-set number 1,
are the time-series values TOTALS or RATES?
(Use return for TOTALS)
RATES

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1960 10  1  0  0  0   1982  9 30 24  0  0 CURRENT

Output options
  output  lines  width
 <------><-----><----->
     none      5     40 MINIMUM
     none 200000    250 MAXIMUM
 TERMINAL     20     80 DEFAULT
 TERMINAL     20     80 CURRENT
TERM,20,80
 TERMINAL     20     80 CURRENT
```

LIST time-series data (screen) LIST

```
Do you want to SCREEN or LIST the data?
(Use return for LIST)
☞ SCREEN

Enter conditions for the listing
                                                                <-- output format -->
<---- value is ----><- change exceeds -> quality  decimal  significant
   below or above     percent  absolute    flag    places    digits
<--------><--------><--------><--------><-------><-------><---------->
  -10.E+19  -10.E+19        0.        0.       0       -1           1 MINIMUM
   10.E+19   10.E+19   10.E+19   10.E+19      30        5           5 MAXIMUM
         0.     9.E+5      none      none       0        0           5 DEFAULT
         0.     9.E+5      none      none      30        2           5 CURRENT
☞ 0,12000,150,4000
         0.    12000.      150.     4000.      30        2           5 CURRENT
☞
8035 Values will be checked.

          ( * ) is for out-of-range data

 ------------------------------------
    Dataset number              1
    Dataset name         11516530
 ------------------------------------
 1964 DEC 21               7560.0
 1964 DEC 22              25000.
 1964 DEC 23              23200.
 1964 DEC 24              17400.
 1964 DEC 25              13300.
 1970 JAN 27              12700.
 1972 JAN 22              10000.
 1972 MAR  2              12700.
 1972 MAR  3              16200.
 1972 MAR  4              15600.
 1972 MAR  5              14700.
 1972 MAR  6              13900.
 1972 MAR  7              13000.
 1972 MAR  8              12500.
 1974 JAN 16              16000.
 1974 JAN 17              11200.
More?
(Use return for YES)
☞ YES
 1974 APR  1              12500.
 1981 DEC 19               6960.0
 1982 FEB 21              16100.
 1982 FEB 22              13600.
 1982 FEB 23              12600.
Finished listing data.
```

DATA-SET MGT ATTRIBUTES MODIFY

You use the MODIFY option in the menu below ATTRIBUTES to modify one or more attributes of a WDM data set. Attributes that describe how data are stored can only be modified before data are added to the data set.

1. Select the data sets for attribute modification.

2. Enter the name of the attribute to be modified.

3. After the current value is shown, enter the new value of the attribute. After the new value has been entered for each data set number in the buffer, a new attribute can be selected.

The example illustrates the modification of the station identification number (ISTAID) from 40350010 to 40350015 and the state code (STCODE) to CO. The modification was done to the data-set number 69 previously placed in the buffer.

```
Enter ADD, MODIFY, DELETE, LIST, or TABLE.
(Use return for DONE)
☞ MODIFY

  1 data set is currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  1 data set is currently in the buffer.
  You are now in the SELECT option.

     69

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
Which attribute for processing (or DONE)?
☞ ISTAID
ADD/MODIFY attribute for DSN. 69
Enter ISTAID, Station identification number.
(Use return for 40350010)
☞ 40350015
Which attribute for processing (or DONE)?
☞ STCODE
ADD/MODIFY attribute for DSN. 69
Enter STCODE, State abbreviation code
☞ CO
Which attribute for processing (or DONE)?
☞ DONE
```

DATA-SET MGT
DATA
TIME SERIES
MODIFY

You use the MODIFY option in the menu below TIME SERIES to modify one or more time-series data values in a WDM data set. However, if the following conditions are true, you must use the COPY UPDATE option instead of MODIFY: (1) the data set to be modified has the attribute COMPFG set for data compression, (2) the value to be changed is in a compressed block of data, and (3) the value in the block for the time step needs to be modified to two or more different values. For example, if a data set with 8 days of missing record is compressed with a value of -999 for each missing day, and the -999 needs to be changed to a different value for each of the 8 days, then the COPY UPDATE must be used. However, if all 8 values of -999 need to be changed to 0, then MODIFY can be used.

To modify data, you need to enter the data-set number, date, and time. Based on the specified date, time, time step of the data set, and whether the time is within a compressed data block, the time span that will be affected is printed. If the printed time span is greater than one time step, the date entered is within a compressed block of data, and any change will be made to the entire compressed block.

[1] Enter the number of the time-series data set to be modified.

[2] Enter the date of the value to be changed.

[3] Enter the value and the quality code you want assigned to the value.

[4] Enter 0 to end modifications, press return for more modifications of the same data set, or enter a new data-set number.

In the example the daily value for January 1, 1967, was changed from 3540 to 2389. The quality flag was changed to 3. No additional modifications were made.

MODIFY time-series data MODIFY

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ MODIFY
Modify time-series VALUES or RECOVER missing blocks?
(Use return for DONE)
☞ VALUES
Which WDM data-set number?
☞ 700
 Attributes of data-set 700
 ISTAID :    11520500
 TSTYPE :         FLOW
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Klamath River near Seiad Valley, CA.

   Data available between the following dates:
1912 OCT 1 - 1978 Jan 24 24:00:00

Enter date
<==  DATE/TIME  ==>
year mo dy hr mi sc
<--><-><-><-><-><->
1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0 DEFAULT
none  1  1  0  0  0 CURRENT
☞ 1967  1  1  0  0  0
1967  1  1  0  0  0 CURRENT
☞
Start of data: 1967 JAN 1
End  of  data: 1967 JAN 1 24:00:00

Enter updated value (return for no change)
    value  quality
 <-------><----->
       none      0 MINIMUM
       none     30 MAXIMUM
         0.      0 DEFAULT
      3540.      0 CURRENT
☞     2389       3
      2389.      3 CURRENT
☞
Modify additional values for this data set?
(Use return for NO)
☞ NO
Modify time-series VALUES or RECOVER missing blocks?
(Use return for DONE)
☞ DONE
```

RENUMBER data sets RENUMBER

DATA-SET MGT
RENUMBER

Use the RENUMBER option in the menu below DATA-SET MGT to renumber WDM data sets. It is most often used to return the number of the updated data set to the original value following a COPY UPDATE operation and after the old data set is deleted. The data are not actually "moved around" in the WDM file, only the pointers are changed.

[1] Enter the number of the data set to be renumbered.

[2] Enter the new number for the data set.

The example illustrates the renumbering of data-set number 500 to data-set number 600.

```
    ADD, ATTRIBUTES, DATA, SELECT, DELETE, or RENUMBER.
    (Use return for DONE)
☞   RENUMBER
    What data set do you want to renumber?
☞   500
    What is the new data-set number?
☞   600
    Data-set 500 renumbered to 600.
```

SELECT ADD SELECT

DATA-SET MGT
SELECT
ADD

Use the ADD option in the menu below SELECT to add a data set to the data-set buffer. This buffer is used to store the data-set numbers to be included in subsequent processing. Data-set numbers may enter the buffer as a result of searches performed using the FIND option, or you may enter them one-by-one with the ADD option. If you continually wish to operate on the same group of data sets, a small command file could be created that would perform the ADD option multiple times.

[1] Following each selection of ADD, enter the data-set number to be placed in the buffer.

The example adds four data-set numbers to the buffer, 34, 2, 56, and 54, and attempts to add 954, which does not exist. Next, the LIST option was used to check the contents of the buffer resulting from previous operations.

```
  NO data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 34
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 2
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 56
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 954
Error: That data-set number does not exist in the WDM file.
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 54
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  4 data sets are currently in the buffer.
  You are now in the SELECT option.

     34       2       56       54

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
```

DATA-SET MGT SELECT CLEAR

Use the CLEAR option in the menu below SELECT to delete all entries in the data-set buffer. This option is exercised when a particular search or operation has been completed and a new search or operation is to be done. Note that this option affects only the data-set buffer. No time series data or attributes are deleted from the WDM file.

[1] Enter the option CLEAR.

In the example the user selects the LIST option to check the contents of the buffer and is informed that three data-set numbers are present. The user then selects the CLEAR response and verifies the CLEAR operation by using the LIST option. Because no data-set numbers are present in the buffer, the operation was successful.

```
  3 data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  3 data sets are currently in the buffer.
  You are now in the SELECT option

     34      54      56

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ CLEAR
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  NO data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
```

DATA-SET MGT SELECT FIND

You use the FIND option in the menu below SELECT to perform searches on data sets in a WDM file. Searches make use of Boolean algebra principles allowing a chain of "and," "or," and "not" conditions. The number of each data set that satisfies the search conditions is added to the buffer. You may limit searches to a range of data-set numbers, to a type of data set (only time series and tables are currently available), or the data sets currently in the buffer. If you want to enter all data sets in a given range or of a given type, then no additional criteria for attributes are used. To search based on attribute values, the attribute name and a value or range is entered (see Appendix B or enter HELP). For each attribute you enter true or false to indicate whether the data-set number is to be included or excluded, respectively, from the buffer based on the value of the attribute. Up to eight attributes may be selected. Once a search has been performed and a group of data sets is contained in the buffer, subsequent searches may be restricted to data sets in the buffer by using the SUBSET option. When all search conditions have been specified, a summary of the search conditions is printed, and the search is performed. A message is printed for every 50th data set checked, the total number of data sets checked, and the total number of data sets that have been added to the buffer. On most computer systems, the maximum number of data set numbers that can be added to the buffer has been set to 300. The LIST option can be used to identify the selected data-set numbers.

[1] Select whether the search should be limited to a RANGE of data-set numbers, TYPE of data set, or the data sets currently in the buffer (SUBSET). If TYPE, enter ALL, TIMESERIES, or TABLE. If RANGE, enter the minimum and maximum data-set number.

[2] If the value of an attribute is to be used for selection, enter the name of the attribute. For attributes that are decimal or integer numbers, enter a minimum and maximum value. For attributes that are character strings, enter a character string. If the data set is to be selected when the attribute value is the same as the character string or between the minimum and maximum, enter TRUE. If the data set is to be selected when the attribute value is not the same as the character string or outside the selected range, enter FALSE.

[3] For the "and" condition, repeat step [2]. For the "or" condition, enter yes to the prompt and repeat step [2].

[4] A summary of your search condition will be printed, then you select to continue or cancel the search.

[5] A summary of the search is printed and you may end or continue the find operation.

The example illustrates a search for all time-series data sets in the WDM file which contain FLOW data, as indicated by the TSTYPE attribute, and have drainage areas between 0.01 and 50.0, as indicated by DAREA attribute. The search resulted in the identification of five data sets that satisfy this condition. Next all data sets between and including data-set numbers 40 and 50 with no criteria for attributes were added. The LIST option was used to display the data set numbers selected.

```
  NO data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ FIND
Limit search to dsn RANGE or TYPE, or a SUBSET of dsn buffer
(Use return for TYPE)
☞ TYPE
Which type data set (or ALL)?
(Use return for ALL)
☞ TIME
Which attribute for processing (or DONE)?
☞ TSTYPE
Value for this attribute?
☞ FLOW
Select data set if condition is TRUE or FALSE?
(Use return for TRUE)
☞ TRUE
Use more search attributes?
(Use return for NO)
☞ YES
Which attribute for processing (or DONE)?
☞ DAREA
Minimum value for this attribute?
☞ .01
Maximum value for this attribute?
☞ 50.
Select data set if condition is TRUE or FALSE?
(Use return for TRUE)
☞ TRUE
Use more search attributes?
(Use return for NO)
☞ NO
Select additional data sets with an 'OR' condition?
(Use return for NO)
☞ NO
```

```
 Finding data sets of type: TIME SERIES
Search criteria:
                TSTYPE  = FLOW     AND
        0.01 <= DAREA  <= 50.
Do you want to cancel this find operation?
(Use return for NO)
☞ NO
 50 data sets checked.
 79 data sets checked.
 1 data sets without requested search attribute.
 74 data sets which didn't match.
 5 data sets matching and added to buffer.
Find more data sets?
(Use return for NO)
☞ Y
Limit search to dsn RANGE or TYPE, or a SUBSET of dsn buffer
(Use return for TYPE)
☞ RANGE
Minimum DSN to search?
(Use return for 1)
☞ 40
Maximum DSN to search?
(Use return for 32000)
☞ 50
Which attribute for processing (or DONE)?
☞ DONE
Finding data sets from 40 to 50.
No search criteria will be used.
Do you want to cancel this find operation?
(Use return for NO)
☞ NO
 11 data sets checked.
 11 data sets matching and added to buffer.
Find more data sets?
(Use return for NO)
☞ NO
FIND, ADD, LIST, SORT, REMOVE or CLEAR dataset numbers?
(Use return for DONE)
☞ LIST

  16 data sets are currently in the buffer.
  You are now in the SELECT option.

     6      11      40      41      42
    43      44      45      46      47
    48      49      50      71     200
   275

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
```

DATA-SET MGT
SELECT
LIST

You use the LIST option in the menu below SELECT to list data-set numbers currently in the data set buffer as a result of the FIND and ADD options of SELECT.

[1] Enter the option LIST.

In the example the LIST option was used to identify the data sets in the buffer resulting from a SELECT option. There were 16 data sets in the buffer.

```
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  16 datasets are currently in the buffer.
  You are now in the SELECT option.

     6      11      40      41      42
    43      44      45      46      47
    48      49      50      71     200
   275

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
```

DATA-SET MGT SELECT REMOVE

You use the REMOVE option in the menu below SELECT to delete data-set numbers from the buffer. Note that the data set itself remains unchanged in the WDM file. Each time the REMOVE option is selected, you enter the data-set number to remove from the buffer.

[1] Select the option REMOVE then the data-set number to be removed.

The example used the LIST option and found four data-set numbers, 2, 34, 54, and 56, in the buffer. Data-set number 2 was removed from the buffer.

```
  4 data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  4 data sets are currently in the buffer.
  You are now in the SELECT option.

      2      34      54      56

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ REMOVE
WDM file data-set number?
☞ 2
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  3 data sets are currently in the buffer.
  You are now in the SELECT option.

     34      54      56

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
```

DATA-SET MGT SELECT SORT

You use the SORT option in the menu below SELECT to reorganize, in ascending order, the data-set numbers currently in the data-set buffer. You might use this option following multiple FIND or ADD operations, but before a LIST operation to more easily view the data-set numbers selected. When the SORT option is not used, the data-set numbers are listed and used in the order in which they enter the buffer.

[1] Enter the option SORT.

The example used the LIST option to view the order of data-set numbers in the buffer. The SORT option was then selected. The LIST option was used again to view the data-set numbers in ascending order.

```
FIND, ADD, LIST, SORT, REMOVE or CLEAR data set numbers?
(Use return for DONE)
☞ LIST

  4 data sets are currently in the buffer.
  You are now in the SELECT option.

     34       2      56      54

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ SORT
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ LIST

  4 data sets are currently in the buffer.
  You are now in the SELECT option.

      2      34      54      56

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ DONE
```

STATISTICS COMPARE

This option uses the flow-duration analysis and class intervals to compute absolute error, root mean square error, and bias by class interval for two time series from a WDM file or PLTGEN file. Also, the standard error of estimate for the time series is computed. The analysis is usually performed on an observed variable and a simulated variable, although the analysis can be used to compare two observed time series to screen the data for possible errors. In addition to the two tables showing errors, a third table is an error matrix that provides a count of plus and minus errors by class interval. Each table can provide insight into the distribution of the error. The flow-duration curves for observed and simulated variables can be plotted.

You select two data sets from a WDM file or two columns from a PLTGEN file created by a rainfall-runoff model. The time period, class intervals, and output file name are required. When plotting the results on a graphics device, the default line type, color, or symbol should be changed for one of the curves.

[1] Select the type of input file and enter the names of the input and output files.

[2] Enter the time step for the values to be used.

[3] If a WDM file is used, enter the data-set number. If a PLTGEN file is used, select two time series. Enter whether the second time series is simulated or measured. The first time series will default to the other.

[4] Enter the time period for the analysis. For WDM files, the current start and end date is determined from the data set. For PLTGEN files, the end date is unknown.

[5] Enter the title for the tables and plot.

[6] Select the standard or user-defined class intervals. For the standard, only the minimum and maximum are entered. The minimum must be greater than zero.

[7] Select options to print the file on the screen and create a plot as needed.

8 For the graphics device, enter type of device, characteristics of each line, scales for the axes, and sizes for the plot.

9 Select the error matrix option if needed.

For the example, two measured time series were selected for comparison, data-set numbers 3 and 4 from the file DAVID.WDM. The output file was TEST14.OT2. A 30-year period from October 1, 1950, was selected from a 41-year period that was common to both time series. The standard class intervals were used for values from 1.0 to 100000. All output options and a plot for a graphics device were selected. One time series was a dashed line and the other solid. The probability axis was limited to four standard deviates and the values off the plot were ignored.

```
Type of statistical analysis?
(Use return for DONE)
☞ COMPARE
PLTGEN or WDM input file?
(Use return for DONE)
☞ WDM
Name of your WDM file?
☞ DAVID.WDM
Name of output file?
☞ TEST14.OT2
Time step for analysis? (minutes)
(Use return for 1440)
☞ 1440
Which WDM data-set number?
☞ 3
 Attributes of data-set 3
 ISTAID :    11517500
 TSTYPE :         FLOW
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Shasta River near Yreka, CA.

   Data available between the following dates:
1933 OCT 1 - 1982 SEP 30 24:00:00
115175
Press return if label OK or enter new label. (max 20 char)
☞
```

```
Which WDM data-set number?
4
 Attributes of data-set 4
 ISTAID :    11519500
 TSTYPE :         FLOW
 TCODE  :            4
 TSSTEP :            1
 STANAM :         Scott River near Fort Jones, CA.

   Data available between the following dates:
1941 OCT 1 - 1982 SEP 30 24:00:00
115195
Press return if label OK or enter new label. (max 20 char)

Is this the MEASURED or SIMULATED variable?
(Use return for MEASURED)
MEASURED

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<-->-><->-><->-><->-><----->-><->-><->-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1941 10  1  0  0  0   1982  9 30 24  0  0 CURRENT
1950                  1980
1950 10  1  0  0  0   1980  9 30 24  0  0 CURRENT

Enter title for plot. (max 80 char)
Comparison of discharge between Shasta River, CA and Scott River, CA
STANDARD or USER defined class intervals?
(Use return for STANDARD)
STANDARD
Lower bound for class intervals?
(Use return for 1.)
1.0
Upper bound for class intervals?
(Use return for 1000.)
100000
File being read.
File being read.
File being read.
File being read.
Do you want to plot the data?
(Use return for YES)
YES
PRINTER plot or on GRAPHICS device?
(Use return for GRAPHICS)
GRAPHICS
Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
SCREEN
```

```
Enter or modify appropriate items.

  line
  type    color  symbol   label for legend
<--1--> <--2--> <--3--> <---------4--------> FIELD
  SOLID   BLACK    NONE 115195               CURV  1
  SOLID   BLACK    NONE 115175               CURV  2


   none    none    none                      MINIMUM
   none    none    none                      MAXIMUM
   NONE   BLACK       0                      DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter or modify appropriate items.

  line
  type    color  symbol   label for legend
<--1--> <--2--> <--3--> <---------4--------> FIELD
  SOLID   BLACK    NONE SCOTT RIVER  CA      CURV  1
   DASH   BLACK    NONE SHASTA RIVER  CA     CURV  2


   none    none    none                      MINIMUM
   none    none    none                      MAXIMUM
   NONE   BLACK       0                      DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Change transformations if needed.
                         Axis                          trans-
  Variable name          type   minimum  maximum   formation
<---------1--------><----2---><----3---><----4---><----5---> FIELD
115195               bottom X      -10.   5.16633      PROB VAR   1
Class interval         left Y        1.    10.E+4       LOG VAR   2
115175               bottom X      -10.   5.16633      PROB VAR   3


                                                     none MINIMUM
                                                     none MAXIMUM
                                                    ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
Location of upper left hand corner of legend?
      X            Y
 COORDINATE  COORDINATE
<---------><---------->
          0.          0. MINIMUM
          1.          1. MAXIMUM
         0.1         0.8 DEFAULT
         0.5         0.8 CURRENT
```

☞

```
       Variable         Minimum    Maximum
------------------- ---------- ----------
 Class interval              1.     10.E+4       LEFT Y-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
       0.1    10.E+4 CURRENT
```

☞ 1.0

```
        1.    10.E+4 CURRENT
```

☞

NOTE: Values off bottom of plot.

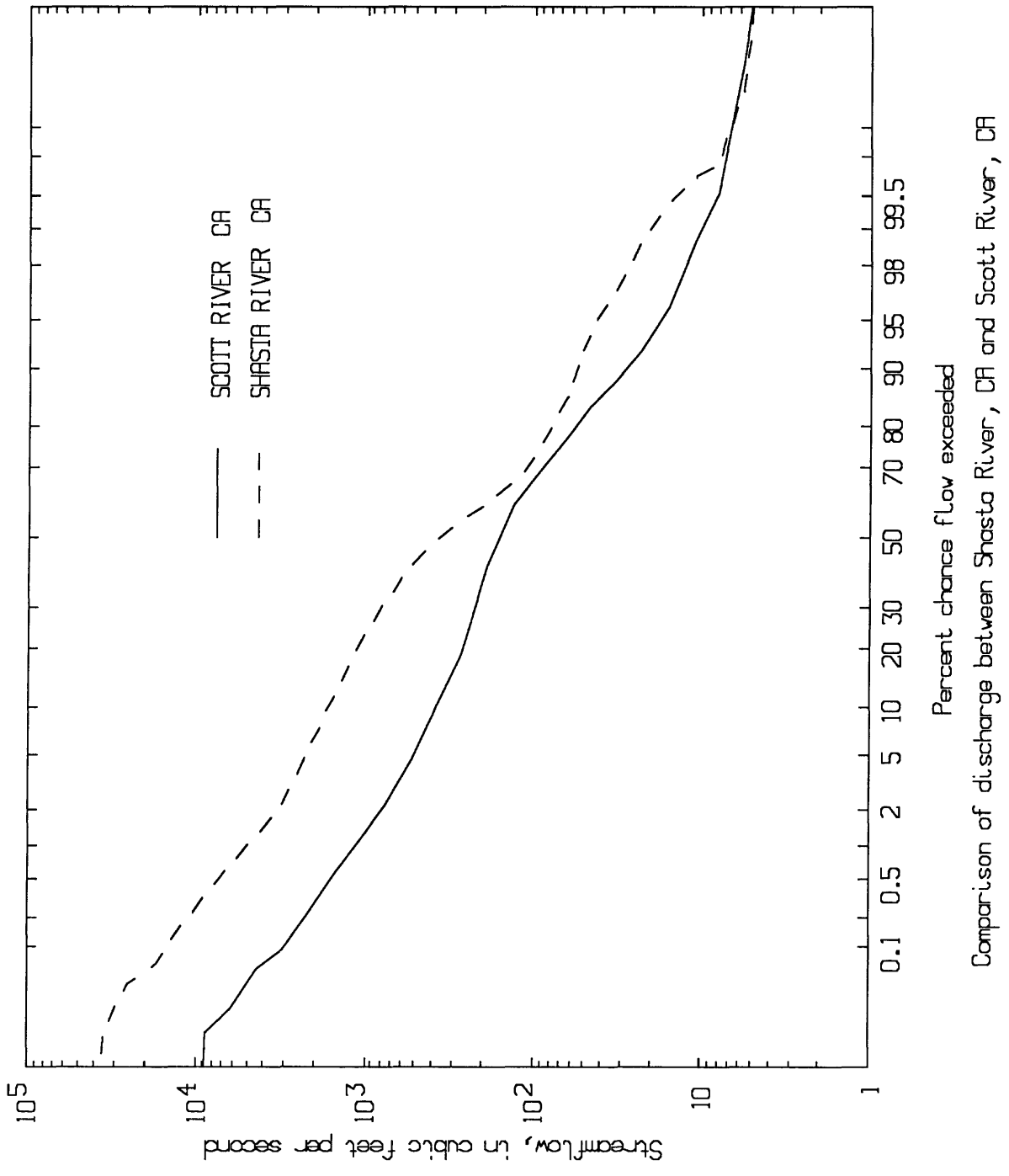
```
       Variable         Minimum    Maximum
------------------- ---------- ----------
 115195                    -10.    5.16633       X-AXIS
 115175                    -10.    5.16633       X-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
       -4.        4. CURRENT
```

☞

Note: values off right of plot.

Note: values off left of plot.

```
Select plotting action to take for values off plot?
   Top    Bottom   Left   Right
 of plot of plot of plot of plot
<------><------><------><------>
    none    none    none    none MINIMUM
    none    none    none    none MAXIMUM
    CLIP    CLIP    CLIP    CLIP DEFAULT
    CLIP    CLIP    CLIP    CLIP CURRENT
☞ CLIP,CLIP,CLIP,CLIP
    CLIP    CLIP    CLIP    CLIP CURRENT
☞

 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space    space   Y-axis   X-axis   letter  location location
    (y)      (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.44     7.83     0.13   1.7675      1.8 CURRENT
☞

Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
Error matrix?
(Use return for YES)
☞ YES
Do you want to see the output file now?
(Use return for NO)
☞ NO
Type of statistical analysis?
(Use return for DONE)
☞ DONE
```



Comparison of discharge between Shasta River, CA and Scott River, CA

STATISTICS compare time series STATISTICS

Listing of output file TEST14.OT2:
Comparison of discharge between Shasta River, CA and Scott River, CA

MEASURED = 115195 SIMULATED = 115175

Lower class limit	Number of cases	Mean absolute error(1) Average	Mean absolute error(1) Percent	Root mean square error(2) Average	Root mean square error(2) Percent	Bias(3) Average	Bias(3) Percent
0.00	0	0.000	0.0	0.000	0.0	0.000	0.0
1.00	0	0.000	0.0	0.000	0.0	0.000	0.0
1.40	0	0.000	0.0	0.000	0.0	0.000	0.0
2.00	0	0.000	0.0	0.000	0.0	0.000	0.0
2.80	0	0.000	0.0	0.000	0.0	0.000	0.0
4.00	2	57.300	1068.6	66.223	1214.4	57.300	1068.6
5.70	49	53.204	770.5	59.853	875.0	53.204	770.5
8.10	83	56.597	600.3	109.309	1137.2	56.311	597.3
11.00	309	89.846	680.5	143.538	1094.3	89.429	677.4
16.00	408	95.760	522.2	154.750	858.7	95.068	518.6
23.00	436	126.222	455.2	235.359	835.7	124.975	450.5
33.00	502	174.630	441.4	322.206	804.0	173.055	437.3
46.00	736	277.008	504.9	453.265	828.0	271.378	495.2
66.00	871	381.727	485.3	596.411	758.0	365.793	465.5
93.00	1030	510.493	465.7	771.839	703.6	474.522	433.4
130.00	2019	326.280	207.4	595.704	385.4	238.260	153.5
190.00	2451	417.574	184.0	660.836	289.9	386.513	168.9
270.00	980	831.233	261.3	1004.578	315.7	827.718	260.2
380.00	573	1165.096	264.4	1394.966	315.1	1161.459	263.6
530.00	271	1612.218	261.3	1953.788	313.8	1605.575	260.2
760.00	123	2389.658	268.5	2902.760	320.7	2389.235	268.4
1100.00	52	4047.115	325.4	4728.623	380.1	4047.115	325.4
1500.00	40	5496.500	310.8	6454.334	366.4	5496.500	310.8
2200.00	13	6279.230	257.5	6870.810	285.4	6279.230	257.5
3100.00	4	12535.000	321.6	13297.467	335.9	12535.000	321.6
4300.00	4	18927.500	359.5	19908.383	369.8	18927.500	359.5
6100.00	1	21220.000	269.3	21220.000	269.3	21220.000	269.3
8700.00	1	29100.000	279.8	29099.996	279.8	29100.000	279.8
12000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
17000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
25000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
35000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
50000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
71000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
100000.00	0	0.000	0.0	0.000	0.0	0.000	0.0
	10958	534.998	181.9	1136.851	3355.9	505.972	311.4

STANDARD ERROR OF ESTIMATE = 1018.09
= (n/n-1)*square root((tot.col.5)**2 - (tot.col.7)**2)

(1) AVERAGE = sum (|S-M|/n)
PERCENT = 100.0 * (sum(|S-M|/M))/n for all M > 0.0

(2) AVERAGE = square root(sum((S-M)**2)/n)
PERCENT = 100.0 * square root(sum(((S-M)/M)**2)/n) for all M > 0

(3) AVERAGE = sum (S-M)/n
PERCENT = 100.0 * (sum ((S-M)/M)/n) for all M > 0.0

S = Simulated value
M = Measured value
sum = Summation
n = Number of pairs of values
| | = Absolute value

note: Percents for the first class interval and the total should not be used if there are measured events that are zero.

STATISTICS compare time series STATISTICS

Comparison of discharge between Shasta River, CA and Scott River, CA

MEASURED = 115195 SIMULATED = 115175

Lower class limit	Cases equal or exceeding lower limit & less than upper limit: Cases Meas	Cases Sim	Percent Measured	Percent Simulated	Percent cases equal or exceeding limit: Measured	Simulated	Average of cases within class limits: Measured	Simulated
0.00	0	0	0.00	0.00	100.00	100.00	0.00	0.00
1.00	0	0	0.00	0.00	100.00	100.00	0.00	0.00
1.40	0	0	0.00	0.00	100.00	100.00	0.00	0.00
2.00	0	0	0.00	0.00	100.00	100.00	0.00	0.00
2.80	0	0	0.00	0.00	100.00	100.00	0.00	0.00
4.00	2	4	0.02	0.04	100.00	100.00	5.20	5.52
5.70	49	22	0.45	0.20	99.98	99.96	7.04	6.65
8.10	83	9	0.76	0.08	99.53	99.76	9.26	9.11
11.00	309	28	2.82	0.26	98.78	99.68	13.28	14.39
16.00	408	80	3.72	0.73	95.96	99.43	18.79	19.82
23.00	436	198	3.98	1.81	92.23	98.70	27.33	26.57
33.00	502	295	4.58	2.69	88.26	96.89	38.90	39.34
46.00	736	1006	6.72	9.18	83.67	94.20	55.58	56.50
66.00	871	1148	7.95	10.48	76.96	85.02	78.76	78.86
93.00	1030	938	9.40	8.56	69.01	74.54	109.65	108.16
130.00	2019	639	18.42	5.83	59.61	65.98	164.29	158.45
190.00	2451	561	22.37	5.12	41.18	60.15	221.64	226.81
270.00	980	657	8.94	6.00	18.82	55.03	316.88	324.50
380.00	573	765	5.23	6.98	9.87	49.03	440.84	455.61
530.00	271	1166	2.47	10.64	4.65	42.05	617.27	638.59
760.00	123	1168	1.12	10.66	2.17	31.41	883.99	916.46
1100.00	52	964	0.47	8.80	1.05	20.75	1247.31	1275.26
1500.00	40	751	0.37	6.85	0.57	11.95	1776.25	1795.11
2200.00	13	312	0.12	2.85	0.21	5.10	2481.54	2569.81
3100.00	4	115	0.04	1.05	0.09	2.25	3840.00	3569.65
4300.00	4	58	0.04	0.53	0.05	1.20	5147.50	4994.65
6100.00	1	36	0.01	0.33	0.02	0.68	7880.00	7049.72
8700.00	1	20	0.01	0.18	0.01	0.35	10400.00	10154.00
12000.00	0	11	0.00	0.10	0.00	0.16	0.00	13463.63
17000.00	0	3	0.00	0.03	0.00	0.06	0.00	20100.00
25000.00	0	3	0.00	0.03	0.00	0.04	0.00	30100.00
35000.00	0	1	0.00	0.01	0.00	0.01	0.00	39500.00
50000.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00
71000.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00
100000.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	10958	10958	100.00	100.00			201.06	707.04

Comparison of discharge between Shasta River, CA and Scott River,

Lower class limit	Number of deviations between indicated percentages							
	-60	-30	-10	0	10	30	60	
0.00	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0
2.80	0	0	0	0	0	0	0	0
4.00	0	0	0	0	0	0	2	0
5.70	0	0	0	0	0	0	49	0
8.10	0	2	2	1	0	0	78	0
11.00	0	8	4	1	0	2	294	0
16.00	5	7	2	3	11	7	373	0
23.00	7	6	11	13	4	6	389	0
33.00	3	8	25	12	18	31	405	0
46.00	18	34	45	25	16	56	542	0
66.00	41	91	100	33	23	43	540	0
93.00	69	209	95	19	2	8	628	0
130.00	252	752	82	48	52	73	760	0
190.00	31	298	169	60	41	126	1726	0
270.00	2	1	16	11	7	5	938	0
380.00	1	4	1	0	0	3	564	0
530.00	1	1	2	1	3	2	261	0
760.00	0	0	0	1	2	0	120	0
1100.00	0	0	0	0	0	1	51	0
1500.00	0	0	0	0	0	1	39	0
2200.00	0	0	0	0	0	0	13	0
3100.00	0	0	0	0	0	0	4	0
4300.00	0	0	0	0	0	0	4	0
6100.00	0	0	0	0	0	0	1	0
8700.00	0	0	0	0	0	0	1	0
12000.00	0	0	0	0	0	0	0	0
17000.00	0	0	0	0	0	0	0	0
25000.00	0	0	0	0	0	0	0	0
35000.00	0	0	0	0	0	0	0	0
50000.00	0	0	0	0	0	0	0	0
71000.00	0	0	0	0	0	0	0	0
100000.00	0	0	0	0	0	0	0	0
	430	1421	554	228	179	364	7782	0

STATISTICS DURATION

Duration analysis performs traditional flow-duration analysis by counting occurrences of all time-series values within flow intervals. Output includes a table and a plot using log-normal axes. You can enter the class intervals or have them set by entering a minimum and maximum. Intervals that are computed are uniform in log space. Data must be in a WDM time-series data set or in a PLTGEN file and the time step of the data must be 1 day or less.

Default start and end dates are based on the record available in the input file but may be changed to a shorter period. Results are placed in a file that can be viewed on the screen. Note that on the scale of the probability axis, the absolute value of the minimum and maximum should be the same. If not, the absolute value of the larger number will be used for both.

[1] Select the type of input file and enter the names of the input and output files.

[2] Enter the time step for the values to be used.

[3] If a WDM file is used, enter the data-set number. If a PLTGEN file is used, select the time series to be used.

[4] Enter the time period for the analysis. For WDM files, the current start and end date is determined from the data set. For PLTGEN files, the end date is unknown.

[5] Enter the title for the table and plot.

[6] Select the standard or user-defined class intervals. For the standard, only the minimum and maximum are entered. The minimum must be greater than zero.

[7] Select options to print the file on the screen and create a plot as needed.

[8] For the graphics device, enter type of device, characteristics of the line, scales for the axes and sizes for the plot.

For the example, data-set number 4 was selected from the file DAVID.WDM. The output table was written to the file TEST14.OT1. A daily time step was used. Although 41 years of record were available, a 30-year period for water years 1951 through 1980 was selected. Standard class intervals from 1.0 to 100000 were used. A plot was made for the graphics terminal using a solid black line. Values greater than three standard deviates were not plotted.

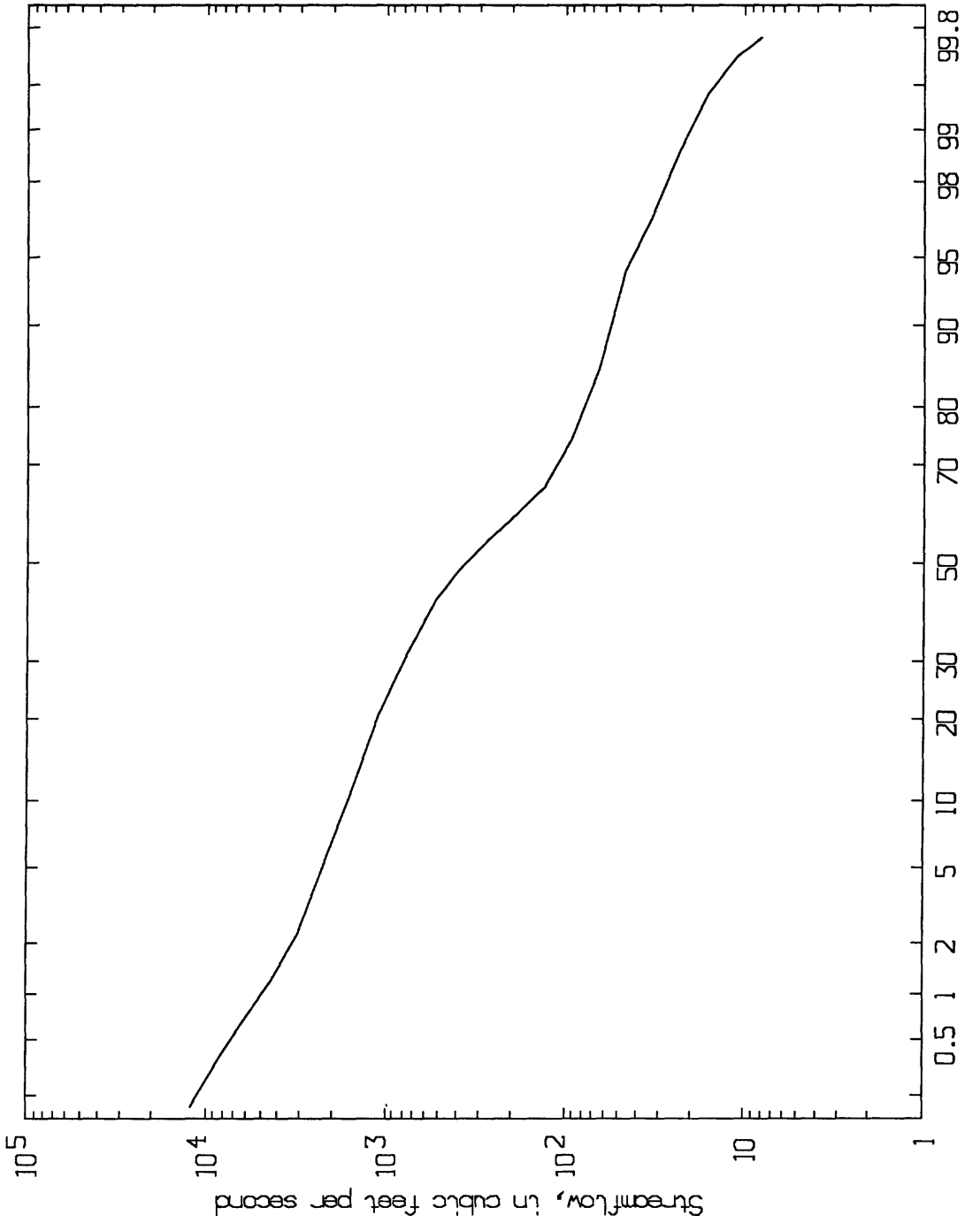
```
Type of statistical analysis?
(Use return for DONE)
☞ DURATION
PLTGEN or WDM input file?
(Use return for DONE)
☞ WDM
Name of your WDM file?
☞ DAVID.WDM
Name of output file?
☞ TEST14.OT1
Time step for analysis? (minutes)
(Use return for 1440)
☞
Which WDM data-set number?
☞ 4
 Attributes of data-set 4
 ISTAID :    11519500
 TSTYPE :         FLOW
 TCODE  :           4
 TSSTEP :           1
 STANAM :         Scott River near Fort Jones, CA.

   Data available between the following dates:
1941 OCT 1 - 1982 SEP 30 24:00:00
115195
Press return if label OK or enter new label. (max 20 char)
☞
Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<-->-><->-><->-><->-><----->-><->-><->-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1941 10  1  0  0  0   1982  9 30 24  0  0 CURRENT
☞ 1950                1980
1950 10  1  0  0  0   1980  9 30 24  0  0 CURRENT
☞
Enter title for plot. (max 80 char)
☞ Flow duration curve for Scott River near Fort Jones, CA.
```

```
STANDARD or USER defined class intervals?
(Use return for STANDARD)
☞ STANDARD
Lower bound for class intervals?
(Use return for 1.)
☞ 1.0
Upper bound for class intervals?
(Use return for 1000.)
☞ 100000
File being read.
File being read.
Do you want to see the output file now?
(Use return for NO)
☞ NO
Do you want to plot the data?
(Use return for YES)
☞ YES
PRINTER plot or on GRAPHICS device?
(Use return for GRAPHICS)
☞ GR
Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
☞ SCREEN

Enter or modify appropriate items.

  line
  type    color  symbol
<-----> <-----> <----->
   none    none    none MINIMUM
   none    none    none MAXIMUM
   NONE   BLACK       0 DEFAULT
   NONE   BLACK       0 CURRENT
☞ SOLID,BLACK,NONE
  SOLID   BLACK    NONE CURRENT
☞
```

```
Change transformations if needed.
                        Axis                          trans-
  Variable name         type   minimum  maximum   formation
<---------1--------><----2---><----3---><----4---><----5---> FIELD
Normal deviates       bottom X      -10.   5.16633      PROB VAR   1
Class interval          left Y        1.    10.E+4       LOG VAR   2


                                                      none MINIMUM
                                                      none MAXIMUM
                                                     ARITH DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

```
       Variable         Minimum    Maximum
------------------- ---------- ----------
 Class interval              1.     10.E+4       LEFT Y-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.         0. DEFAULT
       0.1    10.E+4 CURRENT
☞ 1.0
        1.    10.E+4 CURRENT
☞

  Note: values off bottom of plot.

       Variable         Minimum    Maximum
------------------- ---------- ----------
 Normal deviates           -10.    5.16633       X-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.         0. DEFAULT
       -4.         4. CURRENT
☞ -3,3
       -3.         3. CURRENT
☞


 Note: values off right of plot.


 Note: values off left of plot.


Select plotting action to take for values off plot?
   Top    Bottom   Left   Right
 of plot of plot of plot of plot
<------><------><------><------>
    none    none    none    none MINIMUM
    none    none    none    none MAXIMUM
    CLIP    CLIP    CLIP    CLIP DEFAULT
    CLIP    CLIP    CLIP    CLIP CURRENT
☞ CLIP,CLIP,IGNORE,IGNORE
    CLIP    CLIP  IGNORE  IGNORE CURRENT
☞
```

```
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space     space   Y-axis   X-axis   letter  location location
    (y)       (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.44     7.83     0.13   1.7675      1.8 CURRENT
☞
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```



Flow duration curve for Scott River near Fort Jones, CA.

Listing of output file TEST14.OT1
1
Flow duration curve for Scott River near Fort Jones, CA.

Lower class limit	Cases equal or exceeding lower limit and less than upper limit: Cases	Cases equal or exceeding lower limit and less than upper limit: Percent	Cases equal or exceeding lower class limit: Cases	Cases equal or exceeding lower class limit: Percent
0.00	0	0.00	10958	100.00
1.00	0	0.00	10958	100.00
1.40	0	0.00	10958	100.00
2.00	0	0.00	10958	100.00
2.80	0	0.00	10958	100.00
4.00	4	0.04	10958	100.00
5.70	22	0.20	10954	99.96
8.10	9	0.08	10932	99.76
11.00	28	0.26	10923	99.68
16.00	80	0.73	10895	99.43
23.00	198	1.81	10815	98.70
33.00	295	2.69	10617	96.89
46.00	1006	9.18	10322	94.20
66.00	1148	10.48	9316	85.02
93.00	938	8.56	8168	74.54
130.00	639	5.83	7230	65.98
190.00	561	5.12	6591	60.15
270.00	657	6.00	6030	55.03
380.00	765	6.98	5373	49.03
530.00	1166	10.64	4608	42.05
760.00	1168	10.66	3442	31.41
1100.00	964	8.80	2274	20.75
1500.00	751	6.85	1310	11.95
2200.00	312	2.85	559	5.10
3100.00	115	1.05	247	2.25
4300.00	58	0.53	132	1.20
6100.00	36	0.33	74	0.68
8700.00	20	0.18	38	0.35
12000.00	11	0.10	18	0.16
17000.00	3	0.03	7	0.06
25000.00	3	0.03	4	0.04
35000.00	1	0.01	1	0.01
50000.00	0	0.00	0	0.00
71000.00	0	0.00	0	0.00
100000.00	0	0.00	0	0.00

STATISTICS flood-frequency, Bulletin 17B STATISTICS

STATISTICS
FREQUENCY
YES

The Water Resources Council published procedures for flood-frequency analysis in 1981 in Bulletin 17B (U.S. Geological Survey, 1982). The procedures contain techniques for including historic flood information and high and low outliers. In the analysis, flood peaks are placed in one of two groups, historic peaks or systematic record. Systematic record results from a systematic collection of streamflow data at a site on a stream and historic peaks are data outside the period or periods of systematic record. The Log Pearson Type III distribution which requires a mean, standard deviation and skew is used for the analysis. Skews can be computed from the data, estimated from Bulletin 17B regional maps, or the two estimates can be weighted.

The code used in ANNIE is from the cataloged procedure J407 on the U. S. Geological Survey mainframe computer and has been converted to run in ANNIE. Documentation of J407 can be found in the WATSTORE users manual, Volume 4 (Lepkin, 1979).

Time-series data sets with a yearly time step or table data sets may be used for the analysis. Only table data sets use the qualification codes. IOWDM is the only way to create table data sets and uses files created from retrievals of the WATSTORE peak flow file (Lepkin, 1979). Annual time series can be created with ANNIE using the ADD time series option. To correctly respond to the table menus, the user must understand the program J407 as documented in Bulletin 17B and the WATSTORE manual. As an alternate to input from the WDM file, the formatted file used by J407 as documented in the WATSTORE manual, Volume 4, can be used as input.

[1] Enter the source of the data. Input from the WDM file can be table or time-series data set, but only table data sets include qualification codes.

[2] Enter the name of the input file. If you are using a WDM file, select the data sets to be analyzed.

[3] Enter the name of the output file.

4 If a WDM file is used with table data sets, you can select to make changes to the various analysis options. The options are contained in five table menus. The first menu allows modification of the start and end date, skew computation technique, and whether to include peaks affected by regulation or urbanization. The second menu requires input if a user defined skew is selected. The third menu requires input for historical adjustments. The fourth menu is used to change the low outlier criteria. A fifth menu is presented for base-gage discharge if any less than flags exist for the peak-flow data.

5 Select options for graphics output, confidence limits, and additional output.

6 If graphics output was selected, modify the size specifications if needed.

Five watersheds are used in the example, four from Bulletin 17B and the fifth is Sugar Creek at Crawfordsville, Indiana. Both printer plots and plots on graphics devices are used. The output file and plots are only shown for the first watershed, Floyd River at James, Iowa.

```
Type of statistical analysis?
(Use return for DONE)
☞ FREQUENCY
Do you want to use Bulletin 17B procedures?
(Use return for NO)
☞ YES
Input from WDM file, WATSTORE file, or TERMINAL?
(Use return for DONE)
☞ WDM
WDM file <SWBR2>SW.MODELS>ANNIE0189>TEST>DAVID.WDM
is already open.  Do you want to use it?
(Use return for YES)
☞ YES

  NO data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 12
```

STATISTICS flood-frequency, Bulletin 17B STATISTICS

```
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
ADD
WDM file data-set number?
13
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
ADD
WDM file data-set number?
14
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
ADD
WDM file data-set number?
15
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
ADD
WDM file data-set number?
47
FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
DONE
Name of output file?
TEST15.OT2
Do you want to set or change any options?
(Use return for NO)
YES
Make appropiate changes if needed.
                                                 Include
                                          Skew    urban-
            Station        Begin  End    comp. regulate
              I.D.          year  year    opt.   peaks?
FIELD   <-------1------><--2-><--3-><---4--><---5---> FIELD
Sta.  1         01373500  1882  1984     WTD       NO Sta.  1
Sta.  2         06600500  1935  1987     WTD       NO Sta.  2
Sta.  3         01614000  1929  1975     WTD       NO Sta.  3
Sta.  4         11274500  1932  1986     WTD       NO Sta.  4
Sta.  5         03339500  1913  1986     WTD       NO Sta.  5


MINIMUM                    1    10    none     none MINIMUM
MAXIMUM                 2000  3000    none     none MAXIMUM
DEFAULT                 1901  1988     WTD       NO DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

STATISTICS flood-frequency, Bulletin 17B STATISTICS

```
Make appropiate changes if needed.
                                                 Include
                                          Skew    urban-
           Station        Begin  End     comp. regulate
             I.D.          year  year     opt.   peaks?
FIELD   <-------1------><--2-><--3-><---4--><---5---> FIELD
Sta.  1         01373500  1945  1968      WTD       NO Sta.  1
Sta.  2         06600500  1935  1973      WTD       NO Sta.  2
Sta.  3         01614000  1929  1973      WTD       NO Sta.  3
Sta.  4         11274500  1932  1973      WTD       NO Sta.  4
Sta.  5         03339500  1913  1977      WTD       NO Sta.  5


MINIMUM                      1    10     none     none MINIMUM
MAXIMUM                   2000  3000     none     none MAXIMUM
DEFAULT                   1901  1988      WTD       NO DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

Bulletin 17B or USER defined generalized skew?
(Use return for 17B)
☞ USER

```
Make appropriate changes if needed.
           Station       Generalized  Standard
             I.D.           Skew        Error
FIELD   <-------1------><-----2----> <----3---> FIELD
Sta.  1         01373500     0.59086       0.55 Sta.  1
Sta.  2         06600500     -0.2968       0.55 Sta.  2
Sta.  3         01614000       0.445       0.55 Sta.  3
Sta.  4         11274500    -0.19177       0.55 Sta.  4
Sta.  5         03339500        -0.4       0.55 Sta.  5


MINIMUM                          none       none MINIMUM
MAXIMUM                          none       none MAXIMUM
DEFAULT                            0.         0. DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

STATISTICS flood-frequency, Bulletin 17B STATISTICS

```
Make appropriate changes if needed.
           Station       Generalized  Standard
             I.D.           Skew        Error
FIELD   <-------1------><-----2----> <----3---> FIELD
Sta.  1         01373500         0.6       0.55 Sta.  1
Sta.  2         06600500        -0.3       0.55 Sta.  2
Sta.  3         01614000         0.5       0.55 Sta.  3
Sta.  4         11274500        -0.3       0.55 Sta.  4
Sta.  5         03339500        -0.4       0.55 Sta.  5


MINIMUM                          none       none MINIMUM
MAXIMUM                          none       none MAXIMUM
DEFAULT                            0.         0. DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

Do you want to apply historic adjustment procedures?
(Use return for NO)
☞ YES

Start and end date modified by attributes J407BY and J407EY
for data-set number 12.

Start and end date modified by attributes J407BY and J407EY
for data-set number 13.

Start and end date modified by attributes J407BY and J407EY
for data-set number 14.

Start and end date modified by attributes J407BY and J407EY
for data-set number 15.

Start and end date modified by attributes J407BY and J407EY
for data-set number 47.

```
Make appropiate changes if needed.
                          Largest    Lowest   Historic
           Station       systematic historic  return   Discharge
             I.D.           peak      peak     period   threshold
FIELD   <-------1------><-----2----><----3---><----4---><----5---> FIELD
Sta.  1         01373500       8800.     4400.        0.     4400. Sta.  1
Sta.  2         06600500     7.15E+4       -1.        0.       -1. Sta.  2
Sta.  3         01614000      22400.       -1.        0.       -1. Sta.  3
Sta.  4         11274500      10200.       -1.        0.       -1. Sta.  4
Sta.  5         03339500      26300.     8720.        0.     8720. Sta.  5


MINIMUM                          0.       -1.       -1.       -1. MINIMUM
MAXIMUM                        none       none      none      none MAXIMUM
DEFAULT                          0.         0.        0.        0. DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

STATISTICS flood-frequency, Bulletin 17B STATISTICS

```
Make appropiate changes if needed.
                          Largest    Lowest   Historic
           Station       systematic historic  return   Discharge
             I.D.           peak      peak     period   threshold
FIELD   <-------1------><-----2----><----3---><----4---><----5---> FIELD
Sta.  1         01373500       8800.     4400.        0.     4400. Sta.  1
Sta.  2         06600500     7.15E+4       -1.       82.     7.E+4 Sta.  2
Sta.  3         01614000      22400.       -1.        0.       -1. Sta.  3
Sta.  4         11274500      10200.       -1.        0.       -1. Sta.  4
Sta.  5         03339500      26300.     8720.      102.    3.5E+4 Sta.  5


MINIMUM                           0.       -1.       -1.       -1. MINIMUM
MAXIMUM                        none       none      none      none MAXIMUM
DEFAULT                           0.        0.        0.        0. DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

Do you want to change or view low outlier criteria?
(Use return for NO)
☞ YES

Start and end date modified by attributes J407BY and J407EY
for data-set number 12.

Start and end date modified by attributes J407BY and J407EY
for data-set number 13.

Start and end date modified by attributes J407BY and J407EY
for data-set number 14.

Start and end date modified by attributes J407BY and J407EY
for data-set number 15.

Start and end date modified by attributes J407BY and J407EY
for data-set number 47.

```
Make appropiate changes if needed.
                                    Low
           Station        Lowest   outlier
             I.D.        peak flow criteria
FIELD   <-------1------><-----2----><----3---> FIELD
Sta.  1         01373500        980.        0. Sta.  1
Sta.  2         06600500        318.        0. Sta.  2
Sta.  3         01614000        536.        0. Sta.  3
Sta.  4         11274500          0.        0. Sta.  4
Sta.  5         03339500        903.        0. Sta.  5


MINIMUM                           0.        0. MINIMUM
MAXIMUM                        none      none MAXIMUM
DEFAULT                           0.        0. DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? DONE
```

STATISTICS flood-frequency, Bulletin 17B STATISTICS

```
Modify options as needed.
                          Print                Include
    Plot  Confidence plotting  Additional  debug
   option   limits   position    output  printout?
<--------><--------><--------><--------><-------->
      none       0.5       none       none       none MINIMUM
      none     0.995       none       none       none MAXIMUM
   PRINTER      0.95        YES        WDM         NO DEFAULT
   PRINTER      0.95        YES        WDM         NO CURRENT
☞ BOTH,0.95,YES,WDM,NO
      BOTH      0.95        YES        WDM         NO CURRENT
☞

 Processing data-set number 12.

  Start and end date modified by attributes J407BY and J407EY
  for data-set number 12.

 Mean, standard deviation, skew and n-yr peaks added as
 attributes to data set 12.

Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
(Use return for SCREEN)
☞ SCREEN
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space    space   Y-axis   X-axis   letter  location location
    (y)      (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><------->
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.44     7.57     0.13   1.7675      1.8 CURRENT
☞

Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
☞ PLOT

plot is drawn here

Make a PLOT or REVISE input?
(Use return for DONE)
☞ DONE
```

Note: Identical user interaction for graphics for the next four data sets not included.

STATISTICS flood-frequency, Bulletin 17B STATISTICS

PGM J407 VER 3.9A-P
(REV 08/09/89)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

EXECUTION BEGINNING AT DATE, TIME = 3/ 5/90 1408

-- JOB OPTIONS ---

IPLTOP	IBCPUN	IPRTOP	IDEBUG	IPPOS	ISKUDP	NOXPA	NOCLM	INFORM
3	1	1	0	1	0	0	0	1

INPUT FORMAT = 1 ANNIE/WDMS FILE RETRIEVAL

EXPLANATION OF PEAK DISCHARGE QUALIFICATION CODES

J407	FILE	MEANING
D	3	DAM FAILURE, NON-RECURRENT FLOW ANOMALY
G	8	DISCHARGE GREATER THAN STATED VALUE
X	3+8	BOTH OF THE ABOVE
L	4	DISCHARGE LESS THAN STATED VALUE
K	6 OR C	KNOWN EFFECT OF REGULATION OR URBANIZATION
H	7	HISTORIC PEAK

REPORT TROUBLE TO OFFICE OF SURFACE WATER.

PGM J407 VER 3.9A-P
(REV 08/09/89)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 3/ 5/90 AT 1408 SEQ 2

STATION - 06600500/ FLOYD RIVER AT JAMES, IOWA 1935-73 * HISTORIC * 06600500/

I N P U T D A T A S U M M A R Y

-- YEARS OF RECORD -- SYSTEMATIC	HISTORIC	HISTORIC PEAKS	GENERALIZED SKEW	STD. ERROR OF GENERAL. SKEW	SKEW OPTION	GAGE BASE DISCHARGE	USER-SET OUTLIER CRITERIA HIGH OUTLIER	LOW OUTLIER
39	82	0	-0.300	0.550	WRC WEIGHTED	0.0	70000.0	--

********* NOTICE -- PRELIMINARY MACHINE COMPUTATIONS. *********
********* USER RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 206.8
*WCF161I-USER HIGH OUTLIER CRITERION REPLACES WRC. 70000.0 62394.5
WCF165I-HIGH OUTLIERS AND HISTORIC PEAKS ABOVE HHBASE. 1 0 69999.7

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE DISCHARGE	FLOOD BASE EXCEEDANCE PROBABILITY	LOGARITHMIC MEAN	LOGARITHMIC STANDARD DEVIATION	LOGARITHMIC SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.5553	0.4642	0.357
W R C ESTIMATE	0.0	1.0000	3.5374	0.4377	0.075

ANNUAL FREQUENCY CURVE ORDINATES -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	W R C ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR W R C ESTIMATES LOWER	UPPER
0.9950	276.0	327.3	228.6	143.1	441.5
0.9900	349.5	396.6	302.5	190.3	541.9
0.9500	671.3	694.5	630.4	415.6	960.9
0.9000	955.3	957.2	910.8	630.0	1317.6
0.8000	1470.8	1441.6	1435.6	1037.4	1958.0
0.5000	3403.8	3371.3	3403.8	2596.2	4458.4
0.2000	8018.2	8625.9	8225.8	6025.9	11355.9
0.1000	12638.8	14624.9	13303.6	9148.8	19218.8
0.0400	20644.7	26424.3	22477.6	14169.3	34330.9
0.0200	28429.4	39343.6	32286.7	18761.6	50344.1
0.0100	37987.5	56892.0	44711.4	24143.3	71361.6
0.0050	49608.8	80458.2	61560.9	30414.7	98530.9
0.0020	68702.8	123894.6	88150.0	40258.9	146241.9

STATISTICS flood-frequency, Bulletin 17B STATISTICS

PGM J407 VER 3.9A-P
(REV 008/09/89)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 3/ 5/90 AT 1408 SEQ 2

STATION - 06600500/ FLOYD RIVER AT JAMES, IOWA 1935-73 * HISTORIC * 06600500/

********* NOTICE -- PRELIMINARY MACHINE COMPUTATIONS. *********
********* USER RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION. *********

INPUT DATA LISTING

WATER YEAR	DISCHARGE	CODES
1935	1460.0	
1936	4050.0	
1937	3570.0	
1938	2060.0	
1939	1300.0	
1940	1390.0	
1941	1720.0	
1942	6280.0	
1943	1360.0	
1944	7440.0	
1945	5320.0	
1946	1400.0	
1947	3240.0	
1948	2710.0	
1949	4520.0	
1950	4840.0	
1951	8320.0	
1952	13900.0	
1953	71500.0	
1954	6250.0	
1955	2260.0	
1956	318.0	
1957	1330.0	
1958	970.0	
1959	1920.0	
1960	15100.0	
1961	2870.0	
1962	20600.0	
1963	3810.0	
1964	726.0	
1965	7500.0	
1966	7170.0	
1967	2000.0	
1968	829.0	
1969	17300.0	
1970	4740.0	
1971	13400.0	
1972	2940.0	
1973	5660.0	

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	W R C ESTIMATE
1953	71500.0	0.0250	0.0120
1962	20600.0	0.0500	0.0309
1969	17300.0	0.0750	0.0566
1960	15100.0	0.1000	0.0823
1952	13900.0	0.1250	0.1080
1971	13400.0	0.1500	0.1336
1951	8320.0	0.1750	0.1593
1965	7500.0	0.2000	0.1850
1944	7440.0	0.2250	0.2107
1966	7170.0	0.2500	0.2364
1942	6280.0	0.2750	0.2620
1954	6250.0	0.3000	0.2877
1973	5660.0	0.3250	0.3134
1945	5320.0	0.3500	0.3391
1950	4840.0	0.3750	0.3648
1970	4740.0	0.4000	0.3905
1949	4520.0	0.4250	0.4161
1936	4050.0	0.4500	0.4418
1963	3810.0	0.4750	0.4675
1937	3570.0	0.5000	0.4932
1947	3240.0	0.5250	0.5189
1972	2940.0	0.5500	0.5445
1961	2870.0	0.5750	0.5702
1948	2710.0	0.6000	0.5959
1955	2260.0	0.6250	0.6216
1938	2060.0	0.6500	0.6473
1967	2000.0	0.6750	0.6730
1959	1920.0	0.7000	0.6986
1941	1720.0	0.7250	0.7243
1935	1460.0	0.7500	0.7500
1946	1400.0	0.7750	0.7757
1940	1390.0	0.8000	0.8014
1943	1360.0	0.8250	0.8270
1957	1330.0	0.8500	0.8527
1939	1300.0	0.8750	0.8784
1958	970.0	0.9000	0.9041
1968	829.0	0.9250	0.9298
1964	726.0	0.9500	0.9555
1956	318.0	0.9750	0.9811

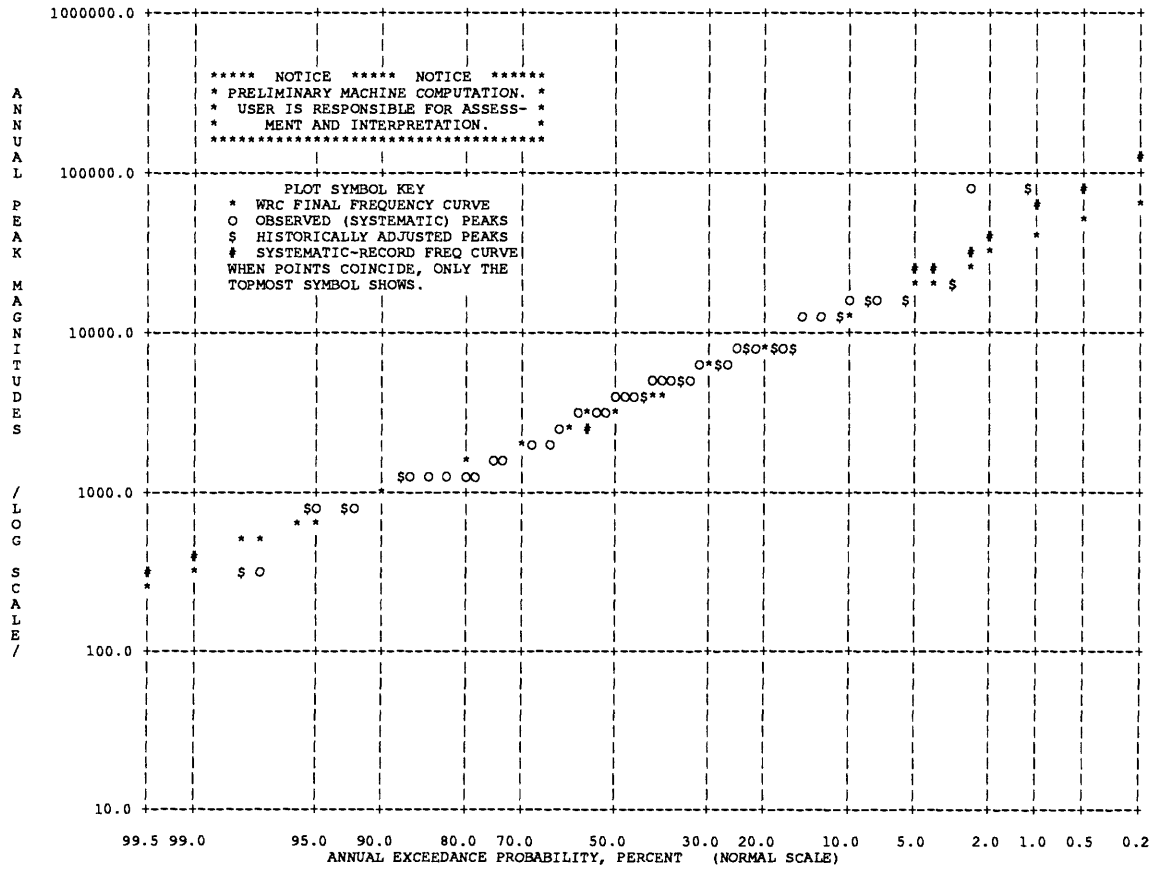
STATISTICS flood-frequency, Bulletin 17B STATISTICS

PGM J407 VER 3.9A-P
(REV 08/09/89)

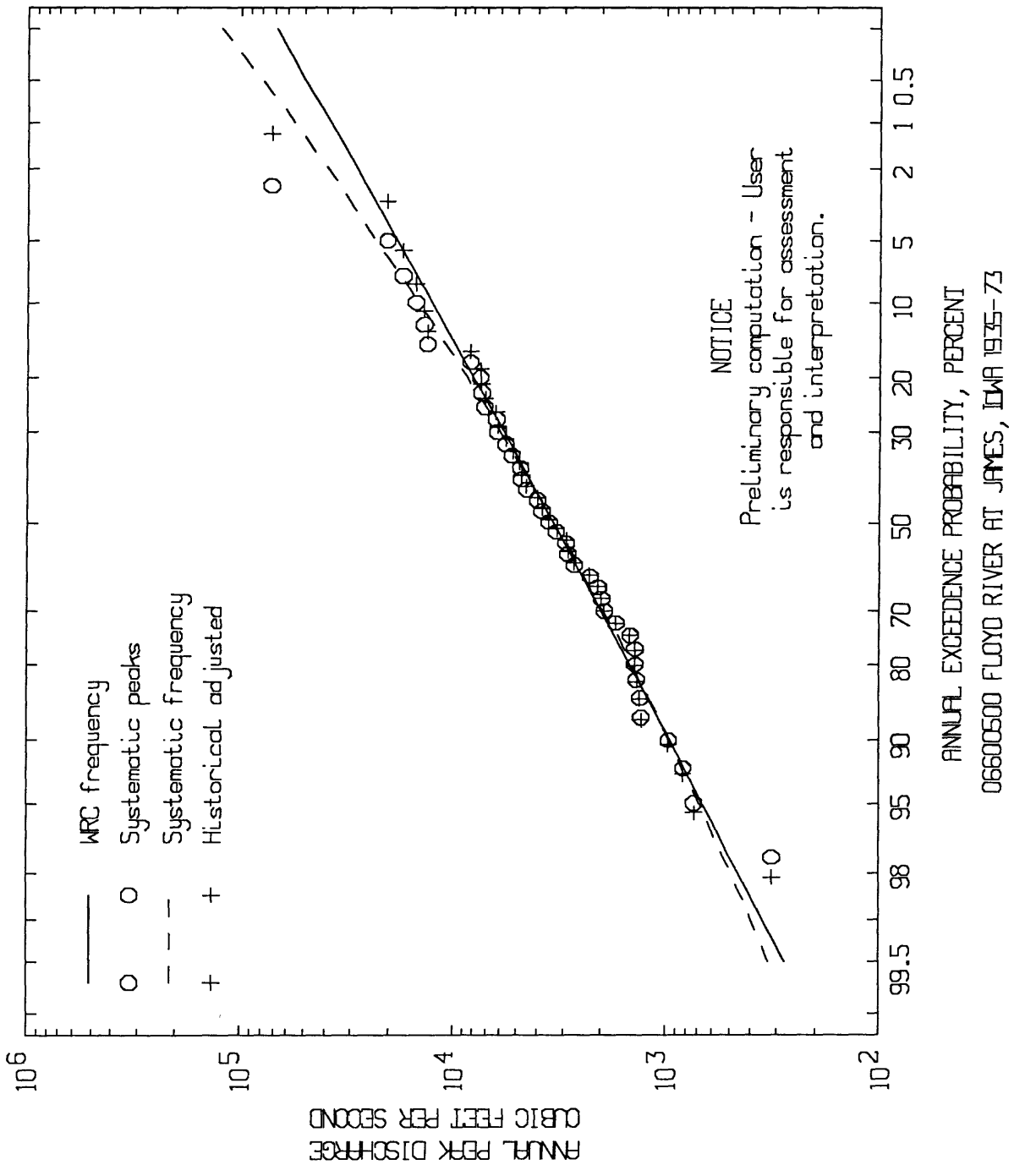
U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 3/ 5/90 AT 1408 SEQ 2

STATION - 06600500/ FLOYD RIVER AT JAMES, IOWA 1935-73 * HISTORIC * 06600500/



STATISTICS flood-frequency Bulletin 17B STATISTICS



STATISTICS
FREQUENCY
NO

With this option annual time series on a WDM data set may be analyzed with the Log Pearson Type III distribution, without the extra features of Bulletin 17B. Data may be entered with IOWDM, the ADD time-series option, or may be created with the STATISTICS N-DAY option that computes n-day annual high and low flow from a daily time series.

The code used in ANNIE is from the cataloged procedure A193 on the U. S. Geological Survey mainframe computer and has been converted to run in ANNIE. Documentation of A193 can be found in the WATSTORE user's manual, Volume 4 (Lepkin, 1979). Procedures have been included to handle zero values and periods of missing records. Missing record must have annual values of -1 or less. Besides an output file and plots on the printer or graphics device, this option may add computed flow statistics to the attributes of each data set if requested by the user. These computed statistics may then be used in the generalized least squares (GLS) procedures or placed in a flat file using TABLE attributes for further processing by statistical packages or spread sheet software.

[1] Enter name of WDM file if not already open and name of file for output.

[2] Select annual time-series data sets using the SELECT option as provided.

[3] Select option for graphics output.

[4] Enter start and end years for analysis.

[5] If graphics device selected, enter type of device, scales for axes (probability axis scaled in standard deviates), and sizes for the plot.

The example shows analysis of 7-day low flow values on data-set number 504 for 44 years on the Shasta River near Yreka, California. Nine attributes were written to the WDM file for data-set number 504. A listing of the output file follows the frequency plot. For a station with zero flows, additional output is provided.

```
     Type of statistical analysis?
     (Use return for DONE)
☞    FREQUENCY
     Do you want to use Bulletin 17B procedures?
     (Use return for NO)
☞    NO
     WDM file <SWBR2>SW.MODELS>ANNIE0189>TEST>DAVID.WDM
     is already open.  Do you want to use it?
     (Use return for YES)
☞    Y
     Name of output file?
☞    TEST16.OT2

       NO data sets are currently in the buffer.
       You are now in the SELECT option.

     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    ADD
     WDM file data-set number?
☞    504
     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    DONE
     Do you want frequency plots?
     (Use return for YES)
☞    YES
     Plot on GRAPHICS device or file for PRINTER?
     (Use return for GRAPHICS)
☞    GRAPHICS
     Should computed statistics be put on WDM file?
     (Use return for NO)
☞    YES

     Enter start and end year.
      Start   End
       year  year
     <----><---->
          1     1 MINIMUM
       2020  2020 MAXIMUM
       1935  1986 DEFAULT
       1935  1982 CURRENT
☞
       9 flow statistics written as data-set attributes
       on data-set number 504.
       MEANND SDND   SKWND  NUMZRO NONZRO L07020 L07010 L07005 L07002

     Output device (SCREEN,PRINTER,PLOTTER,GKS_META,DIS_META)?
     (Use return for SCREEN)
☞    SCREEN
```

STATISTICS frequency, Log-Pearson STATISTICS

```
       Variable          Minimum    Maximum
------------------- ---------- ----------
 Estimated flow         5.47142    67.8571       LEFT Y-AXIS
 Observed flow           5.1207     65.438       LEFT Y-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
        1.      100. CURRENT
```

☞

```
       Variable          Minimum    Maximum
------------------- ---------- ----------
 Calc std deviates     -2.01031    2.01031       X-AXIS
 Assigned std deviate  -1.96039    1.96039       X-AXIS

Enter values for scale.
  MINIMUM   MAXIMUM
<--------><-------->
   -10.E+9   -10.E+9 MINIMUM
    10.E+9    10.E+9 MAXIMUM
        0.        0. DEFAULT
      -2.1       2.1 CURRENT
```

☞

```
 Available plotting space in inches is...
   (proportions will be maintained, size
    will be adjusted to output device.)
         horizontal 10.
         vertical   8.

Enter or modify sizes as needed.
 vertical   horiz.
   space     space   Y-axis   X-axis   letter  location location
    (y)       (x)    length   length    size   Y-origin X-origin
 (inches) (inches) (inches) (inches) (inches) (inches) (inches)
<-------><-------><-------><-------><-------><-------><-------><
       1.       1.       1.       1.     0.01       1.       1. MINIMUM
      38.      38.      38.      38.       3.      36.      36. MAXIMUM
       8.      10.      6.5      7.5      0.1      1.5      1.5 DEFAULT
       8.      10.     5.44     7.83     0.13   1.7675      1.8 CURRENT
```

☞

```
Make a PLOT, REVISE input or DONE?
(Use return for PLOT)
```

☞ PLOT

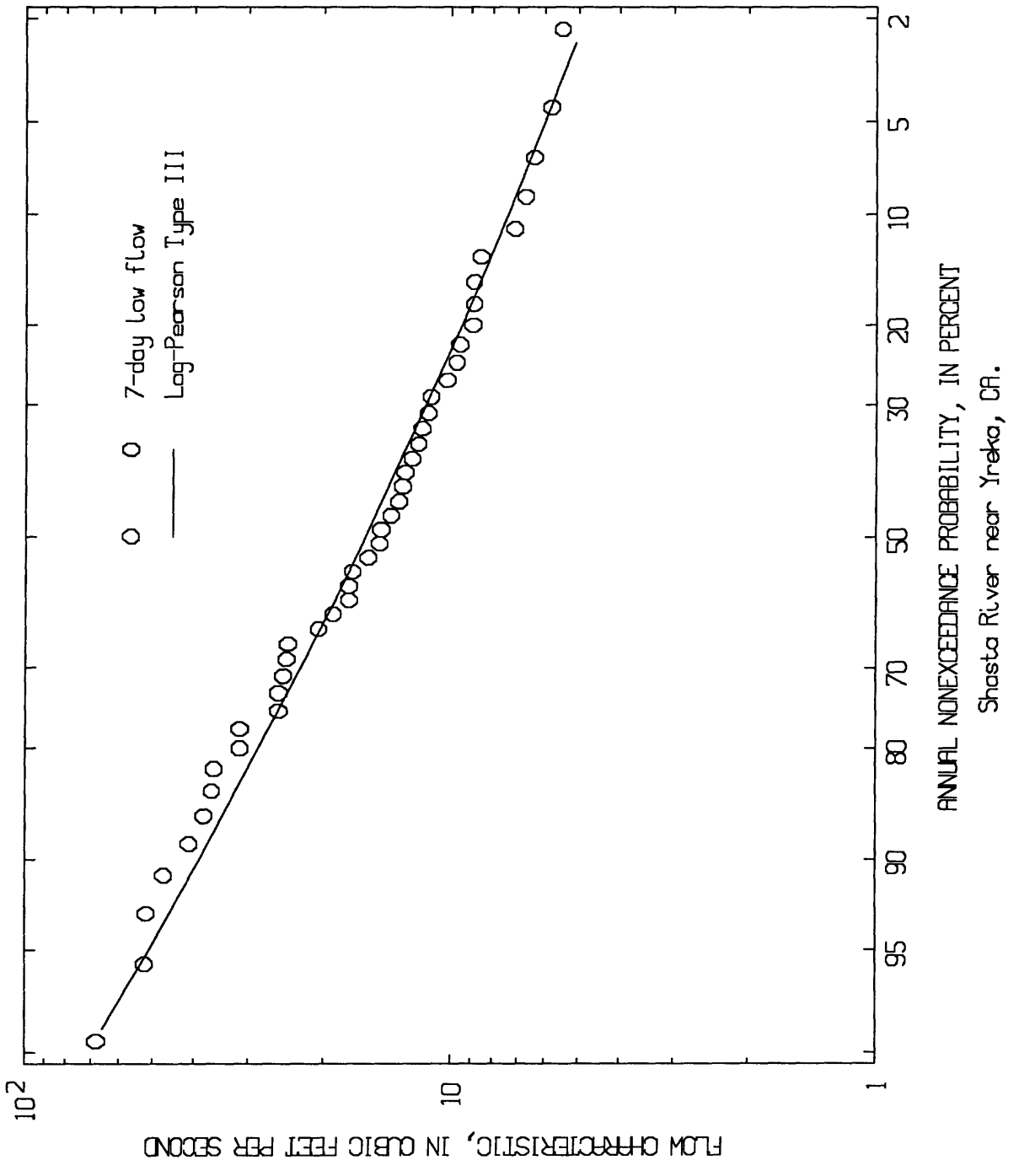
plot is drawn here

```
Make a PLOT or REVISE input?
(Use return for DONE)
```

☞ DONE

```
Finished frequency analysis processing.
```

STATISTICS frequency Log-Pearson STATISTICS



STATISTICS frequency, Log-Pearson STATISTICS

Listing of output file TEST16.OT2:
Log-Pearson Type III Statistics (formerly USGS Program A193, Jan. 1986
(Note -- Use of Log_Pearson Type III distribution is for
preliminary computations. User is responsible
for assessment and interpretation.

Station 11517500 Shasta River near Yreka, CA.

Analysis for -- 12 month period
ending March 31
1935-1982

Parameter is 7-day low value.

0 zero values in data

44 non-zero values in data

8.786	8.500	9.500	8.857	67.857
5.471	36.286	24.286	25.571	17.000
20.571	11.943	9.700	13.286	31.286
24.714	15.714	6.671	52.286	12.857
52.000	11.143	6.414	11.357	13.000
36.143	12.357	38.143	10.229	19.000
7.114	25.571	14.714	24.143	17.429
11.743	47.286	41.143	14.571	8.814
31.286	13.843	17.429	5.800	

The following 14 statistics are based on non-zero values.

Mean	20.496
Variance	212.884
Standard Deviation	14.591
Skewness	1.441
Standard Error of Skewness	0.357
Serial Correlation Coefficient	-0.251
Coefficient of Variation	0.712

Mean (logs)	1.218
Variance (logs)	0.080
Standard Deviation (logs)	0.283
Skewness (logs)	0.331
Standard Error of Skewness (logs)	0.357
Serial Correlation Coefficient (logs)	-0.247
Coefficient of Variation (logs)	0.232

STATISTICS frequency, Log-Pearson STATISTICS

Mean, standard deviation and skew added as attibutes (WRCMN, WRCSD, WRCSKW) to users WDM file on data-set 504

Non-exceedance Probability	Recurrence Interval	Parameter Value
0.0100	100.00	4.261
0.0200	50.00	4.881
0.0500	20.00	6.040
0.1000	10.00	7.366
0.2000	5.00	9.481
0.5000	2.00	15.951
0.8000	1.25	28.236
0.9000	1.11	38.859
0.9600	1.04	55.511
0.9800	1.02	70.522
0.9900	1.01	87.996

9 statistics added as attributes to users WDM file.
MEANND SDND SKWND NUMZRO NONZRO L07020 L07010 L07005 L07002

STATISTICS N-DAY

This option computes annual n-day high and low flows for a daily time series. A default set of 1-, 2-, 3-, 7-, 10-, 30-, 60-, 90-, 183-, and 365-day periods can be selected or you may specify the durations in days for the statistics. The start and end time of the observation period is input so the user can specify calendar year (Jan-Dec), water year (Oct-Sept), any other year, or even season. Output is provided in a table and, optionally, the computed annual time-series data sets are added to a WDM file using a year time step. You should put the results on WDM data sets if subsequent frequency analyses are to be performed.

[1] Enter the name of your WDM file.

[2] Select the type of output and enter file name, decimal places, and significant digits if a print file is selected.

[3] Select option for high flow, low flow, or both.

[4] Select option for standard or user-defined durations. If user defined, enter up to 10 durations.

[5] Select data-set numbers for processing.

[6] Enter a data-set number for output if the WDM output option selected in step [2]. The data set does not need to exist.

[7] Select processing for full period or a common period of record. If a common period, enter the start and ending years.

[8] Enter season for high-flow, low-flow or both depending on the selection in step [3]. Usually the season for high flow is a full year beginning in October and ending in September. The season for low flow is usually April thru March.

In the example, one data set is selected and the standard durations are used for the full period of record. Output to the WDM file started with data-set number 501 for the first annual time series and ended with 520, 10 data sets for low flow and 10 for high flow. The attributes for the 20 new time series were copied from the source daily values time series, with the attributes TSSTEP, TCODE, TGROUP, and TSTYPE changed appropriately. The output file follows the example user interaction. The second value in each of the 10 columns is the rank.

```
     Type of statistical analysis?
     (Use return for DONE)
☞    N-DAY
     Name of your WDM file?
☞    DAVID.WDM
     Do you want output on PRINT file or WDM data-sets?
     (Use return for BOTH)
☞    BOTH
     Name of output file?
☞    TEST16.OT1
     Number of decimal places for output table.
     (Use return for 0)
☞    2
     Significant digits for values in output table?
     (Use return for 3)
☞    5
     HIGH or LOW flow conditions?
     (Use return for BOTH)
☞    B
     STANDARD or USER selected durations?
     (Use return for STANDARD)
☞    STAN

       NO data sets are currently in the buffer.
       You are now in the SELECT option.

     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    ADD
     WDM file data-set number?
☞    3
     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    DONE

     Data-set numbers for output of annual series will be added to
     WDM file based on the first DSN number provided.  The data
     sets can later be SELECTed for further processing using the
     FIND then RANGE options for the group of data-sets created.

     Enter starting data-set number to output n-day annual series.
     (Use return for 501)
☞    501
```

```
Analysis for FULL periods of record or a COMMON period?
(Use return for FULL)
☞ FULL

Enter season for high flow statistics.
  month    month
 season   season
 starts    ends
<------><------>
       1       1 MINIMUM
      12      12 MAXIMUM
      10       9 DEFAULT
      10       9 CURRENT
☞ 10,9
      10       9 CURRENT
☞

Enter season for low flow statistics.
  month    month
 season   season
 starts    ends
<------><------>
       1       1 MINIMUM
      12      12 MAXIMUM
       4       3 DEFAULT
       4       3 CURRENT
☞ 4,3
       4       3 CURRENT
☞

Processing input data-set number 3
 Bad values in year starting 1941.  Year skipped in analysis.
 Bad values in year starting 1942.  Year skipped in analysis.
   10 years processed
 Bad values in year starting 1943.  Year skipped in analysis.
 Bad values in year starting 1944.  Year skipped in analysis.
   20 years processed
   30 years processed
   40 years processed
 1-day low flow for each year on data-set 501.
 2-day low flow for each year on data-set 502.
 3-day low flow for each year on data-set 503.
 7-day low flow for each year on data-set 504.
 10-day low flow for each year on data-set 505.
 30-day low flow for each year on data-set 506.
 60-day low flow for each year on data-set 507.
 90-day low flow for each year on data-set 508.
 183-day low flow for each year on data-set 509.
 365-day low flow for each year on data-set 510.
```

STATISTICS n-day high and low STATISTICS

```
 Processing input data-set number 3
  Bad values in year starting 1941.  Year skipped in analysis.
    10 years processed
  Bad values in year starting 1942.  Year skipped in analysis.
  Bad values in year starting 1943.  Year skipped in analysis.
  Bad values in year starting 1944.  Year skipped in analysis.
    20 years processed
    30 years processed
    40 years processed
    50 years processed
 1-day high flow for each year on data-set 511.
 2-day high flow for each year on data-set 512.
 3-day high flow for each year on data-set 513.
 7-day high flow for each year on data-set 514.
 10-day high flow for each year on data-set 515.
 30-day high flow for each year on data-set 516.
 60-day high flow for each year on data-set 517.
 90-day high flow for each year on data-set 518.
 183-day high flow for each year on data-set 519.
 365-day high flow for each year on data-set 520.
```

Listing of output file TEST16.OT1:

STATION NUMBER 11517500
LOW MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH
DISCHARGE, IN CUBIC FEET PER SECOND

YEAR	1-DAY	2-DAY	3-DAY	7-DAY	10-DAY	30-DAY	60-DAY	90-DAY	183-DAY	365-DAY
1935	6.50 11	7.25 9	7.67 9	8.79 7	9.10 8	11.02 5	15.74 10	18.79 9	30.52 1	87.28 1
1936	6.00 8	6.50 7	7.17 8	8.50 6	9.00 7	11.58 6	11.94 4	14.92 5	34.21 2	107.06 3
1937	6.50 12	8.00 13	8.67 11	9.50 10	9.90 9	13.48 11	14.43 8	16.92 6	38.54 5	87.82 2
1938	6.00 9	6.25 6	7.00 7	8.86 9	8.55 6	12.83 10	14.30 7	19.86 11	51.12 12	206.65 30
1939	56.00 44	58.00 44	58.67 44	67.86 44	75.60 44	85.23 44	98.12 44	103.62 44	129.02 42	200.42 27
1940	4.10 2	4.35 2	4.43 2	5.47 1	5.58 2	7.73 1	11.66 3	13.75 3	35.09 3	144.51 13
1941	32.00 38	33.00 39	33.33 38	36.29 38	40.40 38	48.37 38	54.95 36	59.21 32	90.62 30	224.90 33
1946	17.00 30	17.50 29	18.67 29	24.29 31	25.70 31	30.23 30	31.10 26	34.47 22	81.81 27	159.92 16
1947	19.00 33	20.50 32	21.67 33	25.57 33	27.40 34	38.63 33	45.23 31	50.63 30	73.41 22	126.98 6
1948	14.00 26	15.00 26	15.67 27	17.00 25	17.90 25	20.37 22	22.68 19	29.21 19	48.09 11	114.35 5
1949	18.00 31	19.00 31	19.33 30	20.57 29	21.30 28	29.77 29	47.62 34	59.44 33	115.75 36	163.03 19
1950	9.00 18	9.30 17	9.53 14	11.94 16	13.56 17	16.71 17	22.49 18	26.72 14	65.23 16	127.18 7
1951	7.70 15	8.35 15	8.77 12	9.70 11	10.09 10	15.36 14	17.21 13	26.82 15	55.86 14	200.91 28
1952	11.00 22	12.00 24	12.67 24	13.29 20	14.10 19	15.17 12	16.15 11	21.24 12	61.24 15	194.81 24
1953	25.00 35	26.00 35	27.67 35	31.29 35	32.80 36	44.03 36	46.33 33	60.40 35	103.40 33	237.07 35
1954	22.00 34	22.00 34	22.00 34	24.71 32	27.30 33	42.43 35	46.25 32	56.19 31	132.37 43	239.18 37
1955	12.00 25	14.00 25	14.33 25	15.71 24	16.30 22	21.90 25	26.82 24	41.41 27	84.17 29	132.28 10
1956	5.90 6	5.90 4	5.90 4	6.67 4	7.35 5	10.05 4	10.78 2	12.45 1	35.29 4	257.04 39
1957	46.00 43	48.00 43	49.33 43	52.29 43	54.70 42	60.40 42	61.52 39	71.96 39	126.30 39	209.76 31
1958	10.00 20	11.50 21	11.67 21	12.86 18	15.10 21	19.47 21	25.67 22	37.17 25	83.95 28	282.12 43
1959	41.00 42	47.00 42	48.00 42	52.00 42	55.30 43	66.57 43	83.98 43	101.36 43	145.72 44	225.27 34
1960	9.50 19	9.50 18	9.83 15	11.14 13	12.05 15	15.22 13	20.84 16	33.22 21	69.80 20	134.26 11
1961	5.50 4	5.65 3	5.80 3	6.41 3	7.14 3	9.86 3	12.83 5	14.29 4	46.60 9	130.89 8
1962	7.00 13	8.25 14	9.83 16	11.36 14	11.95 14	17.15 18	22.96 20	28.99 18	77.65 24	159.22 15
1963	10.00 21	10.50 20	11.00 19	13.00 19	13.90 18	19.33 20	26.07 23	28.03 17	65.60 17	198.63 26
1964	32.00 39	32.50 38	33.67 39	36.14 37	38.60 37	46.27 37	61.15 38	75.77 40	127.52 41	201.64 29
1965	7.50 14	7.75 12	10.17 18	12.36 17	12.85 16	18.75 19	22.16 17	30.02 20	71.23 21	284.68 44
1966	31.00 37	32.00 37	32.00 37	38.14 39	41.50 39	51.63 39	66.10 41	76.53 41	102.43 32	190.59 23
1967	6.40 10	7.70 11	8.47 10	10.23 12	10.51 11	12.55 8	14.11 6	17.79 8	52.20 13	145.30 14
1968	14.00 27	15.00 27	15.33 26	19.00 28	21.30 29	25.53 27	32.13 28	43.09 28	109.77 34	177.37 21
1969	4.90 3	6.10 5	6.50 5	7.11 5	7.29 4	11.92 7	16.34 12	27.85 16	46.89 10	160.35 17
1970	16.00 29	18.00 30	20.00 31	25.57 34	25.40 30	33.17 31	50.87 35	60.74 36	101.49 31	276.33 41
1971	11.00 23	11.50 22	12.33 23	14.71 23	17.10 24	21.50 23	25.53 21	37.13 24	79.37 25	218.50 32
1972	18.00 32	20.50 33	21.33 32	24.14 30	26.60 32	34.03 32	43.03 30	59.46 34	127.07 40	250.25 38
1973	15.00 28	15.50 28	15.67 28	17.43 26	18.90 26	23.77 26	29.62 25	35.93 23	66.66 18	131.45 9
1974	5.70 5	7.55 10	9.37 13	11.74 15	11.28 13	15.73 15	17.61 14	19.04 10	43.28 6	277.89 42
1975	38.00 41	38.50 41	40.67 41	47.29 41	49.70 41	55.13 41	60.68 37	67.77 37	111.78 35	267.64 40
1976	36.00 40	37.00 40	37.67 40	41.14 40	42.00 40	53.70 40	62.52 40	68.76 38	120.69 38	198.15 25
1977	8.00 17	10.00 19	11.00 20	14.57 22	16.80 23	21.70 24	34.52 29	45.80 29	75.74 23	113.92 4
1978	6.00 7	6.60 8	6.73 6	8.81 8	11.27 12	12.78 9	15.12 9	17.61 7	44.36 7	160.36 18
1979	27.00 36	28.00 36	28.33 36	31.29 36	32.70 35	41.07 34	68.33 42	81.46 42	118.11 37	172.15 20
1980	7.90 16	8.60 16	10.07 17	13.84 21	14.52 20	16.60 16	19.57 15	26.08 13	67.59 19	185.00 22
1981	11.00 24	11.50 23	12.00 22	17.43 27	19.10 27	27.93 28	31.82 27	39.42 26	81.77 26	138.56 12
1982	1.50 1	2.65 1	3.27 1	5.80 2	5.50 1	8.85 2	10.64 1	12.72 2	46.25 8	238.67 36

STATISTICS n-day high and low STATISTICS

STATION NUMBER 11517500
HIGH MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER
DISCHARGE, IN CUBIC FEET PER SECOND

YEAR	1-DAY		2-DAY		3-DAY		7-DAY		10-DAY		30-DAY		60-DAY		90-DAY		183-DAY		365-DAY	
1934	164.00	1	161.50	1	158.67	1	152.00	1	149.00	1	144.93	1	140.73	1	137.80	1	125.32	1	77.90	1
1935	264.00	4	258.00	5	244.33	5	208.71	3	201.10	3	182.87	3	175.00	3	165.37	2	148.54	3	91.07	2
1936	878.00	19	830.00	20	728.00	20	566.86	21	497.10	20	311.40	16	260.13	14	234.26	14	179.42	8	109.25	7
1937	442.00	11	417.00	11	399.67	11	310.00	10	269.60	9	225.10	8	197.55	7	181.01	4	147.86	2	97.72	4
1938	1470.0	26	1430.0	31	1233.3	28	947.14	29	836.00	29	651.73	33	610.35	38	590.13	39	451.08	40	288.03	39
1939	272.00	5	251.50	4	236.00	4	225.43	5	222.80	5	202.30	5	190.02	5	186.28	5	176.50	7	105.99	6
1940	1900.0	34	1560.0	33	1430.0	33	1093.4	35	921.70	33	548.40	28	536.50	34	445.89	31	318.62	29	201.25	29
1941	1500.0	27	1295.0	26	1200.0	27	1082.4	34	1051.9	35	725.10	37	663.45	39	588.17	38	441.10	38	290.81	40
1946	712.00	16	663.50	16	615.00	16	524.29	19	530.10	21	380.33	22	313.82	22	295.33	22	242.09	21	157.70	22
1947	347.00	7	324.50	7	301.67	7	260.43	6	250.00	7	208.60	6	192.85	6	193.73	7	174.15	6	111.23	8
1948	828.00	18	774.50	19	698.00	19	518.43	18	438.50	17	268.67	12	218.12	10	204.62	9	187.07	9	149.06	18
1949	435.00	10	388.00	10	362.67	10	335.43	11	315.20	11	252.47	11	229.70	11	224.99	11	208.79	15	136.96	14
1950	568.00	14	532.50	14	515.00	14	464.14	16	391.30	13	279.70	13	242.18	13	226.52	13	190.53	11	123.40	11
1951	1510.0	28	1375.0	29	1326.7	32	1054.1	33	933.40	34	663.13	35	524.53	32	480.70	35	343.84	33	202.70	30
1952	1610.0	31	1415.0	30	1265.3	30	1011.1	30	898.20	31	664.83	36	517.20	31	456.27	34	348.21	34	226.63	33
1953	1830.0	33	1805.0	34	1760.0	38	1397.6	39	1227.1	38	758.77	38	566.15	36	489.81	36	376.02	35	250.59	36
1954	1380.0	24	1180.0	23	1076.0	23	846.14	26	732.60	26	621.50	32	531.22	33	448.06	33	335.46	32	211.45	31
1955	220.00	3	216.00	3	214.67	3	209.14	4	206.00	4	193.47	4	188.47	4	188.53	6	169.44	5	102.49	5
1956	5440.0	43	4885.0	43	3950.0	43	2394.9	42	1877.3	42	1092.9	42	822.07	42	752.60	42	511.31	42	311.72	42
1957	1610.0	32	1228.0	25	1150.0	25	836.71	25	723.80	25	592.30	31	440.25	28	369.74	25	287.46	26	182.77	25
1958	2720.0	40	2520.0	40	2153.3	40	1541.4	41	1442.0	41	1077.5	41	854.43	43	762.93	43	538.79	44	352.14	44
1959	483.00	12	483.00	12	473.00	12	424.71	12	404.00	14	313.50	17	284.78	18	261.78	18	222.06	17	146.04	17
1960	1550.0	29	1310.0	27	1139.7	24	685.00	22	557.00	22	327.17	20	273.38	17	241.53	15	200.81	14	125.31	12
1961	1020.0	21	896.50	21	811.00	21	495.71	17	443.80	18	298.13	14	265.17	16	247.31	16	214.13	16	145.16	16
1962	723.00	17	699.00	17	635.00	17	452.14	14	391.10	12	314.20	18	288.37	19	282.27	21	241.36	20	152.67	21
1963	1440.0	25	1310.0	28	1286.7	31	1034.1	31	872.80	30	527.50	27	393.43	25	383.38	28	333.75	31	239.62	34
1964	2620.0	39	1995.0	38	1583.3	34	934.86	28	759.60	27	443.87	24	337.78	24	300.90	24	257.07	23	165.09	23
1965	10400.	45	9140.0	45	7456.7	45	4200.0	45	3209.5	45	1649.7	45	1081.0	45	820.94	44	531.36	43	315.05	43
1966	1050.0	22	1010.5	22	925.33	22	702.14	23	597.90	23	408.57	23	321.88	23	296.78	23	245.40	22	150.31	20
1967	969.00	20	724.50	18	646.67	18	535.43	20	481.80	19	348.20	21	295.18	21	277.81	20	260.21	24	180.36	24
1968	645.00	15	607.50	15	567.67	15	462.00	15	414.60	16	316.67	19	294.95	20	268.46	19	229.92	19	138.78	15
1969	2090.0	36	1900.0	37	1620.0	35	1041.4	32	898.30	32	550.10	29	428.88	27	370.80	26	286.16	25	191.49	26
1970	4010.0	42	3145.0	42	2780.0	42	2585.7	43	2171.7	43	1136.3	43	800.05	41	681.48	41	444.19	39	262.15	37
1971	1300.0	23	1220.0	24	1160.0	26	910.86	27	786.50	28	506.07	26	471.35	29	432.90	30	400.31	37	266.33	38
1972	2280.0	37	1870.0	36	1720.0	37	1241.3	36	1066.8	36	654.77	34	537.67	35	446.44	32	325.05	30	196.00	28
1973	322.00	6	311.50	6	300.67	6	294.14	9	280.30	10	241.17	10	234.78	12	225.91	12	195.96	13	119.73	10
1974	5800.0	44	5410.0	44	4710.0	44	3358.6	44	2790.0	44	1287.3	44	870.33	44	883.42	45	612.60	45	364.09	45
1975	1900.0	35	1825.0	35	1650.0	36	1321.1	37	1288.1	40	782.03	39	595.08	37	511.99	37	377.81	36	248.66	35
1976	511.00	13	484.00	13	485.67	13	443.29	13	407.10	15	304.90	15	261.87	15	248.80	17	223.16	18	149.80	19
1977	208.00	2	199.00	2	195.33	2	186.57	2	183.90	2	175.63	2	168.90	2	166.62	3	149.41	4	97.18	3
1978	1570.0	30	1430.0	32	1235.0	29	830.86	24	690.30	24	456.67	25	405.12	26	378.88	27	314.86	28	213.78	32
1979	364.00	8	358.00	8	326.33	8	268.57	7	249.00	6	217.90	7	210.90	9	206.92	10	193.46	12	131.31	13
1980	2410.0	38	2295.0	39	1963.3	39	1350.1	38	1077.5	37	584.50	30	485.23	30	405.38	29	308.81	27	194.86	27
1981	395.00	9	364.50	9	332.33	9	286.43	8	264.60	8	226.17	9	209.35	8	204.57	8	189.25	10	117.60	9
1982	3620.0	41	2755.0	41	2450.0	41	1483.0	40	1275.3	39	890.50	40	669.08	40	617.29	40	469.75	41	291.39	41

STATISTICS TREND

You use the Kendall Tau statistic to test time series for trends. As implemented in ANNIE, it is used for annual time series as a pre-processing step to frequency analysis. Input can come from either a yearly time-series data set or a peak flow table data set created by IOWDM.

[1] Enter name of your WDM file.

[2] Select data set to be processed.

[3] Enter name of your output file for printing.

For the example, the time-series data set 1003 was processed. The results, Kendall Tau statistic, P-level and median slope, were printed to the screen and written to the file TEST15.OT1.

```
    Type of statistical analysis?
    (Use return for DONE)
☞   TREND
    WDM file <SWBR2>SW.MODELS>ANNIE0189>TEST>DAVID.WDM
    is already open.  Do you want to use it?
    (Use return for YES)
☞   YES

      NO data sets are currently in the buffer.
      You are now in the SELECT option.

    FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
    (Use return for DONE)
☞   ADD
    WDM file data-set number?
☞   1003
    FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
    (Use return for DONE)
☞   DONE
    Name of file for printout?
☞   TEST15.OT1
```

STATISTICS trend analysis STATISTICS

```
Modify as needed.
  Good value range
--------------------
 Minimum    Maximum
<--------><-------->
  -10.E+19  -10.E+19 MINIMUM
   10.E+19   10.E+19 MAXIMUM
        0.         0. DEFAULT
        0.    10.E+9 CURRENT
☞
Do you want to limit analysis for any time series?
(Use return for NO)
☞ NO

 Data-set number 1003.
  Kendall tau is 0.31428.
  P-level is 0.04946.
  Median slope of trend is 1.65795.
```

Listing of output file TEST15.OT1:

```
Data-set number   = 1003
 Station number   = 11516530
 Station name     = Klamath River below Iron Gate Dam, CA.
 Data type        = L003
 Starting year    = 1962
 Ending year      = 1982
 Values used      =   21
 Values skipped   =    0
 Kendall Tau      =    0.314
 P-level          =    0.049
 Median slope     =    1.658
```

FILE MGT SUMMARIZE

You use the SUMMARIZE option in the menu below FILE MGT to summarize the number and type of data sets currently contained in the WDM file, and the directory pathway to the storage location for the WDM file.

[1] Select the option SUMMARY.

The example illustrates the summary information provided for a file named DAVID.WDM that contains 75 time-series data sets and 5 table data sets. The data set numbers range from 1 to 80.

```
Enter CREATE, SUMMARIZE, IMPORT, EXPORT, or DUMP.
(Use return for DONE)
☞ SUMMARIZE
                                General Summary

    WDM file <SWBR2>SW.MODELS>ANNIE0189>TEST>DAVID.WDM
    contains 240 records.

    Minimum data-set number is 1.
    Maximum data-set number is 80.

              Data-set Type       Count
              ------------        -----
               TIMESERIES           75
               TABLE                 5
              ------------        -----
               TOTAL                80
```

DATA-SET MGT ATTRIBUTES TABLE

You use the TABLE option in the menu below ATTRIBUTES to summarize the values of selected attributes in tabular form. You have the option of selecting a table of default attributes for data sets, or your own set of attributes. Output can be routed to the terminal or a file. Pertinent information on the output device is requested to make sure the output device and the specified table dimensions are compatible. You can also include in the table the begin and end dates of the data for time-series data sets.

1. Use the select procedures to identify the data sets to be included in the table.

2. Select the output option, lines per page, and line width.

3. Enter the name of the output file if FILE selected in step 2.

4. Select option for default attributes, start and end dates, and enter any additional attributes to be included in the table. For attributes with decimal numbers for values, you must enter the number of significant digits and decimal places.

In the example a table was written to file TEST03.OUT. The file has Fortran print control characters for 100 lines per page, and a print width of 132 characters. Default attributes were not included in the table. The table included begin and end dates of the time series and the attributes TSTYPE, TSSTEP, TCODE, DAREA, and STANAM. Note that the field for an attribute was left blank for those data sets that did not have a value for the requested attribute. If the file were to be used as input to a spread sheet or statistics program, the LINES per page should be set to the maximum to eliminate repeated printing of the table heading and Fortran print control characters.

```
     Enter ADD, MODIFY, DELETE, LIST, or TABLE.
     (Use return for DONE)
☞    TABLE

       80 data sets are currently in the buffer.
       You are now in the SELECT option.

     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    DONE

     Output options
       output  lines  width
      <------><-----><----->
          none      5     40 MINIMUM
          none 200000    250 MAXIMUM
      TERMINAL     20     80 DEFAULT
      TERMINAL     20     80 CURRENT
☞    FILE,100,132
          FILE    100    132 CURRENT
☞
     Name of output file?
☞    TEST03.OUT
     Do you want to table default attributes?
     (Use return for YES)
☞    NO
     Do you want the data begin and end dates?
     (Use return for YES)
☞    YES
     Which attribute for processing (or DONE)?
☞    TSTYPE
     Which attribute for processing (or DONE)?
☞    TSSTEP
     Which attribute for processing (or DONE)?
☞    TCODE
     Which attribute for processing (or DONE)?
☞    DAREA
     Enter number of significant digits for output.
     (Use return for 5)
☞    5
     Enter number of decimal places for output.
     (Use return for 0)
☞    2
     Which attribute for processing (or DONE)?
☞    STANAM
     Approaching output width limit, spaces remaining: 17
     Which attribute for processing (or DONE)?
☞    DONE
     Enter title for table
☞    Summary of data sets in DAVID.WDM file:
```

TABLE attributes TABLE

Listing of output file TEST03.OUT:

Summary of data sets in DAVID.WDM file:

DSN	PERIOD OF RECORD BEGIN	END	TSTYPE	TSSTEP	TCODE	DAREA	STANAM
1	1960/10/1	1982/9/30	FLOW	1	4	4630.0	Klamath River below Iron Gate Dam, CA.
2	1912/10/1	1982/9/30	FLOW	1	4	6940.0	Klamath River near Seiad Valley, CA.
3	1933/10/1	1982/9/30	FLOW	1	4	793.00	Shasta River near Yreka, CA.
4	1941/10/1	1982/9/30	FLOW	1	4	653.00	Scott River near Fort Jones, CA.
5	1956/1/1	1957/12/31	PREC	1	4	0.67	Cane Branch, KY--precipitation
6	1956/1/1	1957/12/31	FLOW	1	4	0.67	Cane Branch, KY--discharge
7	1956/1/1	1957/12/31	EVAP	1	4	0.67	Cane Branch, KY--pan evaporation
8	1956/1/1	1957/12/31	TEMP	1	4	0.67	Cane Branch, KY--minimum air temperature
9	1956/1/1	1957/12/31	TEMP	1	4	0.67	Cane Branch, KY--maximum air temperature
10	1956/2/17	1957/4/8	PREC	15	2	0.67	Cane Branch, KY--storm precipitation
11	1956/2/2	1957/4/8	FLOW	15	2	0.67	Cane Branch, KY--storm discharge
12			PEAK	1	6		FISHKILL CR AT BEACON NY
13			PEAK	1	6		FLOYD RIVER AT JAMES, IOWA
14			PEAK	1	6		BACK CREEK NEAR JONES SPRINGS,W.VA.
15			PEAK	1	6		ORESTIMBA CREEK NEAR NEWMAN CALIF
16	1956/1/1	1980/12/31	PEAK	1	6	1.05	BIG FOUR DITCH TRIB NEAR PAXTON, IL
17	1950/1/1	1982/12/31	PEAK	1	6	35.00	BLUEGRASS CREEK AT POTOMAC, IL
18	1959/1/1	1985/12/31	PEAK	1	6	134.00	SALT FORK NEAR ST. JOSEPH, IL
19	1939/1/1	1982/12/31	PEAK	1	6	340.00	SALT FORK NEAR HOMER, IL
20	1959/1/1	1980/12/31	PEAK	1	6	2.20	SALT FORK TRIB NEAR CATLIN, IL
21	1939/1/1	1958/12/31	PEAK	1	6	958.00	VERMILION RIVER NEAR CATLIN, IL
22	1915/1/1	1985/12/31	PEAK	1	6	1290.0	VERMILION RIVER NEAR DANVILLE, IL
23	1961/1/1	1975/12/31	PEAK	1	6	1.08	BIG CREEK TRIB NEAR DUDLEY, IL
24	1961/1/1	1985/12/31	PEAK	1	6	186.00	EMBARRAS RIVER NEAR CAMARGO, IL
25	1939/1/1	1985/12/31	PEAK	1	6	919.00	EMBARRAS RIVER NEAR DIONA, IL
26	1956/1/1	1980/12/31	PEAK	1	6	0.08	EMBARRAS RIVER TRIB NEAR GREENUP, IL
27	1951/1/1	1985/12/31	PEAK	1	6	7.61	RANGE CREEK NEAR CASEY, IL
28	1908/1/1	1985/12/31	PEAK	1	6	1516.0	EMBARRAS RIVER AT STE. MARIE, IL
29	1941/1/1	1985/12/31	PEAK	1	6	318.00	NORTH FORK EMBARRAS RIVER NEAR OBLONG, IL
30	1967/1/1	1985/12/31	PEAK	1	6	240.00	LITTLE WABASH RIVER NEAR EFFINGHAM, IL
31	1956/1/1	1972/12/31	PEAK	1	6	1.62	SECOND CREEK TRIB AT KEPTOWN, IL
32	1950/1/1	1985/12/31	PEAK	1	6	745.00	LITTLE WABASH RIVER AT LOUISVILLE, IL
33	1915/1/1	1985/12/31	PEAK	1	6	1131.0	LITTLE WABASH RIVER BELOW CLAY CITY, IL
34	1956/1/1	1976/12/31	PEAK	1	6	1.62	MADDEN CREEK NEAR WEST SALEM, IL
35	1956/1/1	1980/12/31	PEAK	1	6	0.08	DUMS CREEK TRIBUTARY NEAR IUKA, IL
36	1961/1/1	1972/12/31	PEAK	1	6	1.13	HORSE CREEK TRIBUTARY NEAR CARTTER, IL
37	1956/1/1	1980/12/31	PEAK	1	6	0.43	WHITE FEATHER CREEK NEAR MARLOW, IL
38	1960/1/1	1984/12/31	PEAK	1	6	97.20	HORSE CREEK NEAR KEENES, IL
39	1940/1/1	1985/12/31	PEAK	1	6	3102.0	LITTLE WABASH RIVER AT CARMI, IL
40	1960/1/1	1976/12/31	PEAK	1	6	0.16	LITTLE WABASH RIVER TRIB NR NEW HAVEN, IL
41	1959/1/1	1980/12/31	PEAK	1	6	0.52	LITTLE SALINE CREEK TRIB NR GOREVILLE, IL
42	1966/1/1	1985/12/31	PEAK	1	6	147.00	SOUTH F SALINE RIVER NR CARRIER MILLS, IL
43	1967/1/1	1982/12/31	PEAK	1	6	8.51	EAGLE CREEK NEAR EQUALITY, IL
44	1960/1/1	1972/12/31	PEAK	1	6	1.10	BLACK BRANCH TRIB NEAR JUNCTION, IL
45	1968/1/1	1985/12/31	PEAK	1	6	42.90	LUSK CREEK NEAR EDDYVILLE, IL
46	1950/1/1	1985/12/31	PEAK	1	6	19.10	HAYES CREEK AT GLENDALE, IL
47			PEAK	1	6		SUGAR CREEK AT CRAWFORDSVILLE, IND.
48	1940/1/1	1986/12/31	L001	1	6		
49	1940/1/1	1986/12/31	L003	1	6		
50	1940/1/1	1986/12/31	L007	1	6		
51	1940/1/1	1986/12/31	L014	1	6		
52	1940/1/1	1986/12/31	L030	1	6		
53	1940/1/1	1986/12/31	L060	1	6		
54	1940/1/1	1986/12/31	L090	1	6		
55	1940/1/1	1986/12/31	L120	1	6		
56	1940/1/1	1986/12/31	L183	1	6		
57	1940/1/1	1986/12/31	L365	1	6		
58	1939/1/1	1986/12/31	H001	1	6		
59	1939/1/1	1986/12/31	H003	1	6		
60	1939/1/1	1986/12/31	H007	1	6		
61	1939/1/1	1986/12/31	H015	1	6		
62	1939/1/1	1986/12/31	H030	1	6		
63	1939/1/1	1986/12/31	H060	1	6		
64	1939/1/1	1986/12/31	H090	1	6		
65	1939/1/1	1986/12/31	H120	1	6		
66	1939/1/1	1986/12/31	H183	1	6		
67	1939/1/1	1986/12/31	H365	1	6		
68	1973/5/1	1974/7/31	PREC	1	4	0.38	Sanderson Gulch Tributary at Lakewood, CO
69	1973/5/1	1974/7/31	EVAP	1	4		Cherry Creek Lake, CO
70	1973/7/12	1974/12/31	PREC	5	2	0.38	Sanderson Gulch Tributary at Lakewood, CO
71	1973/7/12	1974/12/31	FLOW	5	2	0.38	Sanderson Gulch Tributary at Lakewood, CO
72	1976/1/1	1976/12/31	CLDC	1	4		CLOUD COVER
73	1976/1/1	1976/12/31	SOLR	1	3		SOLAR RADIATION
74	1976/1/1	1976/12/31	GW	1	4		SIMULATED GROUNDWATER
75	1976/1/1	1976/12/31	IF	1	4		SIMULATED INTERFLOW
76	1976/1/1	1976/12/31	STQ	1	4		SIMULATED TOTAL RUNOFF
77	1976/1/1	1976/12/31	OTQ	1	4		OBSERVED TOTAL RUNOFF
78	1982/12/14	1982/12/15	FLOW	5	2		AAAAAAAAAAA
79	1982/12/14	1982/12/15	RAIN	5	2		BBBBBBBBBBB
80	1982/12/14	1982/12/15	SIMF	5	2		CCCCCCCCCCC

TABLE time-series data TABLE

DATA-SET MGT
DATA
TIME SERIES
TABLE

Use the table option in the menu below TIME SERIES to summarize time series data sets with time intervals of 1 day or less. You specify the number of months for the table, the period of record desired, and the number of significant digits for the output values. The output is daily values with columns of months and rows of days, 1 year at a time. The monthly minimum, maximum and mean are included. For discharge time-series data sets that include the attributes PARMCD=60 (WATSTORE parameter code for discharge) and DAREA (drainage area), monthly discharge in inches is also included.

[1] Select the data sets to be tabled.

[2] Enter the name of the output file.

[3] Enter the number of last month to use for the table.

[4] Enter the start and end dates. The start date also indicates which month is used for column 1.

[5] Enter specification for the output file, decimal places, significant digits, quality flag above which data are not listed, and transformation type if time series have intervals less than 1 day.

[6] Repeat steps [4] and [5] for each data set selected.

The example tabled data-set numbers 5 and 6 for the water year 1956. The tabled values were output with 2 decimal places and 5 significant digits. Any values with a quality code of 30 or less were printed. If the actual time step of the data was other than daily, the transformation TOTAL was used for data set 5 and RATE for data set 6. RATE uses average and TOTAL uses sum.

```
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ TABLE

  NO data sets are currently in the buffer.
  You are now in the SELECT option.

FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
(Use return for DONE)
☞ ADD
WDM file data-set number?
☞ 5
```

```
     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    ADD
     WDM file data-set number?
☞    6
     FIND, ADD, LIST, SORT, REMOVE or CLEAR data-set numbers?
     (Use return for DONE)
☞    DONE
     Name of file for printout?
☞    TEST07.OUT
     Enter number of months for table.
     (Use return for 12)
☞    12
     For dataset 5,

     Enter beginning and ending dates
     <= STARTING DATE =>   <=  ENDING DATE  =>
     year mo dy hr mi sc   year mo dy hr mi sc
     <-->-><->-><->-><->-><----->-><->-><->-><->
     1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
     2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
     none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
     1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞    1956,10,1,0,0,0,1957,9,30,24
     1956 10  1  0  0  0   1957  9 30 24  0  0 CURRENT
☞

     For the output values
      <-- output format -->         trans-
       decimal  significant quality formation
        places    digits      flag  if needed
      <------->< ---------><------><-------->
             -1           1       0      none MINIMUM
              5           5      30      none MAXIMUM
              0           5      30      RATE DEFAULT
              2           5      30     TOTAL CURRENT
☞    2,5,0,TOTAL
              2           5      30     TOTAL CURRENT
☞

      Tabling year 1957.
     For dataset 6,

     Enter beginning and ending dates
     <= STARTING DATE =>   <=  ENDING DATE  =>
     year mo dy hr mi sc   year mo dy hr mi sc
     <-->-><->-><->-><->-><----->-><->-><->-><->
     1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
     2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
     none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
     1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞    1956,10,1,0,0,0,1957,9,30,24
     1956 10  1  0  0  0   1957  9 30 24  0  0 CURRENT
☞
```

TABLE time-series data TABLE

```
For the output values
 <-- output format -->          trans-
  decimal  significant quality formation
    places    digits      flag  if needed
 <-------><----------><------><--------->
        -1           1       0      none MINIMUM
         5           5      30      none MAXIMUM
         0           5      30      RATE DEFAULT
         2           5      30     TOTAL CURRENT
☞ 2,5,0,RATE
         2           5      30      RATE CURRENT
☞
 Tabling year 1957.
Enter LIST, TABLE, MODIFY, ADD, COPY, DELETE, or GENERATE?
(Use return for DONE)
☞ DONE
```

Listing of output file TEST07.OUT:

Station number 365205084265702
Table of daily values for the year ending September 1957
Precipitation, in inches

Drainage area 0.67

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	-	-	-	-	0.67	-	0.66	-	-	-	-	-
2	0.02	-	-	-	-	-	0.04	-	0.29	-	-	-
3	0.38	-	-	-	0.01	-	-	-	0.13	-	-	-
4	0.30	-	-	0.90	0.01	-	0.75	-	-	-	0.23	-
5	0.02	-	-	0.02	0.62	-	0.31	-	0.90	-	-	-
6	0.03	-	-	0.01	0.11	0.56	0.01	-	-	-	-	-
7	-	-	0.02	0.02	0.16	0.51	-	-	-	-	-	-
8	-	-	0.24	0.25	0.29	0.02	1.50	-	0.39	-	-	-
9	-	-	0.11	0.76	0.01	0.63	-	-	0.58	0.25	-	0.32
10	-	-	-	0.44	0.39	-	-	0.11	0.22	-	-	0.84
11	-	-	0.25	-	-	0.01	-	0.18	0.17	-	-	-
12	-	-	2.08	-	-	0.10	-	-	-	-	0.02	0.15
13	-	-	1.98	-	-	-	-	-	0.31	-	-	2.14
14	-	-	0.85	-	-	-	-	0.80	-	0.08	0.33	1.42
15	-	0.38	-	-	0.17	0.11	-	-	0.15	0.30	0.17	0.06
16	-	0.26	-	-	0.02	-	0.41	-	0.09	-	-	0.37
17	0.01	-	0.03	0.01	-	-	-	-	-	-	-	-
18	0.09	-	0.16	0.11	-	0.04	-	0.55	0.07	0.33	-	-
19	-	-	-	-	1.21	0.02	-	0.80	-	-	-	0.08
20	-	0.01	0.26	0.30	0.20	-	-	0.09	-	-	-	0.07
21	0.13	0.55	1.84	0.13	-	0.20	0.13	-	-	-	-	-
22	0.42	-	0.24	1.61	-	0.16	0.33	1.15	0.02	-	-	0.26
23	-	-	0.41	0.05	-	-	0.07	-	1.10	0.95	-	0.01
24	-	-	0.20	-	-	0.04	0.09	-	0.71	0.04	-	-
25	-	0.02	-	0.03	-	0.20	-	-	-	-	0.18	-
26	0.51	0.03	-	-	0.32	0.13	-	0.12	-	-	-	-
27	-	-	-	0.71	0.05	-	-	-	0.21	-	-	-
28	-	0.04	0.12	1.18	0.49	-	0.17	-	0.49	-	-	0.21
29	-	-	-	4.83		-	-	-	0.03	-	-	0.37
30	-	-	0.02	0.04		-	-	-	-	-	-	-
31	1.16		-	0.36		-		-		-	-	
Total	3.07	1.29	8.81	11.76	4.73	2.73	4.47	3.80	5.86	1.95	0.93	6.30
Mean	0.28	0.18	0.55	0.62	0.30	0.19	0.37	0.47	0.34	0.32	0.19	0.48
Minimum	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.09	0.02	0.04	0.02	0.01
Maximum	1.16	0.55	2.08	4.83	1.21	0.63	1.50	1.15	1.10	0.95	0.33	2.14

TABLE time-series data TABLE

Station number 3407100
Table of daily values for the year ending September 1957
Discharge, in cubic feet per second

Drainage area 0.67

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	0.04	0.15	0.04	0.26	8.30	1.80	0.75	0.24	0.06	0.12	0.03	0.01
2	0.04	0.05	0.04	0.20	4.90	1.60	1.10	0.20	0.12	0.10	0.03	0.01
3	0.09	0.05	0.04	0.18	2.80	1.30	1.10	0.16	0.13	0.08	0.03	0.01
4	0.11	0.04	0.04	0.82	1.90	1.10	3.40	0.15	0.10	0.06	0.08	0.01
5	0.04	0.04	0.04	1.70	2.80	0.94	3.50	0.13	0.44	0.06	0.04	0.01
6	0.04	0.04	0.04	1.20	2.70	1.00	2.70	0.12	0.24	0.05	0.03	0.01
7	0.04	0.05	0.04	0.94	2.50	3.10	1.80	0.10	0.12	0.05	0.03	0.01
8	0.03	0.05	0.06	0.78	2.50	4.00	10.00	0.09	0.29	0.05	0.03	0.01
9	0.03	0.05	0.05	5.50	2.70	2.70	4.50	0.09	0.85	0.08	0.03	0.02
10	0.03	0.05	0.04	6.50	3.70	2.60	2.50	0.09	0.55	0.06	0.03	0.38
11	0.04	0.04	0.05	2.60	2.40	2.50	1.70	0.16	0.33	0.05	0.03	0.03
12	0.04	0.04	1.30	1.70	1.90	2.00	1.20	0.09	0.26	0.05	0.03	0.05
13	0.04	0.04	7.30	1.20	1.50	1.60	0.94	0.06	0.23	0.05	0.03	1.20
14	0.04	0.03	6.60	0.88	1.10	1.30	0.78	0.37	0.18	0.06	0.03	1.90
15	0.04	0.04	1.50	0.78	0.88	1.20	0.64	0.16	0.15	0.13	0.07	0.42
16	0.04	0.19	0.68	0.60	0.83	0.94	0.88	0.09	0.13	0.06	0.03	0.34
17	0.04	0.04	0.42	0.49	0.68	0.83	0.64	0.08	0.13	0.05	0.03	0.22
18	0.06	0.04	0.43	0.42	0.64	0.78	0.52	0.36	0.10	0.16	0.03	0.16
19	0.05	0.03	0.31	0.39	3.00	0.68	0.45	0.82	0.10	0.06	0.03	0.13
20	0.05	0.03	0.38	0.48	3.50	0.60	0.42	0.30	0.09	0.04	0.02	0.15
21	0.05	0.21	4.90	0.94	2.40	0.56	0.55	0.16	0.08	0.04	0.02	0.12
22	0.19	0.06	12.00	11.00	2.00	0.72	0.81	1.80	0.06	0.04	0.01	0.17
23	0.09	0.04	5.10	8.50	1.70	0.56	0.68	0.83	0.66	0.37	0.01	0.10
24	0.08	0.04	2.50	2.90	1.50	0.49	0.68	0.40	0.75	0.08	0.01	0.09
25	0.09	0.04	1.40	1.90	1.20	0.66	0.56	0.24	0.79	0.04	0.02	0.08
26	0.19	0.04	0.94	1.30	1.40	0.56	0.49	0.15	0.28	0.04	0.02	0.08
27	0.06	0.04	0.68	2.20	1.10	0.56	0.42	0.10	0.31	0.04	0.01	0.08
28	0.06	0.04	0.56	12.00	1.70	0.49	0.48	0.10	0.48	0.04	0.01	0.09
29	0.06	0.04	0.49	84.00		0.49	0.36	0.10	0.32	0.04	0.01	0.29
30	0.05	0.04	0.36	6.10		0.49	0.28	0.09	0.18	0.04	0.01	0.12
31	0.44		0.31	3.70		0.45		0.09		0.04	0.01	
Total	2.29	1.68	48.64	162.16	64.23	38.60	44.83	7.92	8.51	2.23	0.83	6.30
Mean	0.07	0.06	1.57	5.23	2.29	1.25	1.49	0.26	0.28	0.07	0.03	0.21
Minimum	0.03	0.03	0.04	0.18	0.64	0.45	0.28	0.06	0.06	0.04	0.01	0.01
Maximum	0.44	0.21	12.00	84.00	8.30	4.00	10.00	1.80	0.85	0.37	0.08	1.90
Inches	0.06	0.05	1.36	4.54	1.80	1.08	1.26	0.22	0.24	0.06	0.02	0.18

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APPENDIX A--IOWDM

INTRODUCTION

The program IOWDM is used to enter data in selected file formats into a WDM file and to output data from a WDM file to selected file formats. IOWDM also can be used to create a new WDM file. Once data have been entered into a WDM file, ANNIE can be used for plotting, listing, and analyzing. Data in a WDM file is available for use by a number of models, including the Distributed-Routing Rainfall-Runoff Model (DR3M) (Alley, 1982), Generalized Least Squares (GLS), Hydrological Simulation Program-Fortran (HSPF) (Johanson, 1984), and Precipitation Runoff Modeling System (PRMS) (Leavesley, 1983). User written programs that call the ANNIE library of routines also can use data in a WDM file. Figure A.1 shows the IOWDM program options. The allowable input and output formats can be found in table A.1. A reference for each of the formats can be found in table A.2. This Appendix ends with a description and sample session for each of the program options.

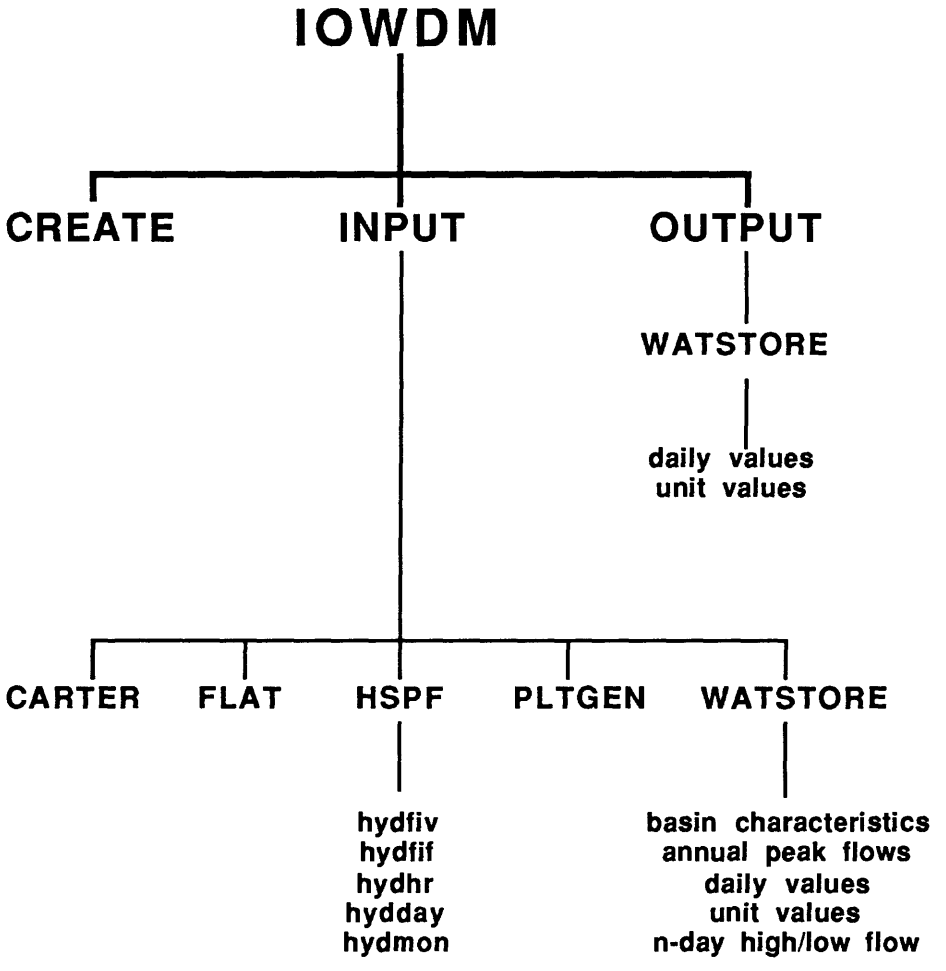

Figure A.1.--Upper-level branches of the IOWDM option tree.

INPUT

Time-series data of 1 year, 1 month, 1 day, and smaller time steps can be input to WDM files as TIMESERIES data sets. WATSTORE basin characteristics can be stored as attributes in TIMESERIES or TABLE data sets. Annual peaks can be stored as TIMESERIES or TABLE data sets. For each input file processed using IOWDM, you will be asked to enter information and attributes required to describe and store the data in WDM file data sets. The values you enter will depend on the type of data and its expected uses and applications. A general discussion of these inputs follows. Additional information can be found in the sample sessions for each input format. You have the option of writing a summary of the processed input files to either the terminal or a file. When the summary is written to a file, an abbreviated summary is also written to the terminal. For the sample sessions, all summary information was written to a file. If an unexpected record is encountered in an input file, a warning message and the record will be written to the terminal. The record will not be processed.

DSN

An input file can contain data from one or more observation stations and one or more sets of data for each observation station. For all input file formats, you will be asked for a starting data-set number (DSN). For each set of data in the input file, a new data set will be added to the WDM file. IOWDM will attempt to assign the initial DSN you supply. If the requested DSN already exists in the WDM file, the first unused DSN will be assigned. For each subsequent set of data in the input file, the next available DSN will be assigned. The actual DSN used and attributes describing the data sets are written in the summary. If different data-set numbers are needed, the RENUMBER option in ANNIE can be used to make the changes.

Table A.1.--Allowable input and output formats for IOWDM

Data type	Input	Output	Time-series data set	Table data set
Carter	X		X	
HSPF	X		X	
PLTGEN	X		X	
Flat	X		X	
WATSTORE				
DAILY	X	X	X	
UNIT	X	X	X	
BASIN	X		X	X
PEAK	X		X	X
N-DAY	X		X	

TSFILL

You are asked to enter a value to be used for missing data. This value is stored as the attribute TSFILL. The value to be used for TSFILL is dependent on the type of data and the expected application of the data. TSFILL is often a large negative number or zero. As IOWDM processes the input file, missing values are replaced with TSFILL. A time step is considered missing if it falls between the first and last time steps of a set of data, but the record or field that should have contained the time step is missing or blank. The TSFILL value will be used for every set of data in a file. If this is not appropriate, you must separate the input file into two or more files. TSFILL cannot be changed once time-series data are entered into a data set. A value of zero is often used for precipitation data since a missing record usually means no recorded precipitation.

TSTYPE

TSTYPE is a four-character alpha-numeric descriptor used to identify the type of data stored in a data set. The CARTER and WATSTORE DAILY, N-DAY, and UNIT input options will supply a standard TSTYPE based on the input data, if it can be determined. The user is asked to supply a TSTYPE for the remainder of the input options.

TGROUP and TSBYR

The length of record that can be stored in a data set will be determined by the data set group pointers (TGROUP) and the base year (TSBYR). TGROUP is the time units of the groups for pointer to the data; hours, days, months, years, or centuries. TSBYR is the year of the first group. By default, there is space for 100 group pointers in each time series data set. With a year group pointer and a base year of 1900, a WDM data set could contain a time series at a time step of 1 month or smaller between 1900 and 1999. With a month group pointer and a base year of 1980, a WDM data set could contain a time series at a time step of 1 day or smaller between January 1980 and April 1988. Together, these two attributes determine the period of record that can be stored in a data set and how fast a subset of the record

Table A.2.--References for input and output formats for IOWDM

Data type	Reference
CARTER	Users Guide for U.S. Geological Survey Rainfall-Runoff Models--Revision of Open-File Report 74-33, by P.H. Carrigan, Jr., G.R. Dempster, Jr., and D.E. Bower, U.S. Geological Survey Open-File Report 77-884, 1977.
HSPF, PLTGEN	Hydrological Simulation Program-Fortran (HSPF): Users Manual for Release 8.0, by R.C. Johanson, J.C. Imhoff, J.L. Kittle, Jr., A.S. Donigian, Jr., June 1984.
WATSTORE	WATSTORE Users Guide, Volumes 1, 4, and 5.
FLAT	none

can be retrieved. After time-series data have been added to a data set, TGROUP and TSBYR cannot be changed. Refer to the section on time-series attributes in the Overview for additional discussion.

COMPFG and VBTIME

The compression flag (COMPFG) and the variable-time-step option (VBTIME) affect how the time series is physically stored in the data set. Compressed data with a constant time step is the most efficient storage method. Data stored with a constant time step can be retrieved several times faster than data stored with a variable time step. Data stored in a compressed form will usually take up less disk space than data stored in an uncompressed form. For time series that have lots of like values (such as rainfall) or periods of missing record, the space savings can be as much as 80 percent or more. The principle reason for storing time series in an uncompressed form is so that it is easier to make corrections to the data. Data that is stored compressed may require an ANNIE COPY/UPDATE operation to be modified; data that is stored uncompressed may be modified using the ANNIE MODIFY option.

TSFORM

The form of the time series (TSFORM) describes whether the data are a mean or total over the time interval or an instantaneous measurement at the end of the time interval (actual time of measurement).

STAID and ISTAID

One of two attributes is used for a data set's station identification. A station identification can be up to 16 alphanumeric characters. Any station identification that is a valid integer number will be stored as the attribute ISTAID. Any station identification that contains non-numeric characters, is not a valid integer number, or is an integer greater than 9 digits will be stored as the attribute STAID. There is one major difference between these two attributes. Using the ANNIE SELECT options, a range of stations can be selected using ISTAID. With STAID, a data set can be found only by supplying the exact value of STAID.

OUTPUT

Time-series data with time steps of 1 day and smaller can be output from a WDM file in WATSTORE daily and unit values 80-character record formats. For each data set in the WDM file to be written, you will be asked to enter information describing the desired output.

RATE or TOTAL

A time series can be written at a time step other than the data's actual time step. A time series is considered to be a RATE if the data values should be averaged to obtain a larger time step or the same value should be used to obtain a smaller time step. A time series is a TOTAL if the data values should be summed to obtain a larger time step or divided to obtain a smaller time step. Discharge is usually considered to be a RATE and precipitation is usually considered to be a TOTAL.

QUALITY CODE

Each value in a time-series data set has a quality code associated with it. The quality code is an integer value from 0 to 30 that describes the quality of the data. It may be application specific or user defined. All data values in a data set do not necessarily have the same quality code. With the exception of WATSTORE PEAK input, all data input to a WDM file using IOWDM, has a quality code of 0. Time series that have been modified, added, or copied using ANNIE may have a user-specified quality code from 0 to 30. When time-series data are retrieved from a WDM file data set, only data values with a quality code less than or equal to the requested quality code will be retrieved. Data values with a quality code greater than requested will be replaced with the data sets missing value filler, TSFILL.

DECIMAL PLACES and SIGNIFICANT DIGITS

You will be asked to specify the number of decimal places and significant digits for the data values to be written. You can specify from 0 to 5 decimal places or, by choosing -1, allow the program to determine the output format for each data value. Data values that cannot be output as requested will be output using exponential notation.

INPUT WATSTORE BASIN

You use the BASIN option to process data files in the standard WATSTORE basin characteristics 80-character record format. The input file may contain data for one or more stations. The basin characteristics are stored as attributes in the data sets. The data can be put into WDM time series or table data sets, depending on the expected uses and applications. Annual peak flows can be added to the data sets in a subsequent step using the PEAK option. N-day high and low flows can be added to the data sets using the N-DAY option. See table A.3 for the relationship between the WATSTORE basin and stream-flow characteristics and the WDM attributes.

For each station found in the input file, the data-set number assigned, station number (ISTAID or STAID), and the station name (STANAM) are written in tabular form to the terminal and, if you request, to the output summary file. A summary of the storage specific attributes and the basin characteristics added to the data set as attributes will be written to the summary file or the terminal if no summary file was requested. An "####" in the summary table indicates that the value for an expected basin characteristic was missing from the input file.

[1] Specify the WATSTORE input format, starting DSN and the value to use for missing record (TSFILL).

[2] Enter the name of the input file.

[3] Enter the data-set descriptor (TSTYPE) and the type of data set to be added. If you will be adding annual peaks to the data sets, TSTYPE here will have to agree with the TSTYPE you use in the PEAK option. If you will be adding n-day high and/or low flows, TSTYPE must be "NDAY." For all other cases, TSTYPE is user defined. The data-set type will depend on your intended uses of the data sets.

[4] Enter the time step (TSSTEP) and units (TCODE) for the data sets.

[5] For TIME series type data sets, enter the storage specific attributes TGROUP, TSFORM, VBTIME, and COMPFG.

In the example, BASIN characteristics are added to the WDM file starting at data-set number 12. The missing value filler is -999999. The input file is BULT17B.BCD. A TSTYPE of PEAK was used for TABLE type data sets. The data sets contain annual data. The summary written to the terminal indicates four data sets, 12 thru 15, were added to the WDM file. The summary information written to the file includes the names and values of the attributes added to each of the data sets.

```
For the WATSTORE input file:
                          missing
 WATSTORE starting         value
  format    dsn           filler
 <------><-------><---------->
     none        1          none MINIMUM
     none    32000          none MAXIMUM
     DONE        1            0. DEFAULT
     DONE       12       -10.E+5 CURRENT
☞   BASIN              -999999
    BASIN       12       -10.E+5 CURRENT
☞
Name of input file?
☞ BULT17B.BCD

Enter general information about datasets:
 TS- data-set
 TYPE  type
 <--><------>
         none MINIMUM
         none MAXIMUM
         TIME DEFAULT
        TABLE CURRENT
☞ PEAK  TABLE
  PEAK   TABLE CURRENT
☞

Enter time step and time units
TIME  TIME
STEP  UNITS
<--><----->
   1   none MINIMUM
3600   none MAXIMUM
   1    DAY DEFAULT
   1   YEAR CURRENT
☞  1   YEAR
   1   YEAR CURRENT
☞

  DSN STATION NUMBER   STATION NAME / ATTRIBUTES
----- ---------------- ----------------------------------------
   12   01373500       FISHKILL CR AT BEACON NY
   13   06600500       FLOYD RIVER AT JAMES, IOWA
   14   01614000       BACK CREEK NEAR JONES SPRINGS,W.VA.
   15   11274500       ORESTIMBA CREEK NEAR NEWMAN CALIF
```

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    12   01373500       FISHKILL CR AT BEACON NY
                        STFIPS =  36      DSCODE =  36
                        TSTYPE = PEAK     TSSTEP = 1        TCODE  =  6
                        TSFILL =-.1000E+07
                        CONTDA = 190.0    SLOPE  = 10.70    LATDEG = 41.51
                        LNGDEG = 73.95    PRECIP = 42.80    WRCSKW =0.7480
                        WRCMN  = 3.376    WRCSD  =0.2520

    13   06600500       FLOYD RIVER AT JAMES, IOWA
                        STFIPS =  19      DSCODE =  19
                        TSTYPE = PEAK     TSSTEP = 1        TCODE  =  6
                        TSFILL =-.1000E+07
                        CONTDA = 882.0    SLOPE  = 4.380    LATDEG = 42.58
                        LNGDEG = 96.31    PRECIP = 26.60    WRCSKW =0.4800E-01
                        WRCMN  = 3.538    WRCSD  =0.4300

    14   01614000       BACK CREEK NEAR JONES SPRINGS,W.VA.
                        STFIPS =  54      DSCODE =  54
                        TSTYPE = PEAK     TSSTEP = 1        TCODE  =  6
                        TSFILL =-.1000E+07
                        CONTDA = 243.0    SLOPE  = 9.200    LATDEG = 39.51
                        LNGDEG = 78.04    PRECIP = 39.00    WRCSKW =0.6150
                        WRCMN  = 3.747    WRCSD  =0.2380

    15   11274500       ORESTIMBA CREEK NEAR NEWMAN CALIF
                        STFIPS =   6      DSCODE =   6
                        TSTYPE = PEAK     TSSTEP = 1        TCODE  =  6
                        TSFILL =-.1000E+07
                        CONTDA = 134.0    SLOPE  = 43.00    LATDEG = 37.32
                        LNGDEG = 121.1    PRECIP = 16.00    WRCSKW =-.5000
                        WRCMN  = 2.975    WRCSD  =0.6380
```

```
Listing of INPUT file BULT17B.BCD:
1 01373500      3636FISHKILL CR AT BEACON NY
2 01373500        2190.000  3 10.700 22 41.510 23 73.950 32 42.800179 0.7480   1
2 01373500      180 3.3760181 0.2520                                             2
1 06600500      1919FLOYD RIVER AT JAMES, IOWA
2 06600500        2882.000  3 4.3800 22 42.580 23 96.310 32 26.600179 0.0480   1
2 06600500      180 3.5380181 0.4300                                             2
1 01614000      5454BACK CREEK NEAR JONES SPRINGS,W.VA.
2 01614000        2243.000  3 9.2000 22 39.510 23 78.040 32 39.000179 0.6150   1
2 01614000      180 3.7470181 0.2380                                             2
1 11274500       6 6ORESTIMBA CREEK NEAR NEWMAN CALIF
2 11274500        2134.000  3 43.000 22 37.320 23121.130 32 16.000179-0.5000   1
2 11274500      180 2.9750181 0.6380                                             2
```

Table A.3.--The relationship between WATSTORE basin and streamflow characteristics and WDM attributes.

Basin and streamflow characteristics		WDM attributes
Variable number	File code	Name of attribute
1	AREA	DAREA
2	CONTDA	CONTDA
3	SLOPE	SLOPE
4	BSLOPE	BSLOPE
5	LENGTH	LENGTH
6	BLENGTH	BLNGTH
7	VALLGH	VALLGH
8	ELEV	ELEV
9	ELV10,85	EL1085
10	EL5000	EL5000
11	EL6000	EL6000
12	STORAGE	STORAG
13	LAKEAREA	LAKE
14	FOREST	FOREST
15	GLACIER	GLACER
16	SOIL INF	SOILIN
17	LOESS	LOESS
18	AZIMUTH	AZMUTH
19	LAT	LATCTR
20	LONG	LNGCTR
21	TIMETOPK	TMTOPK
22	LAT GAGE	LATDEG
23	LNG GAGE	LNGDEG
24	undefined	UBC024
25	undefined	UBC025
26	undefined	UBC026
27	undefined	UBC027
28	undefined	UBC028
29	undefined	UBC029
30	undefined	UBC030
31	undefined	UBC031
32	PRECIP	PRECIP
33	I24,2	I24-2.
34	I24,10	I24010
35	I24,25	I24025
36	I24,50	I24050
37	I24,100	I24100
38	undefined	UBC038
39	undefined	UBC039
40	undefined	UBC040
41	PRC10	PRC0CT
42	PRC11	PRCNOV
43	PRC12	PRCDEC

Table A.3.--The relationship between WATSTORE basin and streamflow characteristics and WDM attributes (continued).

Basin and streamflow characteristics		WDM attributes
Variable number	File code	Name of attribute
44	PRC1	PRCJAN
45	PRC2	PRCFEB
46	PRC3	PRCMAR
47	PRC4	PRCAPR
48	PRC5	PRCMAY
49	PRC6	PRCJUN
50	PRC7	PRCJUL
51	PRC8	PRCAUG
52	PRC9	PRCSEP
53	SNOFALL	SNOVAL
54	SNOMAR	SNOMAR
55	SNOAPR	SNOAPR
56	SN2	SN002
57	SN10	SN010
58	SN25	SN025
59	SN100	SN100
60	JANMIN	JANMIN
61	JANAV	JANAVE
62	MARMAX	MARMAX
63	JULYMAX	JULMAX
64	JULYAV	JULAVE
65	WE MAR2	WEMAR2
66	undefined	UBC066
67	undefined	UBC067
68	undefined	UBC068
69	undefined	UBC069
70	EVAP	LKEVAP
71	EVAPAN	PNEVAP
72	FROST	FROST
73	undefined	UBC073
74	undefined	UBC074
75	P1,25	P1.25
76	P2	P2.
77	P5	P5.
78	P10	P10.
79	P25	P25.
80	P50	P50.
81	P100	P100.
82	P200	P200.
83	MEANPK	MEANPK
84	SDPK	SDPK
85	SKEWPK	SKWPK
86	QA	QANN
87	SDQA	QSDANN

Table A.3.--The relationship between WATSTORE basin and streamflow characteristics and WDM attributes (continued).

Basin and streamflow characteristics		WDM attributes
Variable number	File code	Name of attribute
88	Q10	QOCT
89	Q11	QNOV
90	Q12	QDEC
91	Q1	QJAN
92	Q2	QFEB
93	Q3	QMAR
94	Q4	QAPR
95	Q5	QMAY
96	Q6	QJUN
97	Q7	QJUL
98	Q8	QAUG
99	Q9	QSEP
100	SDQ10	QSDOCT
101	SDQ11	QSDNOV
102	SDQ12	QSDDEC
103	SDQ1	QSCJAN
104	SDQ2	QSDFEB
105	SDQ3	QSDMAR
106	SDQ4	QSDAPR
107	SDQ5	QSDMAY
108	SDQ6	QSDJUN
109	SDQ7	QSDJUL
110	SDQ8	QSDAUG
111	SDQ9	QSDSEP
112	M1,2	L1D02
113	M1,10	L1D10
114	M1,20	L1D20
115	M3,2	L3D02
116	M3,10	L3D10
117	M3,20	L3D20
118	M7,2	L7D02
119	M7,5	L7D05
120	M7,10	L7D10
121	M7,20	L7D20
122	M14,2	L14D02
123	M14,10	L14D10
124	M14,20	L14D20
125	M30,2	L30D02
126	M30,10	L30D10
127	M30,20	L30D20
128	M90,2	L90D02
129	M90,10	L90D10
130	M90,20	L90D20
131	V1,100	H01100

Table A.3.--The relationship between WATSTORE basin and streamflow characteristics and WDM attributes (continued).

Basin and streamflow characteristics		WDM attributes
Variable number	File code	Name of attribute
132	V15,5	H15005
133	V30,5	H30005
134	V30,20	H30020
135	V30,100	H30100
136	V1,2	H01002
137	V1,5	H01005
138	V1,10	H01010
139	V1,20	H01020
140	V1,25	H01025
141	V1,50	H01050
142	V3,2	H03002
143	V3,5	H03005
144	V3,10	H03010
145	V3,20	H03020
146	V3,25	H03025
147	V3,50	H03050
148	V3,100	H03100
149	V7,2	H07002
150	V7,5	H07005
151	V7,10	H07010
152	V7,20	H07020
153	V7,25	H07025
154	V7,50	H07050
155	V7,100	H07100
156	V15,2	H15002
157	V15,10	H15010
158	V15,20	H15020
159	V15,25	H15025
160	V15,50	H15050
161	V15,100	H15100
162	V30,2	H30002
163	V30,10	H30010
164	V30,25	H30025
165	V30,50	H30050
166	undefined	UBC166
167	undefined	UBC167
168	DEPH25	DEPH25
169	undefined	UBC169
170	undefined	UBC170
171	D95	QEX95P
172	D90	QEX90P
173	D75	QEX75P
174	D70	QEX70P
175	D50	QEX50P

Table A.3.--The relationship between WATSTORE basin and streamflow characteristics and WDM attributes (continued).

Basin and streamflow characteristics		WDM attributes
Variable number	File code	Name of attribute
176	D25	QEX25P
177	D10	QEX10P
178	P500	P500.
179	WRC SKEW	WRCSKW
180	WRC MEAN	WRCMN
181	WRC SD	WRCSD
182	undefined	UBC182
183	undefined	UBC183
184	undefined	UBC184
185	undefined	UBC185
186	undefined	UBC186
187	undefined	UBC187
188	undefined	UBC188
189	undefined	UBC189
190	undefined	UBC190
191	undefined	UBC191
192	undefined	UBC192
193	undefined	UBC193
194	undefined	UBC194
195	undefined	UBC195
196	YRSPK	YRSPK
197	YRSHISPK	YRSHPK
198	YRSDAY	YRSDAY
199	YRSLOW	YRSLOW
200	undefined	UBC200

NOTE: See Appendix B for attribute definitions.

INPUT CARTER

Use the CARTER option to process files in the standard Carter 80-character format. The input file may contain one or more stations and one or more data types. Daily time steps and storm event periods with time steps of less than 1 day cannot be input in the same file. However, a file of storm events may contain records with different time steps. For storm event periods, the attributes TSSTEP and TCODE are for the primary time step. The base year (TSBYR) will be set to the starting year of the data. The four-character data set descriptor (TSTYPE) will be determined from the input file with FLOW, PREC, EVAP, and CRTR for discharge, precipitation, evaporation, and unknown, respectively.

For each set of data found in the input file, the data-set number assigned, station number (ISTAID or STAID), and period of record will be written in tabular form to the terminal, and, if you request, to the output summary file. A summary of the attributes added to the data set will be written to the summary file or the terminal if no summary file is requested. Long periods of missing record will be noted in the summary; shorter periods will not be noted.

[1] Enter the name of the input file.

[2] Specify the starting DSN. The time step and units (TSSTEP, TCODE) to be used, and the value to be used for missing record.

In the example, the input file SAND.CTU is processed. The default starting data-set number of 70 is used. A 5-minute time step and a missing value filler of 0.0 are selected. The summary written to the terminal indicates that two data sets, 70 and 71, were added to the WDM file. The period of record is July 12, 1973, to July 30, 1974. Both data sets have missing data from August 7, 1973, to July 22, 1974. The attributes relating to data storage are included in the summary file. The attribute TSTYPE was determined from the input, the first data set is PREC and the second is FLOW.

```
     Input file format (WATSTORE, HSPF, CARTER, PLTGEN, FLAT)
     (Use return for DONE)
☞    CARTER
     Name of input file?
☞    SAND.CTU

     For the new data-set(s):
      starting             missing
      data-set time  time   value
       number  step units  filler
      <------><---><-----><--------->
             1    1   none       none MINIMUM
        200000 1400   none       none MAXIMUM
             1    1    DAY         0. DEFAULT
            70    1    DAY    -10.E+5 CURRENT
☞                 5    MIN    0.0
            70    5 MINUTE         0. CURRENT
☞

       DSN STATION NUMBER   STATION NAME / ATTRIBUTES
      ----- ---------------- ----------------------------------------
         70         06714310
                             1973/7/12 18:0
                  *** missing 1973/8/7 18:0:0 to 1974/7/22 0:0:0.
                             1974/7/30 6:20
         71         06714310
                             1973/7/12 18:0
                  *** missing 1973/8/7 19:0:0 to 1974/7/22 0:0:0.
                             1974/7/30 8:0
```

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    70         06714310
                        TSTYPE = PREC     TSFILL =      0.00TSSTEP = 5
                        TCODE  = 2        TGROUP = 6        TSFORM = 1
                        VBTIME = 2        COMPFG = 1        TSBYR  = 1973
                        1973/7/12 18:0
             *** missing 1973/8/7 18:0:0 to 1974/7/22 0:0:0.
                        1974/7/30 6:20
    71         06714310
                        TSTYPE = FLOW     TSFILL =      0.00TSSTEP = 5
                        TCODE  = 2        TGROUP = 6        TSFORM = 1
                        VBTIME = 2        COMPFG = 1        TSBYR  = 1973
                        1973/7/12 18:0
             *** missing 1973/8/7 19:0:0 to 1974/7/22 0:0:0.
                        1974/7/30 8:0
```

Listing of file SAND.CTU:

```
067143107307120519                                                      7    5    1 1
067143107307120520    4    9    4    2    1                                       1
067143107307190521    0    0    0    0    0    0   28   23    4    2    1    2 1
067143107307190522    1    1    1    0    0    0    0    0    0    0    0    0 1
067143107307220514                                                           11 1
067143107307220515    9    2    1                                            1
067143107307240519    7   25   28    7    1    7    3    1    0    0    0    1 1
067143107307240520    1    2    1    0    0    0    1    2    2    1    2    1 1
067143107307240521    2    0    0    0    0    0    0    0    0    0    0    0 1
067143107307300519                   4    1                                  1
067143107307300520   16    9    4                                            1
067143107308070517    0    0   10   47   33   36   26   25    3    2    8    3 1
067143107308070518    1    0    0    0    0    0    0    0    0    0    0    0 1
067143107407220501                        2    2    1    1    1    5   23   19 1
067143107407220502   20   12    5    5    3    3    1    1    1    1         1
067143107407300506                                  4   26   33   33   22 1
067143107407300507   10    6    3    1                                       1
0671431073 712 519 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.20 9.50 2
0671431073 712 520 9.8018.0026.0032.0025.00 9.80 6.50 5.50 4.50 3.90 3.20 3.00 2
0671431073 712 521 2.50 2.00 1.50 1.00 0.80 0.40 0.10 0.00 0.00 0.00 0.00 0.00 2
0671431073 719 521 0.00 0.00 0.00 0.00 0.00 0.00 5.0052.0068.0056.0033.0024.00 2
0671431073 719 52217.0014.0014.0013.0011.00 9.00 7.00 6.00 5.00 4.50 4.00 3.00 2
0671431073 719 523 2.00 1.50 1.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431073 722 514 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431073 722 51517.0022.0013.00 9.40 7.5012.00 9.40 5.50 4.50 4.00 3.00 2.30 2
0671431073 722 516 1.80 1.20 0.80 0.20 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431073 724 519 0.0026.0092.00  10484.0054.0048.0033.0026.0020.0016.0014.00 2
0671431073 724 52011.0011.0011.0012.0010.00 8.00 6.20 6.10 8.00 9.6012.0013.00 2
0671431073 724 52114.0013.0011.00 9.00 7.60 6.00 5.00 4.50 4.00 3.00 2.00 1.80 2
0671431073 724 522 1.50 1.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431073 730 519 0.00 0.00 0.00 2.00 3.70 5.20 7.30 4.10 3.50 2.50 1.80 1.60 2
0671431073 730 520 3.5032.0029.0018.0012.00 6.80 3.50 2.80 2.00 1.60 1.00 0.50 2
0671431073 730 521 0.20 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431073 8 7 517 0.00 0.00 0.0033.00  155  236  230  215  206  16898.0058.00 2
0671431073 8 7 51842.0027.0020.0015.0013.0011.00 9.00 7.00 6.00 4.00 3.00 2.00 2
0671431073 8 7 519 1.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431074 722 5 1 0.00 0.00 0.00 0.00 0.00 9.2010.0011.00 8.90 7.5018.0049.00 2
0671431074 722 5 242.0098.0053.0027.0019.0016.0015.00 9.20 7.80 6.50 5.80 5.10 2
0671431074 722 5 3 4.10 2.90 2.00 1.20 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
0671431074 730 5 6 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0036.00  233  251 2
0671431074 730 5 7  183  152  11375.0044.0023.0015.0012.00 7.50 6.50 5.30 4.70 2
0671431074 730 5 8 3.00 2.00 1.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2
```

CREATE

Use the CREATE processing option to create a new WDM file. The file will be initialized and available for further processing. This CREATE is identical to the CREATE option in ANNIE. Any file name that is valid on the computer being used is acceptable to the program. To make the files easy to identify, it is recommended that all WDM files have the suffix WDM. It is important to remember that WDM files cannot be used with an editor. In most cases, the editor will not be able to make sense of the file and no harm will be done. Some editors have been known to corrupt WDM files, making them unreadable to ANNIE and IOWDM.

[1] Enter the name for your WDM file.

In the example, a WDM file named DAVID.WDM is created.

```
    Processing option (INPUT, OUTPUT, CREATE, or LOGGER)
    (Use return for DONE)
☞   C
    Name for your WDM file?
☞   DAVID.WDM
```

INPUT WATSTORE DAILY

Use the DAILY option to process data files in the standard WATSTORE daily values format. The input file may contain daily values, with or without station header records, for one or more stations with one or more parameter and statistics codes. The data for each time series must be contiguous in the input file. The time step (TSSTEP, TCODE) and base year (TSBYR) are determined from the input time series. The attributes entered will be used for all time series found in the input file. Since you cannot change these attributes once time-series data have been added to a data set, each input file should contain time series with like attributes. TSTYPE is determined from the parameter code.

For each station found in the input file, the data-set number assigned, station number (ISTAID or STAID), and station name are written in tabular form to the terminal and, if you request, the summary file. A summary of the storage specific and additional descriptive attributes is written to the summary file, or to the terminal if no file is requested. The period of record processed and any long periods of missing record are written to the terminal and, if requested, the summary file.

[1] Specify the WATSTORE input format, the desired starting data-set number, and the value to use for missing record (TSFILL).

[2] Enter the name of the input file.

[3] Enter the time-series specific attributes (TGROUP, TSFORM, VBTIME, COMPFG).

In the example, five time series starting with data-set number 5 are added to the WDM file. A missing value filler of 0.0 is used. The defaults for group pointers, form of data, time-step option, and compression flag are used. The summary written to the terminal and the summary file indicate that data-sets 5 thru 9 were added to the WDM file. The station numbers, station names, and periods of record are included. Additional attributes that were added to the data set are tabled in the summary file.

```
For the WATSTORE input file:
                        missing
 WATSTORE starting       value
  format    dsn          filler
 <------><-------><---------->
     none        1          none MINIMUM
     none    32000          none MAXIMUM
     DONE        1            0. DEFAULT
     DONE        5       -10.E+5 CURRENT
☞   DAILY                   0.0
☞    DAILY          5          0. CURRENT
☞ Name of input file?
CANE.GSD

Enter time-series specific attributes:
  group    form of time-step compression
 pointers  data     option       flag
  TGROUP  TSFORM   VBTIME      COMPFG
 <------><------><--------><---------->
     none    none       none         none MINIMUM
     none    none       none         none MAXIMUM
     YEAR    MEAN   VARIABLE          YES DEFAULT
     YEAR    MEAN   CONSTANT          YES CURRENT
☞ YEAR,MEAN,CONST,YES
     YEAR    MEAN   CONSTANT          YES CURRENT
☞

  DSN STATION NUMBER    STATION NAME / ATTRIBUTES
----- ---------------- ----------------------------------------
    5  365205084265702 Cane Branch, KY--precipitation
                       1956/1/1
                       1957/12/31
    6  03407100        Cane Branch, KY--discharge
                       1956/1/1
                       1957/12/31
    7  365200085090000 Cane Branch, KY--pan evaporation
                       1956/1/1
                       1957/12/31
    8  370700084370000 Cane Branch, KY--minimum air temperature
                       1956/1/1
                       1957/12/31
    9  370700084370000 Cane Branch, KY--maximum air temperature
                       1956/1/1
                       1957/12/31
```

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
     5  365205084265702 Cane Branch, KY--precipitation
                        TSTYPE = PREC     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 1        TCODE  = 4        TGROUP = 6
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 45       STATCD = 6
                        DAREA  =      0.67
                        1956/1/1
                        1957/12/31
     6  03407100        Cane Branch, KY--discharge
                        TSTYPE = FLOW     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 1        TCODE  = 4        TGROUP = 6
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 60       STATCD = 3
                        DAREA  =      0.67
                        1956/1/1
                        1957/12/31
     7  365200085090000 Cane Branch, KY--pan evaporation
                        TSTYPE = EVAP     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 1        TCODE  = 4        TGROUP = 6
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 50       STATCD = 6
                        DAREA  =      0.67
                        1956/1/1
                        1957/12/31
     8  370700084370000 Cane Branch, KY--minimum air temperature
                        TSTYPE = TEMP     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 1        TCODE  = 4        TGROUP = 6
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 20       STATCD = 2
                        DAREA  =      0.67
                        1956/1/1
                        1957/12/31
     9  370700084370000 Cane Branch, KY--maximum air temperature
                        TSTYPE = TEMP     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 1        TCODE  = 4        TGROUP = 6
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 20       STATCD = 1
                        DAREA  =      0.67
                        1956/1/1
                        1957/12/31
```

```
Partial listing of the input file CANE.GSD:
Z                              USGS
H365205084265702                                  .67
N365205084265702Cane Branch, KY--precipitation
2365205084265702            0004500006                ENT
33652050842657021956 1 1   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 1 2   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 1 3   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 1 4   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 2 1   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 2 2   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.27
33652050842657021956 2 3   2.71   0.57   0.58   0.00   0.00   0.00   0.00   0.73
33652050842657021956 2 4   0.52   0.00   0.35   0.00   0.00
33652050842657021956 3 1   0.20   0.25   0.47   0.00   0.00   0.00   1.14   0.08
33652050842657021956 3 2   0.00   0.00   0.05   0.63   0.84   0.94   0.05   0.65
33652050842657021956 3 3   0.00   0.13   0.00   0.00   0.00   0.00   0.00   0.50
33652050842657021956 3 4   0.00   0.00   0.00   0.20   0.03   0.00   0.00
33652050842657021956 4 1   0.00   0.60   0.40   0.28   0.00   1.84   0.03   0.00
33652050842657021956 4 2   0.00   0.04   0.00   0.00   0.00   0.17   1.25   0.12
33652050842657021956 4 3   0.00   0.00   0.00   0.00   0.00   0.34   0.13   0.09
33652050842657021956 4 4   0.00   0.00   0.00   0.00   0.07   0.20
33652050842657021956 5 1   0.10   0.28   0.13   0.00   0.00   0.00   0.00   0.00
33652050842657021956 5 2   0.00   0.00   0.00   0.00   0.00   0.00   0.24   0.00
33652050842657021956 5 3   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 5 4   0.00   0.45   0.08   0.08   0.02   0.00   0.36
33652050842657021956 6 1   0.60   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 6 2   0.23   0.00   0.00   0.00   0.39   0.16   0.00   0.00
33652050842657021956 6 3   0.00   0.00   0.06   0.02   0.08   0.00   0.11   0.00
33652050842657021956 6 4   0.78   0.00   0.00   0.00   0.00   0.30
33652050842657021956 7 1   0.25   0.61   0.00   0.06   0.36   0.00   0.05   0.33
33652050842657021956 7 2   0.00   0.00   0.00   0.43   1.46   0.07   0.04   0.98
33652050842657021956 7 3   0.00   0.00   0.00   0.00   0.00   0.00   1.39   0.56
33652050842657021956 7 4   0.00   0.00   0.00   0.59   0.62   0.00   0.00
33652050842657021956 8 1   0.01   0.55   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 8 2   0.00   0.00   0.11   0.00   0.00   0.98   0.00   0.00
33652050842657021956 8 3   0.00   0.00   1.43   0.29   0.01   0.00   0.00   0.00
33652050842657021956 8 4   0.00   0.00   0.00   0.42   0.00   0.02   0.00
33652050842657021956 9 1   0.04   0.01   0.00   0.00   0.20   0.14   0.01   0.00
33652050842657021956 9 2   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021956 9 3   0.00   0.00   0.00   0.00   0.00   0.00   0.06   0.00
33652050842657021956 9 4   0.00   0.00   0.00   0.00   0.00   0.00
336520508426570219561 0    0.00   0.02   0.38   0.30   0.02   0.03   0.00   0.00
336520508426570219561 0 2  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
336520508426570219561 0 3  0.01   0.09   0.00   0.00   0.13   0.42   0.00   0.00
336520508426570219561 0 4  0.00   0.51   0.00   0.00   0.00   0.00   1.16
336520508426570219561 1 1  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
336520508426570219561 1 2  0.00   0.00   0.00   0.00   0.00   0.00   0.38   0.26
336520508426570219561 1 3  0.00   0.00   0.00   0.01   0.55   0.00   0.00   0.00
336520508426570219561 1 4  0.02   0.03   0.00   0.04   0.00   0.00
336520508426570219561 2 1  0.00   0.00   0.00   0.00   0.00   0.00   0.02   0.24
336520508426570219561 2 2  0.11   0.00   0.25   2.08   1.98   0.85   0.00   0.00
336520508426570219561 2 3  0.03   0.16   0.00   0.26   1.84   0.24   0.41   0.20
336520508426570219561 2 4  0.00   0.00   0.00   0.12   0.00   0.02   0.00
33652050842657021957 1 1   0.00   0.00   0.00   0.90   0.02   0.01   0.02   0.25
33652050842657021957 1 2   0.76   0.44   0.00   0.00   0.00   0.00   0.00   0.00
33652050842657021957 1 3   0.01   0.11   0.00   0.30   0.13   1.61   0.05   0.00
33652050842657021957 1 4   0.03   0.00   0.71   1.18   4.83   0.04   0.36
```

OUTPUT DAILY

Use the DAILY output option to write WDM time-series data sets to a file with the WATSTORE daily values 80-character record format. One or more data sets can be written to a single file. For missing time steps or time steps with a quality code greater than requested, the output field will be left blank. Only those records containing non-blank output fields will be written to the output file.

[1] Enter the WATSTORE output format and the data-set number of the time series to be written.

[2] Enter the name for the output file.

[3] Use the CURRENT time span from the data set or subset the time span by entering a later starting date, an earlier ending date, or both.

[4] Enter the type of time conversion, RATE or TOTAL, and the maximum acceptable quality code. Enter the number of decimal places and significant digits to be used on the output.

In the example, time-series data from data-set number 5 was written to file TEST01.GSD. Data for the entire period of record was selected. Since data set 5 contains precipitation, TOTAL was used. The quality code of 30 indicates that all of the data were requested. The data will be written to the output file with two decimal places and four significant digits.

```
Enter output format and source DSN;
 WATSTORE source
  format    DSN
 <------><----->
     none      0 MINIMUM
     none  32000 MAXIMUM
     DONE      0 DEFAULT
     DONE      0 CURRENT
☞   DAILY     5
      DAILY      5 CURRENT
☞
Name of output file?
☞ TEST01.GSD
```

```
      Enter beginning and ending dates
      <= STARTING DATE =>   <=  ENDING DATE  =>
      year mo dy hr mi sc   year mo dy hr mi sc
      <--><-><-><-><-><-><-----><-><-><-><-><->
      1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
      2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
      none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
      1956  1  1  0  0  0   1957 12 31 24  0  0 CURRENT
☞
      Enter information about output of requested data:
       RATE  maximum
        or   quality decimal significant
       TOTAL   code   places    digits
       <---->< ----><------><---------->
         none      0      -1           1 MINIMUM
         none     30       5           5 MAXIMUM
         RATE      0       0           5 DEFAULT
         RATE     30       2           4 CURRENT
☞    TOTAL,30,2,4
        TOTAL     30       2           4 CURRENT
☞
        Processing period beginning 1956/1/1
        Processing period beginning 1957/1/1
```

```
Partial listing of output file TEST01.GSD:
2365205084265702              45    6
33652050842657021956 2 2                                                0.27
33652050842657021956 2 3   2.71   0.57   0.58                           0.73
33652050842657021956 2 4   0.52          0.35
33652050842657021956 3 1   0.20   0.25   0.47                    1.14   0.08
33652050842657021956 3 2                 0.05   0.63   0.84   0.94   0.05   0.65
33652050842657021956 3 3          0.13                                  0.50
33652050842657021956 3 4                        0.20   0.03
       .
       .
       .
336520508426570219561O 3   0.01   0.09                  0.13   0.42
336520508426570219561O 4          0.51                                1.16
336520508426570219561I 2                                              0.38   0.26
336520508426570219561I 3                        0.01   0.55
336520508426570219561I 4   0.02   0.03          0.04
336520508426570219562 1                                               0.02   0.24
336520508426570219562 2    0.11          0.25   2.08   1.98   0.85
336520508426570219562 3    0.03   0.16          0.26   1.84   0.24   0.41   0.20
336520508426570219562 4                        0.12          0.02
2365205084265702                  45    6
33652050842657021957 1 1                        0.90   0.02   0.01   0.02   0.25
33652050842657021957 1 2   0.76   0.44
33652050842657021957 1 3   0.01   0.11          0.30   0.13   1.61   0.05
33652050842657021957 1 4   0.03          0.71   1.18   4.83   0.04   0.36
33652050842657021957 2 1   0.67          0.01   0.01   0.62   0.11   0.16   0.29
33652050842657021957 2 2   0.01   0.39                                0.17   0.02
       .
       .
       .
33652050842657021957 9 3                 0.08   0.07          0.26   0.01
33652050842657021957 9 4                        0.21   0.37
```

INPUT FLAT

Use the FLAT input option to input time-series data in columnar format. The time step of the data can be any valid time step from 1 second to 1 year. Up to 18 time series can be input. The data can be input from a file or the terminal. Each input record will have the same format and will include the date/time of the record.

[1] Specify how many time series are to be input.

[2] For each of the input time series, enter the desired output DSN and TSTYPE, station identification (STAID or ISTAID), and station name (STANAM).

[3] For each of the input time series, enter the time series and storage specific attributes TSSTEP, TCODE, TSFILL, TGROUP, TSBYR, TSFORM, VBTIME, and COMPFG.

[4] Enter the time step and units to be used for the time series. If VBTIME (step [3]) is constant, these must agree with the values in step [3].

[5] Enter information describing the date fields in the input. A date consists of one to six numeric fields described in the order year, month, day, hour, minute, and second. You need to describe only as many fields as are required by the time step of the data. Indicate the included fields with a YES.

[6] Enter information describing the positions on the record for the variables. None of the fields for dates or variables can overlap.

In the example, a file containing three time series is processed. IOWDM prompted for data set number, TSTYPE, station id, and station name for all three time series, using a table menu. The default data-set numbers of 78 thru 80 and TSTYPE's of FLOW, RAIN, and SIMF, station identifications of 111111, 222222, and 333333, and station names of AAAAAAAAAAA, BBBBBBBBBBB, and CCCCCCCCCCC, respectively, were selected. For all three data sets the 5-minute time step, -10.E+5 for missing value filler, month group pointers, base year of 1980, mean data at constant time step and compressed format were selected. The input file has a 5-minute time step, agreeing with what had been specified as an attribute, since the constant time step option had been selected. Then the length and locations of the date string in the input file was specified; year of length 4 starting in column 7, month, day, hour, and minute of length 3 each, starting in columns 11, 14, 17, and 20, respectively.

Next the length, 10, and locations, 23, 37, and 55, of each of the time series in the input file is specified. Finally the name of the input file, IN.FLAT, was entered.

```
Input file format (WATSTORE, HSPF, CARTER, PLTGEN, FLAT)
(Use return for DONE)
☞ FLAT
How many variables from input file?
(Use return for 1)
☞ 3
```

```
General Description attributes:
     ts-
 dsn type   station id    station name and/or location
<-1-><-2><-------3------><-----------------------4---------------------->
   78
   79
   80


    1
99999
    1


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
General Description attributes:
     ts-
 dsn type   station id    station name and/or location
<-1-><-2><-------3------><-----------------------4---------------------->
   78FLOW 111111         AAAAAAAAAAAA
   79RAIN 222222         BBBBBBBBBBBB
   80SIMF 333333         CCCCCCCCCCCC


    1
99999
    1


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? D
```

```
Enter time-specific attributes for the DSN:

   time     missing                  form     time-
----------   value     group  base   of      step    compress
step units   filler   pointer year  data    option     data
<-1><--2-><----3----><---4--><-5-><---6--><----7---><---8---> FIELD
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   1
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   2
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   3


   1  none       none    none    1    none      none     none MINIMUM
1440  none       none    none 2000    none      none     none MAXIMUM
   1   DAY         0.    YEAR 1900    MEAN  CONSTANT      YES DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter time-specific attributes for the DSN:

   time     missing                  form     time-
----------   value     group  base   of      step    compress
step units   filler   pointer year  data    option     data
<-1><--2-><----3----><---4--><-5-><---6--><----7---><---8---> FIELD
   5MINUTE    -10.E+5   MONTH 1980    MEAN  CONSTANT      YES VAR   1
   5MINUTE    -10.E+5   MONTH 1980    MEAN  CONSTANT      YES VAR   2
   5MINUTE    -10.E+5   MONTH 1980    MEAN  CONSTANT      YES VAR   3


   1  none       none    none    1    none      none     none MINIMUM
1440  none       none    none 2000    none      none     none MAXIMUM
   1   DAY         0.    YEAR 1900    MEAN  CONSTANT      YES DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? D
```

```
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    78  111111          AAAAAAAAAAAA
    79  222222          BBBBBBBBBBBB
    80  333333          CCCCCCCCCCCC

Enter time step and time units
TIME  TIME
STEP  UNITS
<--><----->
   1   none MINIMUM
3600   none MAXIMUM
   1    DAY DEFAULT
   5 MINUTE CURRENT
☞ 5,MIN
   5 MINUTE CURRENT
☞
```

```
Enter locations of DATE fields selected.
  1 - year     4 - hour
  2 - month    5 - minute
  3 - day      6 - second

  included
   on your  starting
    file?    column    length
 <---1---><----2---><----3---> FIELD
       NO          1         10 DATE  1
       NO          1         10 DATE  2
       NO          1         10 DATE  3
       NO          1         10 DATE  4
       NO          1         10 DATE  5
      YES          1         10 DATE  6


     none          1          1 MINIMUM
     none        132        132 MAXIMUM
      YES          1         10 DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter locations of DATE fields selected.
  1 - year     4 - hour
  2 - month    5 - minute
  3 - day      6 - second

  included
   on your  starting
    file?    column    length
 <---1---><----2---><----3---> FIELD
      YES          7          4 DATE  1
      YES         11          3 DATE  2
      YES         14          3 DATE  3
      YES         17          3 DATE  4
      YES         20          3 DATE  5
       NO          1          1 DATE  6


     none          1          1 MINIMUM
     none        132        132 MAXIMUM
      YES          1         10 DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? D
```

```
Enter the positions on the record of the variables.
 starting
  column    length    variable name
<----1---><----2---><---------3--------> FIELD
         1        10                     VAR   1
        11        20                     VAR   2
        21        30                     VAR   3


         1         1                     MINIMUM
       132       132                     MAXIMUM
        10        10                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter the positions on the record of the variables.
 starting
  column    length    variable name
<----1---><----2---><---------3--------> FIELD
        23        10XXXXXXXX             VAR   1
        37        10YYYYYYYY             VAR   2
        55        10ZZZZZZZZ             VAR   3


         1         1                     MINIMUM
       132       132                     MAXIMUM
        10        10                     DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? D
```

```
Input data from TERMINAL or FILE?
(Use return for TERMINAL)
☞ FILE
Name of input file?
☞ IN.FLT
```

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    78  111111          AAAAAAAAAAAA
                        TSTYPE = FLOW     TSFILL = -1.00E+06TSSTEP = 5
                        TCODE  = 2        TGROUP = 5        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1980
    79  222222          BBBBBBBBBBBB
                        TSTYPE = RAIN     TSFILL = -1.00E+06TSSTEP = 5
                        TCODE  = 2        TGROUP = 5        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1980
    80  333333          CCCCCCCCCCCC
                        TSTYPE = SIMF     TSFILL = -1.00E+06TSSTEP = 5
                        TCODE  = 2        TGROUP = 5        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1980
```

Partial listing of input file IN.FLT:

```
UNIT  1982 12 15  0  5   0.29000          25.              30.0
UNIT  1982 12 15  0 10   0.29000          20.              35.0
UNIT  1982 12 15  0 15   0.29000          15.              40.0
UNIT  1982 12 15  0 20   0.29000          10.              45.0
UNIT  1982 12 15  0 25   0.29000          25.              30.0
UNIT  1982 12 15  0 30   0.29000          20.              35.0
UNIT  1982 12 15  0 35   0.29000          15.              40.0
UNIT  1982 12 15  0 40   0.29000          10.              45.0
UNIT  1982 12 15  0 45   0.29000          25.              30.0
UNIT  1982 12 15  0 50   0.29000          20.              35.0
UNIT  1982 12 15  0 55   0.29000          15.              40.0
UNIT  1982 12 15  1  0   0.29000          10.              45.0
UNIT  1982 12 15  1  5   0.29000          25.              30.0
UNIT  1982 12 15  1 10   0.29000          20.              35.0
UNIT  1982 12 15  1 15   0.29000          15.              40.0
UNIT  1982 12 15  1 20   0.29000          10.              45.0
UNIT  1982 12 15  1 25   0.29000          25.              30.0
UNIT  1982 12 15  1 30   0.29000          20.              35.0
UNIT  1982 12 15  1 35   0.29000          15.              40.0
UNIT  1982 12 15  1 40   0.29000          10.              45.0
UNIT  1982 12 15  1 45   0.29000          25.              30.0
UNIT  1982 12 15  1 50   0.29000          20.              35.0
UNIT  1982 12 15  1 55   0.29000          15.              40.0
UNIT  1982 12 15  2  0   0.29000          10.              45.0
UNIT  1982 12 15  2  5   0.29000          25.              30.0
UNIT  1982 12 15  2 10   0.29000          20.              35.0
UNIT  1982 12 15  2 15   0.29000          15.              40.0
UNIT  1982 12 15  2 20   0.29000          10.              45.0
UNIT  1982 12 15  2 25   0.29000          25.              30.0
UNIT  1982 12 15  2 30   0.29000          20.              35.0
UNIT  1982 12 15  2 35   0.29000          15.              40.0
UNIT  1982 12 15  2 40   0.29000          10.              45.0
UNIT  1982 12 15  2 45   0.29000          25.              30.0
UNIT  1982 12 15  2 50   0.29000          20.              35.0
UNIT  1982 12 15  2 55   0.29000          15.              40.0
UNIT  1982 12 15  3  0   0.29000          10.              45.0
UNIT  1982 12 15  3  5   0.29000          25.              30.0
UNIT  1982 12 15  3 10   0.29000          20.              35.0
UNIT  1982 12 15  3 15   0.29000          15.              40.0
UNIT  1982 12 15  3 20   0.29000          10.              45.0
UNIT  1982 12 15  3 25   0.29000          25.              30.0
UNIT  1982 12 15  3 30   0.29000          20.              35.0
UNIT  1982 12 15  3 35   0.29000          15.              40.0
UNIT  1982 12 15  3 40   0.29000          10.              45.0
UNIT  1982 12 15  3 45   0.29000          25.              30.0
UNIT  1982 12 15  3 50   0.29000          20.              35.0
UNIT  1982 12 15  3 55   0.29000          15.              40.0
UNIT  1982 12 15  4  0   0.29000          10.              45.0
UNIT  1982 12 15  4  5   0.29000          25.              30.0
UNIT  1982 12 15  4 10   0.29000          20.              35.0
UNIT  1982 12 15  4 15   0.29000          15.              40.0
UNIT  1982 12 15  4 20   0.29000          10.              45.0
UNIT  1982 12 15  4 25   0.29000          25.              30.0
UNIT  1982 12 15  4 30   0.29000          20.              35.0
UNIT  1982 12 15  4 35   0.29000          15.              40.0
UNIT  1982 12 15  4 40   0.29000          10.              45.0
UNIT  1982 12 15  4 45   0.29000          25.              30.0
UNIT  1982 12 15  4 50   0.29000          20.              35.0
UNIT  1982 12 15  4 55   0.29000          15.              40.0
```

INPUT HSPF

Use the HSPF option to read data in a standard HSPF card image format. The input file may contain only one time series. The allowable HSPF time steps are 5 minutes, 60 minutes, daily, and monthly. The semimonthly time step cannot be processed.

[1] Enter the name of the input file.

[2] Enter the DSN desired and the time step and units of the input file.

[3] Enter a description of the time series (TSTYPE) and the station (STAID or ISTAID, STANAM).

[4] Enter the time-series storage attributes TSSTEP, TCODE, TGROUP, TSBYR, TSFORM, VBTIME, and COMPFG. Note that if VBTIME is constant, the time step and units entered here must agree with those in step [3].

The actual data-set number assigned, station number, station name, and period of record are written to the terminal, and if requested, the summary file.

In the example, the input file IOWA.HYH containing hourly data is processed. The default data-set number of 73 was used and an input time step of 1 hour, with a missing value filler of -999999 were specified. The descriptive information, a TSTYPE of SOLR, STAID of IOWA RIVER, and STANAM of SOLAR RADIATION were entered. The storage specific attributes, time step of 1 hour, month group pointers, base year of 1976, mean form, constant time step, and compressed format were selected. As indicated in the summary file and the terminal interaction, the period of record was January 1, 1976, thru December 12, 1976.

```
Input file format (WATSTORE, HSPF, CARTER, PLTGEN, FLAT)
(Use return for DONE)
☞ HSPF
Name of input file?
☞ IOWA.HYH

For the new data set(s):
 starting              missing
 data-set time  time    value
  number  step units   filler
 <------><---><-----><--------->
       1    1   none        none MINIMUM
  200000 1400   none        none MAXIMUM
       1    1    DAY          0. DEFAULT
      73    1    DAY     -10.E+5 CURRENT
☞              1    HOUR -999999
      73    1   HOUR     -10.E+5 CURRENT
☞
```

```
     General description attributes for data set
      TS-  station id
      TYPE (ISTAID/STAID) station name and/or location (STANAM)
      <--><--------------><-------------------------------------------->
                                                                        CURRENT
☞    SOLR,IOWA RIVER,SOLAR RADIATION
      SOLR IOWA RIVER     SOLAR RADIATION                               CURRENT
☞

     Modify time specification attributes as needed.

     time   time  group  base form of time step compression
     step  units pointer year   data    option      flag
     <--><-----><------><---><------><---------><---------->
        1   none    none    1    none       none       none MINIMUM
     1440   none    none 2000    none       none       none MAXIMUM
        1    DAY    YEAR 1900    MEAN   VARIABLE        YES DEFAULT
        1   HOUR    YEAR 1900    MEAN   CONSTANT        YES CURRENT
☞    1,HOUR,MONTH,1976,MEAN,CONSTANT,YES
        1   HOUR   MONTH 1976    MEAN   CONSTANT        YES CURRENT
☞
       DSN STATION NUMBER   STATION NAME / ATTRIBUTES
      ----- ---------------- ----------------------------------------
         73  IOWA RIVER      SOLAR RADIATION
                             1976/1/1
                             1976/12/31
```

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    73  IOWA RIVER      SOLAR RADIATION
                        1976/1/1
                        1976/12/31
```

```
Partial listing of input file IOWA.HYH:
          76  1  1 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.4  1.2  1.8  1.8  1.8
          76  1  1 2  1.8  1.8  1.2  0.4  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  2 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  5.9  8.9  8.9  8.9
          76  1  2 2  8.9  8.9  5.9  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  3 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  5.7 16.7 25.0 25.0 25.0
          76  1  3 2 25.0 25.0 16.7  5.7  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  4 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  6.8 19.9 29.5 29.5 29.5
          76  1  4 2 29.5 29.5 19.9  6.8  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  5 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  6.2 17.8 26.3 26.3 26.3
          76  1  5 2 26.3 26.3 17.8  6.2  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  6 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.7  2.1  3.1  3.1  3.1
          76  1  6 2  3.1  3.1  2.1  0.7  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  7 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  7.0 19.9 29.2 29.2 29.2
          76  1  7 2 29.2 29.2 19.9  7.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  8 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  7.2 20.2 29.6 29.6 29.6
          76  1  8 2 29.6 29.6 20.2  7.2  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1  9 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  5.9 16.3 23.8 23.8 23.8
          76  1  9 2 23.8 23.8 16.3  5.9  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1 10 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  3.3  8.9 13.0 13.0 13.0
          76  1 10 2 13.0 13.0  8.9  3.3  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
          76  1 11 1  0.0  0.0  0.0  0.0  0.0  0.0  0.0  5.4 14.6 21.1 21.1 21.1
```

INPUT WATSTORE N-DAY

Use the N-DAY option to process files in the standard WATSTORE N-DAY high- and low-flow format. The input file may contain high- and (or) low-flow values for any number of stations. The station number is read from the input file. TSTYPE is determined from the data and has the format annn where a is either H for high flow or L for low flow, and nnn indicates the number of days: 001 for 1 day, 003 for 3 days, 365 for 365 days, and so forth. A 7-day low flow would be indicated by L007. If basin characteristics data sets were added with a TSTYPE of "NDAY", then the N-day data sets will include those attributes. The begin and end months of the type of year (complete or partial) being processed are read from the input file and added to the data sets as attributes SEASBG and SEASND.

[1] Specify the WATSTORE input format, the starting DSN, and the value to use for missing record.

[2] Enter the name of the input file.

[3] Enter the time-series storage attributes TGROUP, TSFORM, VBTIME, and COMPFG.

A summary of the data processed is written in table format to the terminal and, if requested the summary file. The table includes the assigned data set number, station number, TSTYPE, number of years in the data set (from beginning to end, includes missing record within the record), and the start year of the data.

In the example, the default starting data-set number 48 and the missing value filler -999999 are used. The name of the input file is BIRD.NDY. The time-series storage attributes are century group pointers, mean data, a constant time step, and compressed data. The summary written to the terminal and the summary file indicate that 20 data sets, 48 thru 67, were added to the WDM file. The low-flow data sets contained 47 years of record, starting in 1940. The high-flow data sets contained 48 years of data, starting in 1939.

```
For the WATSTORE input file:
                          missing
 WATSTORE starting         value
  format    dsn           filler
 <------><-------><---------->
     none        1          none MINIMUM
     none    32000          none MAXIMUM
     DONE        1            0. DEFAULT
     DONE       48       -10.E+5 CURRENT
☞   N-DAY             -999999
    N-DAY       48       -10.E+5 CURRENT
☞
Name of input file?
☞ BIRD.NDY

Enter time-series specific attributes:
  group   form of time-step compression
 pointers  data    option      flag
  TGROUP  TSFORM   VBTIME     COMPFG
 <------><------><--------><---------->
     none    none      none        none MINIMUM
     none    none      none        none MAXIMUM
     YEAR    MEAN  VARIABLE         YES DEFAULT
  CENTURY    MEAN  CONSTANT         YES CURRENT
☞ CENTURY,MEAN,CONSTANT,YES
  CENTURY    MEAN  CONSTANT         YES CURRENT
☞
                                  Numb. Start
   DSN Station number    TSTYPE years  year
 ----- ---------------- ------ ----- -----
    48   07177500         L001     47  1940  added
    49   07177500         L003     47  1940  copied
    50   07177500         L007     47  1940  copied
    51   07177500         L014     47  1940  copied
    52   07177500         L030     47  1940  copied
    53   07177500         L060     47  1940  copied
    54   07177500         L090     47  1940  copied
    55   07177500         L120     47  1940  copied
    56   07177500         L183     47  1940  copied
    57   07177500         L365     47  1940  copied
    58   07177500         H001     48  1939  copied
    59   07177500         H003     48  1939  copied
    60   07177500         H007     48  1939  copied
    61   07177500         H015     48  1939  copied
    62   07177500         H030     48  1939  copied
    63   07177500         H060     48  1939  copied
    64   07177500         H090     48  1939  copied
    65   07177500         H120     48  1939  copied
    66   07177500         H183     48  1939  copied
    67   07177500         H365     48  1939  copied
```

Listing of summary output file:

DSN	Station number	TSTYPE	Numb. years	Start year	
48	07177500	L001	47	1940	added
49	07177500	L003	47	1940	copied
50	07177500	L007	47	1940	copied
51	07177500	L014	47	1940	copied
52	07177500	L030	47	1940	copied
53	07177500	L060	47	1940	copied
54	07177500	L090	47	1940	copied
55	07177500	L120	47	1940	copied
56	07177500	L183	47	1940	copied
57	07177500	L365	47	1940	copied
58	07177500	H001	48	1939	copied
59	07177500	H003	48	1939	copied
60	07177500	H007	48	1939	copied
61	07177500	H015	48	1939	copied
62	07177500	H030	48	1939	copied
63	07177500	H060	48	1939	copied
64	07177500	H090	48	1939	copied
65	07177500	H120	48	1939	copied
66	07177500	H183	48	1939	copied
67	07177500	H365	48	1939	copied

Partial listing of input file BIRD.NDY:

```
2 07177500      99999999999900060000003 20011940    0403
3 07177500      2      1   0.00   0.30   3.80  22.00   2.20   4.50   5.00   2.10
3 07177500      2      2   1.70   1.30   5.60   8.60  12.00   0.30   0.10   0.00
3 07177500      2      3   0.00   0.00   7.20   1.19   1.50   4.80  17.00   3.80
3 07177500      2      4   0.10   0.00   0.00   0.00   7.20   0.23   2.20   0.60
3 07177500      2      5   0.20   1.19  12.00  10.00  20.00   1.00   0.76   1.80
3 07177500      2      6   1.19   1.80   1.10   4.80  14.00   3.50   5.20
2 07177500      99999999999900060000003 20031940    0403
3 07177500      2      1   0.00   0.57   3.80  22.00   2.20   4.50   5.30   2.10
3 07177500      2      2   1.80   1.40   6.10   9.30  12.00   0.30   0.17   0.00
3 07177500      2      3   0.00   0.00   7.20   1.19   1.80   4.80  18.00   4.10
3 07177500      2      4   0.10   0.00   0.00   0.00   7.40   0.28   2.30   0.63
3 07177500      2      5   0.33   1.40  13.00  10.00  22.00   1.19   1.10   2.10
3 07177500      2      6   1.30   2.00   1.19   5.20  14.00   3.90   5.60
.
.
.
2 07177500      99999999999900060000003 31831939    1009
3 07177500      2      1 143.00 203.00 690.001680.002030.00 673.00 942.00 592.00
3 07177500      2      2 673.00 923.00 976.001050.00 797.00 615.00 284.00 242.00
3 07177500      2      3 328.00  26.002280.00 443.00 615.001340.001660.00 627.00
3 07177500      2      4 161.00 237.00 397.00 171.00 498.00 784.00 864.00 679.00
3 07177500      2      5 591.00 594.002120.001430.002230.00 457.00 443.001020.00
3 07177500      2      6 555.00 681.00 145.00 933.001060.001030.002850.00 611.00
2 07177500      99999999999900060000003 33651939    1009
3 07177500      2      1  76.00 102.00 436.001470.001070.00 448.00 716.00 359.00
3 07177500      2      2 397.00 466.00 500.00 544.00 445.00 370.00 151.00 124.00
3 07177500      2      3 168.00  15.001140.00 240.00 324.00 939.00 880.00 495.00
3 07177500      2      4  98.00 121.00 272.00  96.00 254.00 426.00 530.00 434.00
3 07177500      2      5 355.00 387.001290.001200.001480.00 249.00 241.00 548.00
3 07177500      2      6 291.00 389.00  78.00 522.00 577.00 604.001570.00 502.00
```

INPUT WATSTORE PEAK

Use the PEAK option to process files in the standard WATSTORE peak flows 80-character record format. The input file may contain annual peaks for one or more stations. The data can be put in time series or table type data sets, but only the table data sets store the qualification codes. The ANNIE frequency analysis option for Bulletin 17B uses the qualification codes in a tables data set. For each station found in the input file, the program will first attempt to find an existing data set in the WDM file containing the basin characteristics of the station. IOWDM searches for a unique data set with matching data set type, TSTYPE, station id, and time step. If the peaks are to be added to existing basin characteristics data sets, it is important that the same value be entered for TSTYPE and data-set type for both the basin characteristics and the peaks. If the program is unable to find an existing data set for a station, the station will be added to the WDM using your specified starting data-set number, and time-storage attributes.

[1] Specify the WATSTORE input format, the starting DSN, and the value to be used for missing record. The DSN and TSFILL will be used only if an existing data set is not found.

[2] Enter the name of the input file.

[3] Enter the value for TSTYPE and select TABLE or TIME series type data sets. If the PEAK data are to be added to Basin Characteristics data sets, these must agree with the values entered in the BASIN option.

The program writes to the terminal and, if requested, a summary file, a table of the peaks processed. The table includes the data-set numbers, station numbers, starting year of the peaks, number of peaks and, for time-series data sets the quality code. For stations having different quality codes for different peaks, the starting year and number of years for each quality code are included. The table also indicates whether the peaks were added to a data set that was found or a new data set had to be added.

The WATSTORE peak flows format allows up to 12 qualification codes that can be associated with each peak. For table data sets, the exact string of qualification codes is stored in the data set for each peak. Qualification codes are not stored on time-series data sets.

In the example, peaks for four stations are added to existing table type data sets. The first station, added to data set 12, has 32 peaks starting in 1956. The second station, added to data-set 13, has 53 peaks starting in 1935. The third station, added to data-set 14, has 39 peaks beginning in 1929. The fourth station, added to data-set 15, had 55 peaks with a quality code of 0, beginning in 1932.

```
For the WATSTORE input file:
                        missing
 WATSTORE starting       value
  format    dsn          filler
 <------><-------><---------->
     none        1         none MINIMUM
     none    32000         none MAXIMUM
     DONE        1           0. DEFAULT
     DONE       48     -10.E+5 CURRENT
     PEAK               -999999
     PEAK       48     -10.E+5 CURRENT

Name of input file?
BULT17B.PKS

Enter general information about datasets:
 TS- data set
 TYPE  type
 <--><------>
         none MINIMUM
         none MAXIMUM
         TIME DEFAULT
        TABLE CURRENT
 PEAK  TABLE
 PEAK   TABLE CURRENT

                                    Numb. Start
   DSN Station number    TSTYPE years  year
 ----- ---------------- ------ ----- -----
 12      01373500         PEAK   32    1882          found
 13      06600500         PEAK   53    1935          found
 14      01614000         PEAK   39    1929          found
 15      11274500         PEAK   55    1932          found
```

Listing of summary output file:

DSN	Station number	TSTYPE	Numb. years	Start year	
12	01373500	PEAK	32	1882	found
13	06600500	PEAK	53	1935	found
14	01614000	PEAK	39	1929	found
15	11274500	PEAK	55	1932	found

Partial listing of input file BULT17B.BCD:

```
3 01373500      18820924   77007
3 01373500      18880322   52007
3 01373500      18881218   44007
3 01373500      18910123   88007
3 01373500      18930312   61007
3 01373500      18960207   83007
3 01373500      19020301  137007E                      1882
3 01373500      19450305   2290              5.95
3 01373500      19451227   1470              4.76
3 01373500      19470315   2220              5.85
3 01373500      19480318   2970              6.96
3 01373500      19490101   3020              7.03
3 01373500      19500309   1210              4.33
3 01373500      19510401   2490              6.31
3 01373500      19520312   3170              7.21
3 01373500      19530125   3220              7.28
3 01373500      19540913   1760              5.24
3 01373500      19550820   8800             12.13
3 01373500      19551016   8280             11.78
3 01373500      19570410   1310              4.52
3 01373500      19571221   2500              6.42
3 01373500      19590211   1960              5.61
3 01373500      19600406   2140              5.89
3 01373500      19610226   4340              8.52
3 01373500      19620313   3060              7.15
3 01373500      19630328   1780              5.33
3 01373500      19640126   1380              4.66
3 01373500      19650209    980              3.90
3 01373500      19660215   1040              4.01
3 01373500      19670330   1580              4.97
3 01373500      19680319   3630              7.80
3 01373500      19840530  69607             10.80
3 06600500      19350628   1460             15.20
3 06600500      19360310  40502             18.101
3 06600500      19370527   3570             17.20
3 06600500      19380915   2060             16.50
3 06600500      19390312  13002             16.101
3 06600500      19400605   1390             15.40
3 06600500      19410311   1720             16.20
3 06600500      19420604   6280             18.80
3 06600500      19430617   1360             15.20
3 06600500      19440513   7440             18.80
3 06600500      19450312   5320             18.40
3 06600500      19460301   1400             15.30
3 06600500      19470625   3240             17.80
3 06600500      19480317   2710             17.10
3 06600500      19490305   4520             18.10
3 06600500      19500619   4840             19.20
3 06600500      19510328   8320             19.942        0912   19.981
3 06600500      19520331  13900             20.32
3 06600500      19530608  71500             25.30     1892
3 06600500      19540622   6250             19.88
3 06600500      19550710   2260             16.25
3 06600500      19560713    318              8.60
3 06600500      19570705   1330             13.83
3 06600500      19580531    970             13.12
3 06600500      19590601   1920             17.59
3 06600500      19600329  15100             21.93
3 06600500      19610302   2870             18.00
```

INPUT PLTGEN

The PLTGEN option is a special case of the FLAT file format and is used to input standard HSPF PLTGEN format files to WDM file data sets. IOWDM reads the header records from the input file to determine how many variables are in the input file.

1. Enter the name of the input file.

2. For each of the variables in the PLTGEN file, indicate whether or not it should be included, the desired output DSN, and the descriptors TSTYPE, station identification (STAID or ISTAID), and STANAM.

3. For each of the input variables, enter the time-series and storage specific attributes TSSTEP, TCODE, TSFILL, TGROUP, TSBYR, TSFORM, VBTIME, and COMPFG.

For each data set added to the WDM file, the assigned data-set number, station identification, and station name are written in tabular form to the terminal and, if requested, the summary file. Additional attributes added will be written to the summary file or the terminal if no summary file is requested. Finally, the period of the record processed is written to the terminal and, if requested, the summary file.

In the example, the file IOWA.PLT is processed. All four variables contained in the file are added to the WDM file as data sets 74 thru 77. The TSTYPE GW, IF, STQ, and OTQ, the station identification, IOWA RIVER, and station name SIMULATED GROUNDWATER, SIMULATED INTERFLOW, SIMULATED TOTAL RUNOFF, and OBSERVED TOTAL RUNOFF were entered. A 1-day time step, missing value filler of -10.E+5, year group pointers, base year of 1900, mean, constant time-step data in a compressed format were specified. The summary indicates the requested data-set numbers were assigned and that the file contained data for the calendar year 1976.

```
    Input file format (WATSTORE, HSPF, CARTER, PLTGEN, FLAT)
    (Use return for DONE)
☞   PLTGEN
    Name of input file?
☞   IOWA.PLT
```

```
For the following variables found in the PLTGEN file:
            ts-
include dsn type station id      station name
<--1--><-2-><-3><-------4------><-----------------------5----------------------
    YES   74
    YES   75
    YES   76
    YES   77


   none    1
   none99999
    YES none


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
For the following variables found in the PLTGEN file:
            ts-
include dsn type station id      station name
<--1--><-2-><-3><-------4------><-----------------------5----------------------
    YES   74GW  IOWA RIVER      SIMULATED GROUNDWATER
    YES   75IF  IOWA RIVER      SIMULATED INTERFLOW
    YES   76STQ IOWA RIVER      SIMULATED TOTAL RUNOFF
    YES   77OTQ IOWA RIVER      OBSERVED TOTAL RUNOFF


   none    1
   none99999
    YES none


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? D
```

```
Enter time-specific attributes for the DSN:

   time     missing                  form     time-
----------   value     group  base   of      step    compress
step units   filler   pointer year  data    option     data
<-1><--2-><----3----><---4--><-5-><---6--><----7---><---8---> FIELD
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   1
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   2
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   3
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   4


   1  none       none    none    1    none      none     none MINIMUM
1440  none       none    none 2000    none      none     none MAXIMUM
   1   DAY         0.    YEAR 1900    MEAN  CONSTANT      YES DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? EG
```

```
Enter time-specific attributes for the DSN:

   time     missing                    form     time-
----------   value     group  base     of      step    compress
step units   filler   pointer year   data    option     data
<-1><--2-><----3----><---4--><-5-><---6--><----7---><---8---> FIELD
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   1
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   2
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   3
   1   DAY    -10.E+5    YEAR 1900    MEAN  CONSTANT      YES VAR   4


   1  none       none    none    1    none       none     none MINIMUM
1440  none       none    none 2000    none       none     none MAXIMUM
   1   DAY         0.    YEAR 1900    MEAN  CONSTANT      YES DEFAULT


Commands:DONE,?,HELP,VIEW,EDIT,TRANSFORM
command? D
```

```
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    74 IOWA RIVER       SIMULATED GROUNDWATER
    75 IOWA RIVER       SIMULATED INTERFLOW
    76 IOWA RIVER       SIMULATED TOTAL RUNOFF
    77 IOWA RIVER       OBSERVED TOTAL RUNOFF

                        For this flat file:
                        1975/12/31 24:0:0
                        1976/12/31 24:0:0
```

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ----------------------------------------
    74 IOWA RIVER       SIMULATED GROUNDWATER
                        TSTYPE = GW       TSFILL = -1.00E+06TSSTEP = 1
                        TCODE  = 4        TGROUP = 6        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1900
    75 IOWA RIVER       SIMULATED INTERFLOW
                        TSTYPE = IF       TSFILL = -1.00E+06TSSTEP = 1
                        TCODE  = 4        TGROUP = 6        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1900
    76 IOWA RIVER       SIMULATED TOTAL RUNOFF
                        TSTYPE = STQ      TSFILL = -1.00E+06TSSTEP = 1
                        TCODE  = 4        TGROUP = 6        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1900
    77 IOWA RIVER       OBSERVED TOTAL RUNOFF
                        TSTYPE = OTQ      TSFILL = -1.00E+06TSSTEP = 1
                        TCODE  = 4        TGROUP = 6        TSFORM = 1
                        VBTIME = 1        COMPFG = 1        TSBYR  = 1900

                        For this flat file:
                        1975/12/31 24:0:0
                        1976/12/31 24:0:0
```

```
Partial listing of input file IOWA.PLT:
SIMU HSPF FILE FOR DRIVING SEPARATE PLOT PROGRAM
SIMU Time interval: 1440 mins          Last month in printout year:  9
SIMU No. of curves plotted:  Point-valued:  0   Mean-valued:  4   Total  4
SIMU Label flag:  0          Pivl:   24          Idelt:   60
SIMU Plot title:   SIMULATED FLOW
SIMU Y-axis label: CFS
SIMU Scale info:  Ymin:  0.00000              Threshold:-0.10000E+31
SIMU              Ymax:   1500.0
SIMU              Time:   20.000     intervals/inch
SIMU Data for each curve (Point-valued first, then mean-valued):
SIMU Label                   LINTYP     INTEQ    COLCOD      TRAN   TRANCOD
SIMU SIM GROUNDWATER              0         5         1      AVER         2
SIMU SIM INTERFLOW                0         4         1      AVER         2
SIMU SIM TOTAL RUNOFF             1         1         1      AVER         2
SIMU OBS TOTAL RUNOFF             2         8         2      AVER         2
SIMU
SIMU
SIMU
SIMU
SIMU
SIMU
SIMU Time series (pt-valued, then mean-valued):
SIMU
SIMU Date/time                          Values
SIMU
SIMU  1975 12 31 24  0  -0.10000E+31  -0.10000E+31  -0.10000E+31  -0.10000E+31
SIMU  1976  1  1 24  0     22.694         22.694         22.703         15.000
SIMU  1976  1  2 24  0     22.205         22.205         22.205         15.000
SIMU  1976  1  3 24  0     21.725         21.725         21.725         15.000
SIMU  1976  1  4 24  0     21.256         21.256         21.256         16.000
SIMU  1976  1  5 24  0     20.799         20.799         20.799         16.000
SIMU  1976  1  6 24  0     20.352         20.352         20.352         17.000
SIMU  1976  1  7 24  0     19.915         19.915         19.915         18.000
SIMU  1976  1  8 24  0     19.489         19.489         19.489         18.000
SIMU  1976  1  9 24  0     19.073         19.073         19.073         19.000
SIMU  1976  1 10 24  0     18.666         18.666         18.666         19.000
SIMU  1976  1 11 24  0     18.362         18.362         18.374         20.000
SIMU  1976  1 12 24  0     18.441         18.441         18.581         20.000
SIMU  1976  1 13 24  0     19.718         19.718         20.276         20.000
SIMU  1976  1 14 24  0     22.113         22.147         22.936         21.000
SIMU  1976  1 15 24  0     24.534         24.598         25.499         21.000
SIMU  1976  1 16 24  0     25.356         25.408         25.408         21.000
SIMU  1976  1 17 24  0     24.805         24.846         24.846         21.000
SIMU  1976  1 18 24  0     24.399         24.435         24.464         21.000
SIMU  1976  1 19 24  0     24.098         24.130         24.136         21.000
SIMU  1976  1 20 24  0     23.892         23.918         24.006         20.000
SIMU  1976  1 21 24  0     23.732         23.753         23.753         20.000
SIMU  1976  1 22 24  0     25.105         25.157         26.085         20.000
SIMU  1976  1 23 24  0     29.967         30.229         32.690         20.000
SIMU  1976  1 24 24  0     34.126         34.547         35.115         20.000
SIMU  1976  1 25 24  0     34.539         34.865         34.865         20.000
SIMU  1976  1 26 24  0     35.984         36.376         38.039         20.000
SIMU  1976  1 27 24  0     39.426         39.905         40.646         20.000
SIMU  1976  1 28 24  0     44.416         45.162         48.623         20.000
SIMU  1976  1 29 24  0     54.184         55.443         58.784         20.000
SIMU  1976  1 30 24  0     59.228         60.373         60.373         20.000
SIMU  1976  1 31 24  0     57.806         58.545         58.545         19.000
SIMU  1976  2  1 24  0     56.748         57.255         57.440         19.000
SIMU  1976  2  2 24  0     55.845         56.204         56.204         19.000
```

INPUT WATSTORE UNIT

Use the UNIT input option to process data files in the standard WATSTORE unit values card image format. The input file may contain unit values, with or without station header records, for one or more stations with one or more parameter and statistic codes. The time steps need not be the same for each time series, and the time step may vary within a time series. The data for each time series must be contiguous in the input file. The attributes entered will be used for all the time series found in the input file. Since you cannot change those attributes once time-series data has been added to a data set, each input file should contain time series with like attributes. However, the time step (TSSTEP, TCODE) and base year (TSBYR) are determined from each time series in the input file. The TSTYPE is determined from the parameter code.

[1] Specify the WATSTORE input format, the desired starting data-set number, and the value to use for missing record (TSFILL).

[2] Enter the name of the input file.

[3] Enter the time-series specific attributes TGROUP, TSFORM, VBTIME, and COMPFG.

For each station found in the input file, the data-set number assigned, station number (ISTAID or STAID), and station name are written in tabular form to the terminal and, if requested, the summary file. A summary of the storage specific and additional descriptive attributes is written to the summary file, or the terminal if no file is requested. The period of record processed and any long periods of missing record are written to the terminal and, if requested, the summary file.

In the example, two time series, starting with data-set number 10, are added to the WDM file. A missing value filler of 0.0 is used. The defaults for group pointers, form of data, time-step option, and compression flag were used. The summary written to the terminal and summary file indicate that data sets 10 and 11 were added to the WDM file. The station numbers, station names, and periods of record are included. Additional attributes that were added to the data set are tabled in the summary file.

```
For the WATSTORE input file:
                        missing
 WATSTORE starting       value
  format    dsn          filler
 <------><-------><---------->
     none         1         none MINIMUM
     none     32000         none MAXIMUM
     DONE         1           0. DEFAULT
     DONE        10     -10.E+5 CURRENT
   UNIT               0.0
     UNIT        10           0. CURRENT

Name of input file?
CANE.GSU

Enter time-series specific attributes:
  group   form of time-step compression
 pointers  data    option      flag
  TGROUP  TSFORM   VBTIME     COMPFG
 <------><------><--------><---------->
     none    none      none        none MINIMUM
     none    none      none        none MAXIMUM
     YEAR    MEAN  VARIABLE         YES DEFAULT
    MONTH    MEAN  CONSTANT         YES CURRENT
MONTH,MEAN,CONST,YES
    MONTH    MEAN  CONSTANT         YES CURRENT

  DSN STATION NUMBER   STATION NAME / ATTRIBUTES
----- ---------------- ---------------------------------------
   10  365205084265702 Cane Branch, KY--storm precipitation
                       1956/2/17 1:30
            *** missing 1956/7/23 19:30:0 to 1956/12/21 0:0:0.
            *** missing 1957/1/29 19:30:0 to 1957/4/8 1:30:0.
                       1957/4/8 16:30
   11  03407100        Cane Branch, KY--storm discharge
                       1956/2/3 0:0
            *** missing 1956/7/23 24:0:0 to 1956/12/21 0:0:0.
            *** missing 1957/1/29 24:0:0 to 1957/4/8 0:0:0.
                       1957/4/8 24:0
```

UNIT input UNIT

```
Listing of summary output file:
   DSN STATION NUMBER   STATION NAME / ATTRIBUTES
 ----- ---------------- ---------------------------------------
    10  365205084265702 Cane Branch, KY--storm precipitation
                        TSTYPE = PREC     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 15       TCODE  = 2        TGROUP = 5
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 45       STATCD = 6
                        DAREA  =      0.67
                        1956/2/17 1:30
            *** missing 1956/7/23 19:30:0 to 1956/12/21 0:0:0.
            *** missing 1957/1/29 19:30:0 to 1957/4/8 1:30:0.
                        1957/4/8 16:30
    11  03407100        Cane Branch, KY--storm discharge
                        TSTYPE = FLOW     TSFILL =      0.00AGENCY = USGS
                        TSSTEP = 15       TCODE  = 2        TGROUP = 5
                        TSFORM = 1        VBTIME = 1        COMPFG = 1
                        TSBYR  = 1956     PARMCD = 60       STATCD = 11
                        DAREA  =      0.67
                        1956/2/3 0:0
            *** missing 1956/7/23 24:0:0 to 1956/12/21 0:0:0.
            *** missing 1957/1/29 24:0:0 to 1957/4/8 0:0:0.
                        1957/4/8 24:0
```

```
Partial listing of input file CANE.GSU:
Z                              USGS
H365205084265702                                  .67
N365205084265702Cane Branch, KY--storm precipitation
2365205084265702            0004500006                 ENT
B3652050842657021956 217 145 0   96      0.00   0.00   0.00   0.00   0.09   0.09
B3652050842657021956 217 315 0   96      0.09   0.09   0.09   0.09   0.09   0.09
B3652050842657021956 217 445 0   96      0.09   0.09   0.06   0.05   0.05   0.05
B3652050842657021956 217 615 0   96      0.06   0.06   0.01   0.01   0.00   0.00
B3652050842657021956 217 745 0   96      0.00   0.00   0.01   0.02   0.02   0.02
B3652050842657021956 217 915 0   96      0.05   0.05   0.06   0.05   0.05   0.00
B3652050842657021956 2171215 0   96      0.00   0.00   0.00   0.00   0.05   0.05
B3652050842657021956 2171345 0   96      0.01   0.02   0.02   0.02   0.02   0.02
B3652050842657021956 2171515 0   96      0.04   0.04   0.05   0.05   0.02   0.01
B3652050842657021956 2171645 0   96      0.01   0.01   0.01   0.00   0.00   0.00
B3652050842657021956 2172245 0   96      0.02   0.01   0.02   0.21   0.21   0.21
B3652050842657021956 218 015 0   96      0.06   0.06   0.05   0.02   0.02   0.01
B3652050842657021956 218 145 0   96      0.05   0.05   0.02   0.02   0.02   0.02
B3652050842657021956 218 315 0   96      0.01   0.02   0.02   0.02   0.02   0.02
B3652050842657021956 218 445 0   96      0.02   0.02   0.02   0.00   0.00   0.00
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B3652050842657021957 4 8 145 0   96      0.00   0.00   0.00   0.00   0.01   0.02
B3652050842657021957 4 8 315 0   96      0.02   0.09   0.01   0.00   0.00   0.00
B3652050842657021957 4 8 615 0   96      0.13   0.00   0.00   0.00   0.06   0.06
B3652050842657021957 4 8 745 0   96      0.06   0.05   0.00   0.00   0.00   0.00
B3652050842657021957 4 8 915 0   96      0.00   0.00   0.10   0.10   0.09   0.01
B3652050842657021957 4 81045 0   96      0.05   0.03   0.07   0.09   0.09   0.05
B3652050842657021957 4 81215 0   96      0.04   0.04   0.03   0.03   0.03   0.00
B3652050842657021957 4 81345 0   96      0.00   0.00   0.00   0.10   0.01   0.01
B3652050842657021957 4 81515 0   96      0.01   0.00   0.01   0.00   0.00   0.00
```

```
N03407100       Cane Branch, KY--storm discharge
203407100                       0006000011                      ENT
B03407100       1956 2 3 015 0   96      4.10    4.10    4.10    4.10    4.20    4.20
B03407100       1956 2 3 145 0   96      4.40    4.50    4.80    5.10    5.60    6.20
B03407100       1956 2 3 315 0   96      7.00    7.80    9.30   10.80   12.40   15.00
B03407100       1956 2 3 445 0   96     18.50   21.60   26.00   27.50   29.00   30.00
B03407100       1956 2 3 615 0   96     30.10   30.00   29.00   28.00   27.00   26.00
B03407100       1956 2 3 745 0   96     25.00   24.00   23.10   22.30   21.50   20.70
B03407100       1956 2 3 915 0   96     19.80   18.90   18.00   17.10   16.20   15.30
B03407100       1956 2 31045 0   96     14.70   14.10   13.60   13.20   12.80   12.40
B03407100       1956 2 31215 0   96     12.20   12.00   11.90   11.80   11.30   10.80
B03407100       1956 2 31345 0   96     10.30    9.80    9.50    9.30    9.00    8.80
B03407100       1956 2 31515 0   96      8.50    8.30    8.10    7.90    7.70    7.50
B03407100       1956 2 31645 0   96      7.30    7.20    7.05    6.90    6.75    6.60
B03407100       1956 2 31815 0   96      6.48    6.35    6.22    6.10    6.00    5.90
B03407100       1956 2 31945 0   96      5.80    5.70    5.62    5.54    5.46    5.38
B03407100       1956 2 32115 0   96      5.30    5.24    5.15    5.08    5.00    4.98
B03407100       1956 2 32245 0   96      4.94    4.88    4.80    4.74    4.67    4.60
B03407100       1956 2 4 015 0   96      4.54    4.48    4.40    4.34    4.28    4.22
B03407100       1956 2 4 145 0   96      4.16    4.10    4.05    4.00    3.96    3.92
B03407100       1956 2 4 315 0   96      3.88    3.84    3.80    3.78    3.76    3.74
B03407100       1956 2 4 445 0   96      3.72    3.72    3.90    4.40    5.10    6.20
B03407100       1956 2 4 615 0   96      8.00   10.30   13.00   15.30   18.10   21.60
B03407100       1956 2 4 745 0   96     25.00   29.00   34.00   38.00   41.00   42.00
B03407100       1956 2 4 915 0   96     42.20   42.00   41.50   41.00   39.50   38.00
B03407100       1956 2 41045 0   96     36.20   34.50   32.80   31.00   29.20   27.50
B03407100       1956 2 41215 0   96     26.50   25.50   25.00   24.00   23.00   22.00
B03407100       1956 2 41345 0   96     20.80   20.20   19.00   18.50   18.50   17.30
B03407100       1956 2 41515 0   96     16.50   15.70   15.30   14.80   14.30   13.80
B03407100       1956 2 41645 0   96     13.40   13.00   12.60   12.20   11.80   11.50
B03407100       1956 2 41815 0   96     11.30   11.00   10.80   10.50   10.30   10.00
B03407100       1956 2 41945 0   96      9.80    9.55    9.30    9.10    8.90    8.70
B03407100       1956 2 42115 0   96      8.50    8.30    8.10    7.95    7.80    7.60
B03407100       1956 2 42245 0   96      7.40    7.20    7.05    6.90    6.75    6.60
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B03407100       1957 4 8 015 0   96      1.46    1.46    1.46    1.46    1.46    1.46
B03407100       1957 4 8 145 0   96      1.46    1.46    1.46    1.46    1.46    1.46
B03407100       1957 4 8 315 0   96      1.46    1.51    1.57    1.63    1.74    2.12
B03407100       1957 4 8 445 0   96      2.04    1.96    1.92    1.92    1.92    1.96
B03407100       1957 4 8 615 0   96      2.00    2.04    2.40    2.80    2.60    2.50
B03407100       1957 4 8 745 0   96      2.60    3.20    4.10    4.40    3.80    3.50
B03407100       1957 4 8 915 0   96      3.40    3.80    4.40    8.50    7.80    7.80
B03407100       1957 4 81045 0   96      7.80   11.80   16.90   18.90   18.90   22.50
B03407100       1957 4 81215 0   96     26.50   30.50   30.50   30.00   29.00   28.00
B03407100       1957 4 81345 0   96     27.00   26.00   25.50   25.00   24.50   24.00
B03407100       1957 4 81515 0   96     24.50   23.50   22.50   21.30   20.10   19.90
B03407100       1957 4 81645 0   96     18.10   17.30   16.70   16.10   15.50   14.90
B03407100       1957 4 81815 0   96     14.30   13.80   13.40   13.00   12.40   11.80
B03407100       1957 4 81945 0   96     11.40   11.10   10.80   10.40   10.00    9.60
B03407100       1957 4 82115 0   96      9.44    9.28    9.12    8.96    8.80    8.60
B03407100       1957 4 82245 0   96      8.40    8.20    8.00    7.80    7.70    7.60
```

OUTPUT UNIT

Use the UNIT output option to write WDM time-series data sets to WATSTORE unit values 80-character record format. One or more data sets can be written to a single file.

1. Enter the WATSTORE output format and the DSN of the time series to be written.

2. Enter the name for the output file.

3. Use the CURRENT time span from the data set or subset the time span by entering a later starting date, an earlier ending date, or both.

4. Enter the type of time conversion, RATE or TOTAL, and the maximum acceptable quality code. Enter the number of decimal places and significant digits to be used on the output.

For missing time steps or time steps with a quality code greater than requested, the output field will be left blank. Only those records containing non-blank output fields will be written to the output file.

In the example, time-series data from data-set number 10 was written to file TEST01.GSU. Data for the entire period of record was selected. Since data-set 10 contains precipitation, TOTAL was used. The quality code of 30 indicates that all of the data were requested. The data were written to the output file with two decimal places and four significant digits.

```
Enter output format and source DSN;
 WATSTORE source
  format    DSN
 <------><----->
     none      0 MINIMUM
     none  32000 MAXIMUM
     DONE      0 DEFAULT
     DONE      0 CURRENT
    UNIT     10
     UNIT     10 CURRENT

Name of output file?
TEST01.GSU

Enter beginning and ending dates
<= STARTING DATE =>   <=  ENDING DATE  =>
year mo dy hr mi sc   year mo dy hr mi sc
<--><-><-><-><-><-><-----><-><-><-><-><->
1492  1  1  0  0  0   1492  1  1  0  0  0 MINIMUM
2020 12 31 24 59 59   2020 12 31 24 59 59 MAXIMUM
none  1  1  0  0  0   none 12 31  0  0  0 DEFAULT
1956  2 17  1 30  0   1957  4  8 16 30  0 CURRENT
```

UNIT output UNIT

```
Enter time step and time units
TIME  TIME
STEP  UNITS
<--><----->
   1   none MINIMUM
3600   none MAXIMUM
   1    DAY DEFAULT
  15 MINUTE CURRENT
15,MIN
  15 MINUTE CURRENT

Enter information about output of requested data:
 RATE  maximum
  or   quality decimal significant
 TOTAL   flag   places    digits
 <---->-----><------><---------->
   none      0      -1           1 MINIMUM
   none     30       5           5 MAXIMUM
   RATE      0       0           5 DEFAULT
   RATE     30       2           4 CURRENT
TOTAL,30,2,4
  TOTAL     30       2           4 CURRENT

  Processing period beginning 1956/2/17
  Processing period beginning 1956/3/16
  Processing period beginning 1956/5/16
  Processing period beginning 1956/7/16
  Processing period beginning 1956/9/16
  Processing period beginning 1956/11/16
  Processing period beginning 1957/1/16
  Processing period beginning 1957/3/16
```

```
Listing of output file TEST01.GSU:
2365205084265702                45    6
B3652050842657021956 3291815     96                          0.03   0.03   0.04   0.04
B3652050842657021956 3291945     96       0.03   0.03        0.03   0.03   0.03   0.03
B3652050842657021956 3292115     96       0.04   0.04        0.04   0.04   0.04   0.04
B3652050842657021956 3292245     96       0.04   0.04        0.05   0.05   0.05   0.05
B3652050842657021956 330 015     96       0.05   0.05        0.05   0.05   0.05
B3652050842657021956 330 315     96                                 0.02   0.02   0.02
B3652050842657021956 330 445     96       0.02   0.17        0.18   0.18   0.03   0.02
B3652050842657021956 330 615     96       0.02                                     0.01
B3652050842657021956 422 015     96       0.01   0.01        0.01   0.01   0.01   0.02
B3652050842657021956 422 145     96       0.01   0.01        0.01   0.01   0.01   0.01
B3652050842657021956 422 315     96       0.03   0.03        0.03   0.02   0.02   0.02
B3652050842657021956 422 445     96       0.03   0.03        0.05   0.05   0.05   0.05
B3652050842657021956 422 615     96       0.06   0.06        0.06   0.06   0.11   0.11
B3652050842657021956 422 745     96       0.11   0.11        0.11   0.11   0.11   0.10
B3652050842657021956 422 915     96       0.06   0.06
B3652050842657021956 4221215     96                          0.01   0.01   0.01   0.01
B3652050842657021956 4221345     96       0.01   0.01                              0.01
B3652050842657021956 6111045     96              0.06        0.07   0.07   0.06   0.06
B3652050842657021956 6111215     96                                                0.01
B3652050842657021956 6111345     96       0.02   0.10
B3652050842657021956 6292245     96       0.23   0.15                       0.01   0.01
B3652050842657021956 6301645     96                                 0.08   0.06   0.01
B3652050842657021956 6301815     96       0.01
```

B3652050842657021956 711 015	96			0.08	0.08	0.07	0.07	0.07
B3652050842657021956 711 145	96		0.07	0.07	0.04	0.04	0.04	0.03
B3652050842657021956 711 315	96		0.03	0.03	0.03	0.03		
B3652050842657021956 7181215	96						0.21	0.20
B3652050842657021956 7181345	96		0.18	0.01	0.01			
B3652050842657021956 8 81045	96				0.09	0.04	0.01	
B3652050842657021956 8 81345	96		0.28	0.20	0.04	0.02	0.01	0.08
B3652050842657021956 8 81515	96		0.07	0.10				
B3652050842657021956 8 81815	96			0.24	0.21	0.01		
2365205084265702	45	6						
B3652050842657021957 1 6 015	96			0.01				
B3652050842657021957 1 6 145	96			0.01				
B3652050842657021957 1 61945	96				0.30	0.26	0.30	0.07
B3652050842657021957 1 62115	96		0.07	0.07	0.07	0.07	0.05	0.05
B3652050842657021957 1 62245	96		0.05	0.05	0.13	0.13	0.12	0.03
B3652050842657021957 1 7 015	96		0.01		0.02	0.02	0.02	0.02
B3652050842657021957 1 7 145	96		0.02	0.02				
B3652050842657021957 1 71945	96		0.01		0.01	0.01		0.01
B3652050842657021957 1 72115	96		0.01		0.01	0.01		0.01
B3652050842657021957 1 72245	96		0.01		0.01		0.01	
B3652050842657021957 2 7 915	96						0.03	0.04
B3652050842657021957 2 71045	96		0.01	0.01	0.01	0.01	0.01	0.01
B3652050842657021957 2 71215	96		0.01	0.02	0.04	0.04	0.02	0.01
B3652050842657021957 2 71345	96		0.07	0.07	0.07	0.06	0.02	0.02
B3652050842657021957 2 71515	96		0.02	0.02	0.02	0.01	0.01	0.01
B3652050842657021957 2 71645	96		0.01	0.01				
B3652050842657021957 2 71815	96				0.07	0.08	0.08	0.08
B3652050842657021957 2 71945	96		0.08	0.08	0.08	0.08	0.23	0.01
B3652050842657021957 2 72115	96		0.01	0.01	0.01			0.01
B3652050842657021957 2 72245	96							0.01
B3652050842657021957 2 8 015	96				0.01			
B3652050842657021957 2 8 145	96			0.01				
B3652050842657021957 2 8 315	96		0.01					
B3652050842657021957 2 8 445	96			0.01				
B3652050842657021957 212 145	96						0.01	0.03
B3652050842657021957 212 315	96		0.03	0.01		0.01	0.01	0.01
B3652050842657021957 212 445	96		0.02	0.03	0.03	0.03	0.03	0.03
B3652050842657021957 212 615	96				0.01			
B3652050842657021957 212 745	96						0.01	
B3652050842657021957 2121045	96					0.01	0.01	0.04
B3652050842657021957 2121215	96		0.04	0.04	0.04	0.01		0.01
B3652050842657021957 2121345	96			0.01		0.01		0.02
B3652050842657021957 2121515	96		0.03	0.01				
B3652050842657021957 2121645	96		0.01	0.01			0.01	
B3652050842657021957 2121815	96				0.01	0.01		
B3652050842657021957 2121945	96						0.01	0.01
B3652050842657021957 2122115	96		0.01	0.01	0.01		0.01	0.01
B3652050842657021957 2122245	96		0.01					
B3652050842657021957 213 015	96		0.01		0.01		0.01	0.01
B3652050842657021957 213 145	96		0.01	0.01	0.02	0.01	0.02	0.01
B3652050842657021957 213 315	96		0.02	0.01	0.01	0.01	0.01	
B3652050842657021957 213 445	96		0.01		0.01	0.01	0.01	0.01
B3652050842657021957 213 615	96			0.01			0.01	
B3652050842657021957 213 745	96			0.01		0.01		0.01
B3652050842657021957 213 915	96			0.01	0.01	0.01	0.01	0.01
B3652050842657021957 2131045	96		0.01	0.02	0.06	0.06	0.06	0.07
B3652050842657021957 2131215	96		0.06	0.05	0.05	0.05	0.01	0.01
B3652050842657021957 2131345	96		0.01				0.01	
B3652050842657021957 2131515	96		0.01			0.01		0.01
B3652050842657021957 2131645	96			0.01		0.01	0.01	0.01

B3652050842657021957	2131815	96	0.02	0.01	0.02	0.01	0.02	0.01
B3652050842657021957	2131945	96	0.01	0.01		0.01		0.01
B3652050842657021957	2132115	96		0.01	0.01	0.01	0.01	0.01
B3652050842657021957	2132245	96	0.01	0.01	0.01	0.01	0.01	0.02
B3652050842657021957	214 015	96		0.01	0.01	0.28	0.28	0.22
B3652050842657021957	214 145	96	0.05	0.05	0.05	0.05	0.05	0.16
B3652050842657021957	214 315	96	0.02	0.02	0.23	0.17	0.34	0.34
B3652050842657021957	214 445	96	0.06	0.06	0.03	0.03	0.03	0.03
B3652050842657021957	214 615	96	0.03	0.10	0.05	0.38	0.14	0.01
B3652050842657021957	214 745	96	0.03	0.14	0.14	0.13	0.13	0.07
B3652050842657021957	214 915	96	0.07	0.07	0.07	0.04	0.04	0.04
B3652050842657021957	2141045	96	0.01	0.01	0.04	0.04	0.05	0.05
B3652050842657021957	2141215	96	0.05	0.04	0.04	0.04	0.04	0.04
B3652050842657021957	2141345	96	0.04	0.04				0.01
B3652050842657021957	2141515	96				0.01		
B3652050842657021957	2141645	96		0.01				0.01
B3652050842657021957	2141815	96			0.01			

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
ACODE	Int	1	Yes	Opt	Opt	Area units code, user defined.
AGENCY	Char	8	Yes	Opt	Opt	Agency code. See WATSTORE users manual, volume 1, chapter 3.
AQTYPE	Char	4	Yes	Opt	Opt	Aquifer type. See WATSTORE users manual, volume 1, chapter 3. U - unconfined single aquifer N - unconfined multiple aquifers C - confined single aquifer M - confined multiple aquifers X - mixed multiple aquifers
AZMUTH	Real	1	Yes	Opt	Opt	Azimuth, in decimal degrees from north of a straight line connecting points 85- and 10-percent of distance from gage to divide.
BASEQ	Real	1	Yes	Opt	Opt	Base discharge, in cubic feet per second. See WATSTORE users manual, volume 1, chapter 3.
BLNGTH	Real	1	Yes	Opt	Opt	Stream length, in miles, from gage to end of defined channel, blue line on topographic map.
BRANCH	Real	1	Yes	Opt	Opt	Integer id number of a channel segment.
BSLOPE	Real	1	Yes	Opt	Opt	Average basin slope, in feet per mile.
CHEAT	Int	1	Yes	Opt	Opt	Pointer to an associated data set.
COCODE	Int	1	Yes	Opt	Opt	County or parish code. See WATSTORE users manual, Appendix C.
COMPFG	Int	1	No	Opt	No	Compression flag 1 - yes, data are compressed (default) 2 - no, data are not compressed compressed data will take up less space in the WDM file, but may require a COPY operation to update data values.
CONTDA	Real	1	Yes	Opt	Opt	Drainage area, in square miles, that contributes to surface runoff.
DAREA	Real	1	Yes	Opt	Opt	Total drainage area, in square miles, including non-contributing areas.
DATUM	Real	1	Yes	Opt	Opt	Reference elevation, to mean sea level.
DCODE	Int	1	Yes	Opt	Opt	Attribute DCODE.
DEPH25	Real	1	Yes	Opt	Opt	Flow depth, in feet. Corresponding to the difference between the 25 percent flow duration gage height and point of zero flow.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
DEPTH	Real	1	Yes	Opt	Opt	Sampling depth, in feet, at which observation was made.
DESCRP	Char	80	Yes	Opt	Opt	Data-set description. Might include name and/or location, or some anecdotal information.
DSCODE	Int	1	Yes	Opt	Opt	State code of the Geological Survey office that operates the station. Usually the same as the state code (STPIPS). See WATSTORE users manual, Appendix B.
EL1085	Real	1	Yes	Opt	Opt	Average of channel elevations, in feet above mean sea level, at points 10- and 85-percent of stream length upstream from gage.
EL5000	Real	1	Yes	Opt	Opt	Percent of basin above elevation 5,000 feet, mean sea level.
EL6000	Real	1	Yes	Opt	Opt	Percent of basin above elevation 6,000 feet, mean sea level.
ELEV	Real	1	Yes	Opt	Opt	Elevation (mean sea level).
FOREST	Real	1	Yes	Opt	Opt	Forested area, in percent of contributing drainage area, measured by the grid sampling methods.
FROST	Real	1	Yes	Opt	Opt	Mean frost depth on February 28, in inches.
GCODE	Int	1	Yes	Opt	Opt	Angle (slope) code, user defined.
GLACER	Real	1	Yes	Opt	Opt	Area of glaciers, in percent of contributing drainage area.
GUCODE	Char	12	Yes	Opt	Opt	Geologic unit code. See WATSTORE users manual, Appendix F.
H01002	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H01005	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 5-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H01010	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
H01020	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H01025	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 25-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H01050	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 50-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H01100	Real	1	Yes	Opt	Opt	Annual maximum 1-day mean discharge, in cubic feet per second for 100-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03002	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03005	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 5-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03010	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03020	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03025	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 25-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03050	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 50-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H03100	Real	1	Yes	Opt	Opt	Annual maximum 3-day mean discharge, in cubic feet per second for 100-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
H07002	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H07005	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 5-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H07010	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H07020	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H07025	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 25-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H07050	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 50-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H07100	Real	1	Yes	Opt	Opt	Annual maximum 7-day mean discharge, in cubic feet per second for 100-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H15002	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H15005	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 5-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H15010	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H15020	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
H15025	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 25-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H15050	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 50-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H15100	Real	1	Yes	Opt	Opt	Annual maximum 15-day mean discharge, in cubic feet per second for 100-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30002	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30005	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 5-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30010	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30020	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30025	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 25-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30050	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 50-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
H30100	Real	1	Yes	Opt	Opt	Annual maximum 30-day mean discharge, in cubic feet per second for 100-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
HUCODE	Int	1	Yes	Opt	Opt	Hydrologic unit code (8 digits). These codes are given in the U.S. Geological Survey map series "State Hydrologic Unit Maps," Open File Report 84-708.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
I24-2.	Real	1	Yes	Opt	Opt	Precipitation intensity, 24-hour rainfall, in inches, expected on the average of once each 2 years.
I24010	Real	1	Yes	Opt	Opt	Precipitation intensity, 24-hour rainfall, in inches, expected on the average of once each 10 years.
I24025	Real	1	Yes	Opt	Opt	Precipitation intensity, 24-hour rainfall, in inches, expected on the average of once each 25 years.
I24050	Real	1	Yes	Opt	Opt	Precipitation intensity, 24-hour rainfall, in inches, expected on the average of once each 50 years.
I24100	Real	1	Yes	Opt	Opt	Precipitation intensity, 24-hour rainfall, in inches, expected cn the average of once each 100 years.
ISTAID	Int	1	Yes	Opt	Opt	Station identification number, as an integer.
J407BQ	Real	1	Yes	Opt	Opt	Base gage discharge, Bulletin 17B frequency analysis.
J407BY	Int	1	Yes	Opt	Opt	Year to begin analysis, used to identify subset of available record, Bulletin 17B frequency analysis.
J407EY	Int	1	Yes	Opt	Opt	Year to end analysis, used to identify subset of available record, Bulletin 17B frequency analysis.
J407GS	Real	1	Yes	Opt	Opt	Generalized skew, Bulletin 17B frequency analysis.
J407HO	Real	1	Yes	Opt	Opt	High outlier discharge criterion, Bulletin 17B frequency analysis.
J407HP	Int	1	Yes	Opt	Opt	Historic peak option (Bulletin 17B frequency analysis): 1 - include historic peaks 2 - exclude historic peaks
J407LO	Real	1	Yes	Opt	Opt	Low outlier discharge criterion (Bulletin 17B frequency analysis).
J407NH	Int	1	Yes	Opt	Opt	Number of historic peaks (Bulletin 17B frequency analysis).
J407SE	Real	1	Yes	Opt	Opt	Root mean square error of generalized skew (Bulletin 17B frequency analysis).

APPENDIX B--ANNIE attributes

Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
J407SO	Int	1	Yes	Opt	Opt	Generalized skew option (Bulletin 17B frequency analysis): -1 - station skew 0 - weighted skew 1 - generalized skew
J407UR	Int	1	Yes	Opt	Opt	Include urban regulated peaks (Bulletin 17B frequency analysis): 1 - no 2 - yes
JANAVE	Real	1	Yes	Opt	Opt	Mean monthly temperature for January, in degrees F.
JANMIN	Real	1	Yes	Opt	Opt	Mean mini.mum January temperature, in degrees F
JULAVE	Real	1	Yes	Opt	Opt	Mean monthly temperature for July, in degrees F.
JULMAX	Real	1	Yes	Opt	Opt	Mean maximum July temperature, in degrees F.
KENPLV	Real	1	Yes	Opt	Opt	P-level for Kendall Tau statistic.
KENSLP	Real	1	Yes	Opt	Opt	Median slope of time-series trend.
KENTAU	Real	1	Yes	Opt	Opt	Kendall Tau statistic for time-series data.
L01002	Real	1	Yes	Opt	Opt	Annual minimum 1-day mean discharge, in cubic feet per second, for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L01010	Real	1	Yes	Opt	Opt	Annual minimum 1-day mean discharge, in cubic feet per second, for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L01020	Real	1	Yes	Opt	Opt	Annual minimum 1-day mean discharge, in cubic feet per second, for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L03002	Real	1	Yes	Opt	Opt	Annual minimum 3-day mean discharge, in cubic feet per second, for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L03010	Real	1	Yes	Opt	Opt	Annual minimum 3-day mean discharge, in cubic feet per second, for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
L03020	Real	1	Yes	Opt	Opt	Annual minimum 3-day mean discharge, in cubic feet per second, for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L07002	Real	1	Yes	Opt	Opt	Annual minimum 7-day mean discharge, in cubic feet per second, for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L07005	Real	1	Yes	Opt	Opt	Annual minimum 7-day mean discharge, in cubic feet per second, for 5-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L07010	Real	1	Yes	Opt	Opt	Annual minimum 7-day mean discharge, in cubic feet per second, for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L07020	Real	1	Yes	Opt	Opt	Annual minimum 7-day mean discharge, in cubic feet per second, for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L14002	Real	1	Yes	Opt	Opt	Annual minimum 14-day mean discharge, in cubic feet per second, for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L14010	Real	1	Yes	Opt	Opt	Annual minimum 14-day mean discharge, in cubic feet per second, for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L14020	Real	1	Yes	Opt	Opt	Annual minimum 14-day mean discharge, in cubic feet per second, for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L30002	Real	1	Yes	Opt	Opt	Annual minimum 30-day mean discharge, in cubic feet per second, for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L30010	Real	1	Yes	Opt	Opt	Annual minimum 30-day mean discharge, in cubic feet per second, for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L30020	Real	1	Yes	Opt	Opt	Annual minimum 30-day mean discharge, in cubic feet per second, for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.

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Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
L90002	Real	1	Yes	Opt	Opt	Annual minimum 90-day mean discharge, in cubic feet per second, for 2-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L90010	Real	1	Yes	Opt	Opt	Annual minimum 90-day mean discharge, in cubic feet per second, for 10-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
L90020	Real	1	Yes	Opt	Opt	Annual minimum 90-day mean discharge, in cubic feet per second, for 20-year recurrence interval, defined by log-Pearson Type III fitting in ANNIE or WATSTORE program A969.
LAKE	Real	1	Yes	Opt	Opt	Area of lakes and ponds in percent of contributing drainage area.
LATCTR	Real	1	Yes	Opt	Opt	Latitude of center of basin, decimal degrees.
LATDEG	Real	1	Yes	Opt	Opt	Latitude in decimal degrees.
LATDMS	Int	1	Yes	Opt	Opt	Latitude in degrees, minutes, seconds (dddmmss).
LCODE	Int	1	Yes	Opt	Opt	Length units code, user defined.
LENGTH	Real	1	Yes	Opt	Opt	Channel length, units user defined.
LKEVAP	Real	1	Yes	Opt	Opt	Mean annual lake evaporation, in inches.
LNGCTR	Real	1	Yes	Opt	Opt	Longitude of center of basin, decimal degrees.
LNGDEG	Real	1	Yes	Opt	Opt	Longitude in decimal degrees.
LNGDMS	Int	1	Yes	Opt	Opt	Longitude in degrees, minutes, seconds (dddmmss).
LOESS	Real	1	Yes	Opt	Opt	Depth of surficial loess, in feet.
MARMAX	Real	1	Yes	Opt	Opt	Mean maximum March temperature, in degrees F.
MAXVAL	Real	1	Yes	Opt	No	Maximum value in data set, general use.
MEANND	Real	1	Yes	Opt	Opt	Mean of the logarithms, base 10, of annual n-day high-flow or low-flow statistic.
MEANPK	Real	1	Yes	Opt	Opt	Mean of the logarithms, base 10, of systematic annual peak discharges from Bulletin 17B frequency analysis or WATSTORE program J407.
MEANVL	Real	1	Yes	Opt	No	Mean of values in data set, general use.
MINVAL	Real	1	Yes	Opt	No	Minimum value in data set, general use.

APPENDIX B--ANNIE attributes

Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
NONZRO	Int	1	Yes	Opt	No	Number of non-zero values in the time series.
NUMZRO	Int	1	Yes	Opt	No	Number of zero values in the time series.
P1.25	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 1.25-year recurrence interval.
P10.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 10-year recurrence interval.
P100.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 100-year recurrence interval.
P2.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 2-year recurrence interval.
P200.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 200-year recurrence interval.
P25.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 25-year recurrence interval.
P5.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 5-year recurrence interval.
P50.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 50-year recurrence interval.
P500.	Real	1	Yes	Opt	Opt	Annual flood peak, in cubic feet per second, 500-year recurrence interval.
PARMCD	Int	1	Yes	Opt	Opt	Parameter code, see WATSTORE users manual, Appendix D.
PNEVAP	Real	1	Yes	Opt	Opt	Mean annual Class A pan evaporation, in inches.
PRCAPR	Real	1	Yes	Opt	Opt	April mean monthly precipitation, in inches.
PRCAUG	Real	1	Yes	Opt	Opt	August mean monthly precipitation, in inches.
PRCDEC	Real	1	Yes	Opt	Opt	December mean monthly precipitation, in inches.
PRCFEB	Real	1	Yes	Opt	Opt	February mean monthly precipitation, in inches.
PRCJAN	Real	1	Yes	Opt	Opt	January mean monthly precipitation, in inches.
PRCJUL	Real	1	Yes	Opt	Opt	July mean monthly precipitation, in inches.
PRCJUN	Real	1	Yes	Opt	Opt	June mean monthly precipitation, in inches.
PRCMAR	Real	1	Yes	Opt	Opt	March mean monthly precipitation, in inches.

APPENDIX B--ANNIE attributes

Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
PRCMAY	Real	1	Yes	Opt	Opt	May mean monthly precipitation, in inches.
PRCNOV	Real	1	Yes	Opt	Opt	November mean monthly precipitation, in inches.
PRCOCT	Real	1	Yes	Opt	Opt	October mean monthly precipitation, in inches.
PRCSEP	Real	1	Yes	Opt	Opt	September mean monthly precipitation, in inches.
PRECIP	Real	1	Yes	Opt	Opt	Mean annual precipitation, in inches, from U.S. Weather Bureau Series "Climates of States;" grid sampling methods used if isohyetal map is available, otherwise anomaly map constructed (Water-Supply Paper 1580-D).
QANN	Real	1	Yes	Opt	Opt	Mean annual discharge, in cubic feet per second, from WATSTORE flow variability program W4422.
QAPR	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for April, from WATSTORE flow variability program W4422.
QAUG	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for August, from WATSTORE flow variability program W4422.
QDEC	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for December, from WATSTORE flow variability program W4422.
QEX10P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 10 percent of the time, defined by daily flow duration, WATSTORE program A969.
QEX25P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 25 percent of the time, defined by daily flow duration, WATSTORE program A969.
QEX50P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 50 percent of the time, defined by daily flow duration, WATSTORE program A969.
QEX70P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 70 percent of the time, defined by daily flow duration, WATSTORE program A969.
QEX75P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 75 percent of the time, defined by daily flow duration, WATSTORE program A969.
QEX90P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 90 percent of the time, defined by daily flow duration, WATSTORE program A969.

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Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
QEX95P	Real	1	Yes	Opt	Opt	Discharge, in cubic feet per second, exceeded 95 percent of the time, defined by daily flow duration, WATSTORE program A969.
QFEB	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for February, from WATSTORE flow variability program W4422.
QJAN	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for January, from WATSTORE flow variability program W4422.
QJUL	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for July, from WATSTORE flow variability program W4422.
QJUN	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for June, from WATSTORE flow variability program W4422.
QMAR	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for March, from WATSTORE flow variability program W4422.
QMAY	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for May, from WATSTORE flow variability program W4422.
QNOV	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for November, from WATSTORE flow variability program W4422.
QOCT	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for October, from WATSTORE flow variability program W4422.
QSDANN	Real	1	Yes	Opt	Opt	Standard deviation of mean annual discharge, in cubic feet per second, from WATSTORE flow variability program W4422.
QSDAPR	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for April, from WATSTORE flow variability program W4422.
QSDAUG	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for August, from WATSTORE flow variability program W4422.
QSDDEC	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for December, from WATSTORE flow variability program W4422.
QSDFEB	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for February, from WATSTORE flow variability program W4422.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
QSDJAN	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for January, from WATSTORE flow variability program W4422.
QSDJUL	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for July, from WATSTORE flow variability program W4422.
QSDJUN	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for June, from WATSTORE flow variability program W4422.
QSDMAR	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for March, from WATSTORE flow variability program W4422.
QSDMAY	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for May, from WATSTORE flow variability program W4422.
QSDNOV	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for November, from WATSTORE flow variability program W4422.
QSDOCT	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for October, from WATSTORE flow variability program W4422.
QSDSEP	Real	1	Yes	Opt	Opt	Standard deviation, in cubic feet per second, of mean discharge for September, from WATSTORE flow variability program W4422.
QSEP	Real	1	Yes	Opt	Opt	Mean discharge, in cubic feet per second, for September, from WATSTORE flow variability program W4422.
RFOOT	Real	1	Yes	Opt	Opt	Distance from mouth of river, in feet.
RMILE	Real	1	Yes	Opt	Opt	Distance from basin outlet, in miles.
RWFLAG	Int	1	Yes	Opt	Opt	Read/Write flag: 0 - read and write 1 - read only
SDND	Real	1	Yes	Opt	Opt	Standard deviation of logarithms, base 10, of annual n-day high- or low-flow statistic.
SDPK	Real	1	Yes	Opt	Opt	Standard deviation of logarithms, base 10, of systematic annual peak discharges, from Bulletin 17B frequency analysis or WATSTORE program J407.

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Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
SEASBG	Int	1	Yes	Opt	Opt	Beginning month of a user defined season. Will start on first day of the month. Used with attribute SEASND to define a specific time period, usually a year. January is month 1 and December is month 12.
SEASND	Int	1	Yes	Opt	Opt	Ending month of a user defined season. Will end on the last day of the month. Used with attribute SEASBG to define a specific time period, usually a year. January is month 1 and December is month 12.
SITECO	Char	4	Yes	Opt	Opt	Site Code, see WATSTORE users manual, volume 1, chapter 3. SW - stream SP - spring ES - estuary GW - well LK - lake or reservoir ME - meteorological
SKEWCF	Real	1	Yes	Opt	No	Skew coefficient of values in data set, general use.
SKWND	Real	1	Yes	Opt	Opt	Skew of logarithm, base 10, of annual n-day high- or low-flow statistic.
SKWPK	Real	1	Yes	Opt	Opt	Skew of logarithms, base 10, of systematic annual peak discharges, from Bulletin 17B frequency analysis or WATSTORE program J407.
SLOPE	Real	1	Yes	Opt	Opt	Slope, units are user defined.
SN002	Real	1	Yes	Opt	Opt	Maximum water equivalent, in inches, of snow cover as of March 15, 2-year recurrence interval.
SN010	Real	1	Yes	Opt	Opt	Maximum water equivalent, in inches, of snow cover as of March 15, 10-year recurrence interval.
SN025	Real	1	Yes	Opt	Opt	Maximum water equivalent, in inches, of snow cover as of March 15, 25-year recurrence interval.
SN100	Real	1	Yes	Opt	Opt	Maximum water equivalent, in inches, of snow cover as of March 15, 100-year recurrence interval.
SNOAPR	Real	1	Yes	Opt	Opt	Mean water equivalent, in inches, of snow cover as of April 30.
SNOFAL	Real	1	Yes	Opt	Opt	Mean annual snowfall, in inches.
SNOMAR	Real	1	Yes	Opt	Opt	Mean water equivalent, in inches, of snow cover as of March 1.

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Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
SOILIN	Real	1	Yes	Opt	Opt	Soils index, in inches, a relative measure of potential infiltration (soil water storage), from Soil Conservation Service.
STAID	Char	16	Yes	Opt	Opt	Station identification, up to 16 alpha-numeric characters.
STANAM	Char	48	Yes	Opt	Opt	Station name or description of the data set.
STATCD	Int	1	Yes	Opt	Opt	Statistics code, see WATSTORE users manual, Appendix E.
STCODE	Char	4	Yes	Opt	Opt	Standard 2-character post office state abbreviation, includes DC - District of Columbia PR - Puerto Rico VI - Virgin Islands GU - Guam PI - Pacific Trust Territories Use NON for no state abbreviation.
STDDEV	Real	1	Yes	Opt	No	Standard deviation of values in data set, general use.
STFIPS	Int	1	Yes	Opt	Opt	State FIPS code, see WATSTORE users manual, Appendix B.
STORAG	Real	1	Yes	Opt	Opt	Area of lakes, ponds, and swamps in percent of contributing drainage area, measured by the grid sampling methods.
SUBHUC	Int	1	Yes	Opt	Opt	Extension to hydrologic unit code (HUCODE). See the U.S. Geological Survey map series "State Hydrologic Unit Maps," Open File Report 84-708.
TCODE	Int	1	No	Reqd	Opt	Time units code. 1 - seconds 2 - minutes 3 - hours 4 - days 5 - months 6 - years Used in combination with TSSTEP.
TGROUP	Int	1	No	Reqd	No	Unit for group pointers, depending on the time step of the data, may effect the speed of data retrievals. The default group pointer is 6 (years). See table 1 in users manual for recommended values. 3 - hours 4 - days 5 - months 6 - years 7 - centuries
TMTOPK	Real	1	Yes	Opt	Opt	Time, in hours, measured as time difference between center of mass of total rainfall and peak discharge.

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Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
TMZONE	Int	1	Yes	Opt	Opt	Time zone. Each time zone is represented as the number of hours to be added to, or subtracted from, Greenwich time: -4 - Atlantic Standard -8 - Pacific Standard -5 - Eastern Standard -9 - Yukon Standard -6 - Central Standard -10 - Alaska-Hawaii Standard -7 - Mountain Standard
TOLR	Real	1	No	Opt	No	Data compression tolerance. Data values within +- of TOLR will be considered the same value and compressed in the data set. Once data has been compressed, the original values cannot be retrieved.
TSBDY	Int	1	No	Opt	No	Starting day for time-series data in a data set. Defaults to day 1.
TSBHR	Int	1	No	Opt	No	Starting hour for time-series data in a data set. Defaults to hour 1
TSBMO	Int	1	No	Opt	No	Starting month for time-series data in a data set. Defaults to month 1 (January).
TSBYR	Int	1	No	Reqd	No	Starting year for time-series data in a data set. Defaults to year 1900.
TSFILL	Real	1	No	Opt	Opt	Time-series filler value. This value will be used for missing values. The default is 0.0.
TSFORM	Int	1	No	Reqd	No	Form of data: 1 - mean over the time step (default) 2 - total over the time step 3 - instantaneous @ time (end of time step) 4 - minimum over the time step 5 - maximum over the time step
TSPREC	Int	1	No	Opt	No	New group, new record flag: 0 - start new group at the end of the last group (default) 1 - start new group at the beginning of a record
TSPTAD	Int	1	Yes	Opt	No	Time series put aggregation/disaggregation code
TSSTEP	Int	1	No	Reqd	Opt	Time step, in TCODE units (used in combination with TCODE).

APPENDIX B--ANNIE attributes

Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
TSTYPE	Char	4	Yes	Opt	Opt	User-defined four-character descriptor. Used to describe the contents of the data set, for example: PRCP, RAIN, SNOW - precipitation FLOW, DISC, PEAK - discharges TEMP, TMIN, TMAX - temperature EVAP, PET - evapotranspiration Some models and application programs may require a specific TSTYPE for data sets they use.
UBC024	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC025	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC026	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC027	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC028	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC029	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC030	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC031	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC038	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC039	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC040	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC066	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC067	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC068	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC069	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC073	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC074	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC166	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC167	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC169	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC170	Real	1	Yes	Opt	Opt	Defined by user or application.

APPENDIX B--ANNIE attributes

Name	Type	Length	Update	Data-set type: Time	Data-set type: Table	Description
UBC182	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC183	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC184	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC185	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC186	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC187	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC188	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC189	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC190	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC191	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC192	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC193	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC194	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC195	Real	1	Yes	Opt	Opt	Defined by user or application.
UBC200	Real	1	Yes	Opt	Opt	Defined by user or application.
VALLGH	Real	1	Yes	Opt	Opt	Valley length, in miles, measured along general path of flood plain from gage to basin divide.
VBTIME	Int	1	No	Reqd	No	Variable time-step option for the data set 1 - all data are at the same time step 2 - time step may vary (default)
VCODE	Int	1	Yes	Opt	Opt	Volume units code, user defined.
VLCODE	Int	1	Yes	Opt	Opt	Velocity units code, user defined.
WELLDP	Real	1	Yes	Opt	Opt	Depth of well, in feet. The greatest depth at which water can enter the well. See WATSTORE users manual, volume 1, chapter 3.
WEMAR2	Real	1	Yes	Opt	Opt	Water equivalent, in inches, of snow cover as of the first week in March, 2-year recurrence interval.

APPENDIX B--ANNIE attributes

Name	Type	Length	Up-date	Data-set type: Time	Data-set type: Table	Description
WRCMN	Real	1	Yes	Opt	Opt	WRC mean of logarithms, base 10, of annual peak discharges after outlier and historic-peak adjustments, from Bulletin 17B frequency analysis or WATSTORE program J407.
WRCSD	Real	1	Yes	Opt	Opt	WRC standard deviation of logarithms, base 10, of annual peak discharges after outlier and historic-peak adjustments, from from Bulletin 17B frequency analysis or WATSTORE program J407.
WRCSKW	Real	1	Yes	Opt	Opt	WRC skew of logarithms, base 10, of annual peak discharge after outlier and historic-peak adjustments and generalized skew weighting, from Bulletin 17B frequency analysis or WATSTORE program J407.
XSECLC	Real	1	Yes	Opt	Opt	Cross-section locater, distance in feet from left bank (as determined by facing downstream).
YRSDAY	Int	1	Yes	Opt	Opt	Number of years of daily-flow record, from WATSTORE flow variability program W4422.
YRSLOW	Int	1	Yes	Opt	Opt	Number of years of low-flow record.
YRSHPK	Int	1	Yes	Opt	Opt	Number of consecutive years used for historic-peak adjustment to flood-frequency data used in Bulletin 17B frequency analysis or WATSTORE program J407.
YRSPK	Int	1	Yes	Opt	Opt	Number of years of systematic peak flow record, used in Bulletin 17B frequency analysis or WATSTORE program J407.

APPENDIX C--User system specifications file

TERM.DAT

The ANNIE/WDM system contains a number of parameters that define the configuration of the user's computer system and the user's preferences. All of these parameters have default values. Any number of these defaults can be overridden by adding a TERM.DAT file to the directory where ANNIE is being run. The first time ANNIE needs any one of these parameters, they are read from the main message file. Then the user's TERM.DAT file is read, if it exists, and the parameters found replace the defaults from the message file. All of the parameters are saved for the duration of the run. Table C.1 lists the keyword, default value, allowable values, and the definition for each parameter. Table C.2 shows a TERM.DAT file for a PRIME[1] with a terminal that emulates Tektronics 4014 and an HP7475 plotter. The keyword must start in column 1 and the value must start in column 7.

It is essential to correctly set the computer type, CMPTYP, and the Fortran unit numbers for terminals, TRMINP and TRMOUT.

Many of the parameters depend on the implementation of GKS and give the user the opportunity to change or correct colors, line types, symbol types , symbol sizes, background color, text fonts, and graphics devices. With most implementations of GKS, text may be modified with the parameters GKPREC, GKSCFT, GKPRFT, GKPLFT, TXTEXF, and TXTCHS. Background color on color monitors can be changed using parameters BCOLOR or BGRED, BGREEN, and BGBLUE. Symbol size can be modified with the parameter SYSSIZ. Eight parameters are available to reset the default code numbers for each of the curve specification, line type, symbol, color, and pattern. All code numbers should be available in the GKS documentation for workstations or device drivers.

[1] Reference to trade names, commercial products, manufacturers, or distributors in this manual is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey nor recommendation for use.

Table C.1.--TERM.DAT Parameters

Parameter keyword	Default value	Allowable values	Definition
CMPTYP	PC	PC PRIME VAX UNIX DG	type of computer, use PC for IBM clones
TRMTYP	PC	PC VT100	Terminal type
TRMINP	1	0 to 5	Fortran unit number for reading from the terminal (1 for PRIME, 5 for DEC VAX, 1 for PC, 0 for Data General)
TRMOUT	1	0 to 6	Fortran unit number for writing to the terminal (1 for PRIME, 6 for DEC VAX, 1 for PC, 0 for Data General)
GRAPHS	NO	NO YES	are GKS library and drivers available?
SCRWID	80	40 to 256	number of columns on the terminal
SCRLEN	24	10 to 100	number of lines shown on the terminal
FILUNI	30	7 to 99	starting Fortran unit number used by ANNIE for user's files
RECTYP	WORD	WORD HWORD BYTE UNKNOWN	units for specifying record lengths on OPEN statements for unformatted direct access files
The following 13 items are for MS-DOS PC with color display only.			
CLRFRM	15	0 to 15	color of text for messages related to parameter input
CLRFRT	11	0 to 15	color of titles and headers for full screen
CLRFRL	13	0 to 15	color of limits for parameters
CLRFRE	4	0 to 15	color for error messages
CLRFRC	14	0 to 15	color for user input on command line
CLRFRP	7	0 to 15	color for protected data values
CLRFRD	15	0 to 15	color of data to be modified
CLRFRN	14	0 to 15	color of data to be modified when currently none
CLRFRS	7	0 to 15	standard color except for full screen
CLRBKO	2	0 to 15	color of border

Table C.1.--TERM.DAT Parameters--continued

Parameter keyword	Default value	Allowable values	Definition
CLRBKB	1	0 to 15	color of background for full screen
CLRBKS	0	0 to 15	standard background color
CLRBKD	0	0 to 15	color of background block for data to be modified
WEIBA	0	0 to 10000	Weiba plotting position for Bulletin 17B flood-frequency analysis in thousandths
USRLEV	0	0 to 2	User experience level 0-lots, 2=none
For the following 40 items, see the GKS implementation manual for your system or ask your GKS administrator for a list of supported codes.			
GKSDIS	4107	any	GKS code number for workstation type for display terminal (not used for PC)
GKSPRT	102	any	GKS code number for workstation type for printer device (not used for PC)
GKSPLT	9012	any	GKS code number for workstation type for pen plotter (not used for PC)
GKSMET	9005	any	GKS code number for Meta file (not used for PC)
GKSDSP	102	any	DISSPLA Meta file code number (only useful for DISSPLA implementations of GKS)
GKPREC	CHAR	STRING CHAR STROKE	Text precision, see GKS manual for computer system and device type
GKSCFT	1	-9999 to 9999	Text font for screen
GKPRFT	1	-9999 to 9999	Text font for printer
GKPLFT	1	-9999 to 9999	Text font for plotter
LSOLID	1	-9999 to 9999	code for solid line
LDASH	2	-9999 to 9999	code for dashed line
LDOT	3	-9999 to 9999	code for dotted line
LMIXED	4	-9999 to 9999	code for dot dashed line
1LUSER	1	-9999 to 9999	extra line type code
2LUSER	1	-9999 to 9999	extra line type code
3LUSER	1	-9999 to 9999	extra line type code
4LUSER	1	-9999 to 9999	extra line type code

Table C.1.--TERM.DAT Parameters--continued

Parameter keyword	Default value	Allowable values	Definition
CBLACK	1	-9999 to 9999	code for black
CWHITE	2	-9999 to 9999	code for white
CRED	3	-9999 to 9999	code for red
CGREEN	4	-9999 to 9999	code for green
CBLUE	5	-9999 to 9999	code for blue
CCYAN	6	-9999 to 9999	code for cyan
CMAGNT	7	-9999 to 9999	code for magenta
CYELLW	8	-9999 to 9999	code for yellow
CDOT	1	-9999 to 9999	symbol code for dot
CPLUS	2	-9999 to 9999	symbol code for plus
CSTAR	3	-9999 to 9999	symbol code for star
CZERO	4	-9999 to 9999	symbol code for circle
CX	5	-9999 to 9999	symbol code for X
1SUSER	1	-9999 to 9999	extra symbol code
2SUSER	1	-9999 to 9999	extra symbol code
PSOLID	2	-9999 to 9999	code for solid fill area
PHORIZ	3	-9999 to 9999	code for horizontal fill area
PVERT	4	-9999 to 9999	code for vertical fill area
PDIAG	5	-9999 to 9999	code for diagonal fill area
1PUSER	1	-9999 to 9999	extra fill code
2PUSER	1	-9999 to 9999	extra fill code
3PUSER	1	-9999 to 9999	extra fill code
4PUSER	1	-9999 to 9999	extra fill code
SYMSIZ	100	1 to 10000	symbol size ratio in hundredths
TXTEXF	0	0 to 200	text expansion factor in hundredths
TXTCHS	0	0 to 200	text character spacing in hundredths
BCOLOR	BLACK	BLACK WHITE OTHER	background color
BGRED	0	0 to 100	percent red for background if BCOLOR=OTHER

Table C.1.--TERM.DAT Parameters--continued

Parameter keyword	Default value	Allowable values	Definition
BGREEN	0	0 to 100	percent green for background if BCOLOR=OTHER
BGBLUE	0	0 to 100	percent blue for background if BCOLOR=OTHER

Table C.2. Example TERM.DAT

FILE CONTENTS	DESCRIPTION (Note: description is not part of file)
CMPTYP PRIME	*computer type is PRIME*
GRAPHS YES	*graphics library is available*
GKSDIS 9001	*work station code number*
GKSPLT 9012	*GKS code number for pen plotter*
GKSMET 1	*GKS code number for Meta file*
USRLEV 0	*user experience is lots*
FILUNI 60	*starting Fortran unit number*

APPENDIX D--Glossary of terms

Attribute -	a variable listed in Appendix B used to characterize and identify a data set
Block -	a string of data values in a time-series data set with a header value indicating the date of the first value, number of values in the string, and quality code of the string
Buffer -	an array of data-set numbers
Command file -	a sequential file of responses to ANNIE menus
Data compression -	when a sequence of time-series values are the same, the value and the number of those values are stored instead of repeated storage of the same value
Data-set number -	a number from 1 to 32,000 assigned to a data set on a WDM file
Direct-access file -	a file in which records can be randomly written and read
Flat file -	sequential ASCII file of data
GKS -	Graphical Kernal System, an ANSI and FIPS graphics standard implemented by many software vendors with a set of Fortran callable subroutines
Log file -	a file created by ANNIE to store the sequences of responses to menus
Menu -	text written to the terminal requesting input
Message file -	direct access file that stores all the questions, help information, and valid responses for menus as well as the attribute names, definitions, and characteristics
Quality code -	number from 0 to 30 to tag time-series data and used by some of the data process options in ANNIE
TERM.DAT file -	user's configuration file providing computer system options to the ANNIE software