Hydrology Standards

VOLUME 2 of the Sacramento City/County Drainage Manual

PART 3:

# Using SACPRE
## HEC-1 Preprocessor

# Chapter 11

## SACPRE Main Menu

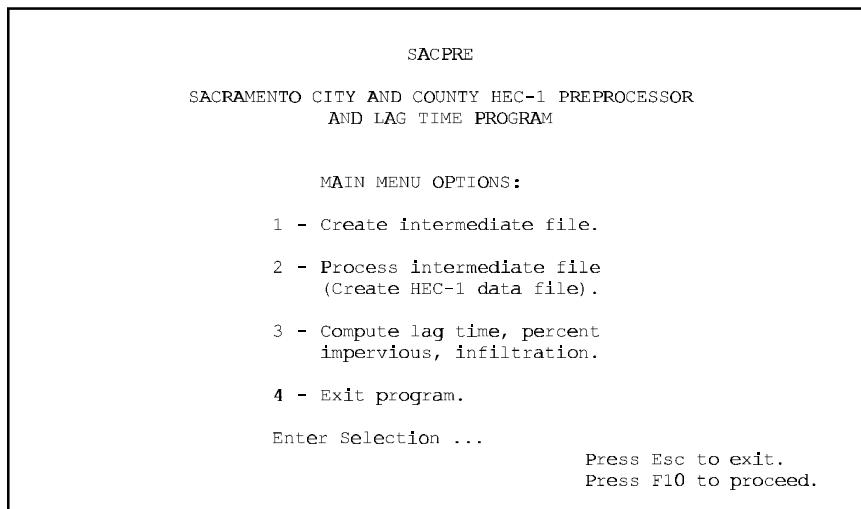## Introduction to SACPRE HEC-1 Preprocessor

*Background*     To facilitate and standardize the creation of HEC-1 input files in accordance with the Sacramento method, Sacramento County has developed a HEC-1 preprocessor, SACPRE. The program consists of interactive computer screens which prompt the user to input the information required for hydrologic calculations.

*Program Format*     The preprocessor consists of interactive input screens which guide the user through the required information for the hydrologic calculations. As the user moves to each input box on the screen, a description of the required input information is given at the bottom screen. Some input boxes, as indicated by the message at the bottom of the screen, can be left blank. If these optional boxes are left blank additional sub-menu screens will appear to aid the user in calculating the input values which were left blank. For more detailed information on the equations used by the program and the required input parameters see Part 2.

*Contents*     This chapter contains the following sections:

- SACPRE Main Menu Options
- SACPRE Hydrograph Options
- Editing Intermediate Files
- Installation and Batch Operation of SACPRE

# Overview of the Main Menu

*Main Menu Screen*

The SACPRE program has four main options as shown in the main menu screen below.

```
                           SACPRE

           SACRAMENTO CITY AND COUNTY HEC-1 PREPROCESSOR
                      AND LAG TIME PROGRAM


                    MAIN MENU OPTIONS:

              1 - Create intermediate file.

              2 - Process intermediate file
                    (Create HEC-1 data file).

              3 - Compute lag time, percent
                    impervious, infiltration.

              4 - Exit program.

              Enter Selection ...
                                       Press Esc to exit.
                                       Press F10 to proceed.
```

*Option 1*

The first main menu option, create intermediate file, prompts the user through a series of input screens for information required to generate, route and combine hydrographs. As the user enters information to the input screens the program creates an intermediate file. The intermediate file is an ascii file which contains all the information entered by the user along with additional information required by HEC-1 generated by the program. The intermediate file can be edited by any text editor, should the user wish to change any of the information previously entered in the input screens.

# Overview of the Main Menu (continued)

*Option 2*          The second main menu option, process intermediate file, will create a HEC-1 input file compatible with the latest versions of the HEC-1 program. In processing the intermediate file the user also has the option to create a summary file listing all the input parameters used in processing the intermediate file in a table suitable for review or documentation.

*Option 3*          The third main menu option, calculate lag time, percent impervious, infiltration, will do the given calculations for a basin without creating an intermediate file or an HEC-1 file. A summary file may also be created.
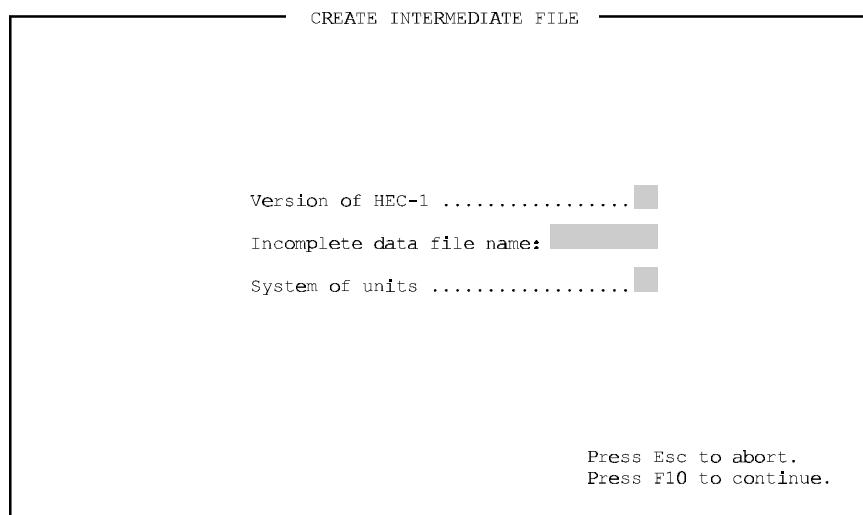
# Option 1: Create Intermediate File

*Create*
*Intermediate File*
*Screen*

The create intermediate file option prompts the user through a series of input screens for information required to generate, route and combine hydrographs. As the user enters information to the input screens the program creates an intermediate file. If the user chooses the create an intermediate file option on the main menu screen the following screen will appear.

```
┌──────────────────── CREATE INTERMEDIATE FILE ────────────────────┐
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│            Version of HEC-1 .................▮                     │
│                                                                   │
│            Incomplete data file name: ▮▮▮▮▮▮▮                      │
│                                                                   │
│            System of units .................▮                     │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│                                         Press Esc to abort.       │
│                                         Press F10 to continue.    │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

# Option 1: Create Intermediate File (continued)

*Input Data*

A summary of the required input for the *Create Intermediate File* screen follows.

**HEC-1 Version:** The user should indicate the version of HEC-1 that will be used to run the processed intermediate file. The user should enter "1" for version 4.0 (September 1990) or "2" for version 4.0.1e (April 1991).  The latest version, 4.0.1e allows the use of 2000 hydrograph computation points while previous versions use only 300 points.

**Incomplete Data File Name:** The user can start a new file or add to the end of a file previously created that was left incomplete. An incomplete file is created by choosing the pause option following the input of hydrograph data.

**System of Units:** The user can indicate the system of units for data input. Enter "S" for International System or "E" for English.

After the above *Create Intermediate File* screen is completed the *Global Program Parameters* screen appears.

*Global Program Parameters Screen*

The *Global Program Parameters* screen requires parameters which apply to the general HEC-1 model set-up and the SACPRE input defaults.

```
┌──────────────────── GLOBAL PROGRAM PARAMETERS ────────────────────┐
│                                                                    │
│                    HEC-1 file name  ▭▭▭▭▭                           │
│                                                                    │
│     Title: ▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭                              │
│     Title: ▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭                              │
│     Title: ▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭                              │
│                                                                    │
│     Number of subbasins ........ ▭    Recurrence interval ....... ▭ │
│                                                                    │
│     Design storm duration ...... ▭    Units of channel length ..... ▭ │
│                                                                    │
│     Units of area ............. ▭     Total basin area ... ▭▭▭      │
│                                                                    │
│     Output control ............. ▭    Diagram .................... ▭ │
│                                                                    │
│                                        Press Esc to abort.         │
│                                        Press F10 to continue.      │
└────────────────────────────────────────────────────────────────────┘
```

## Option 1: Create Intermediate File (continued)

*Global Parameters Input Data*

A summary of the required parameters follows.

**HEC-1 File Name:** Name of the new intermediate file to be created. The intermediate file will have a .INT extension. The HEC-1 file will have the same name with a .DAT extension.

**Title:** Title information as the user would like it to appear in the intermediate, summary and HEC-1 files.

**Number of Subbasins:** The total number of subbasins.

**Recurrence Interval:** The recurrence interval of the design storm to be used. Available options include 2-, 5-, 10-, 25- ,50-, 100-, 200-, or 500- years.

**Design Storm Duration:** The duration of the design storm. Available options include 6-, 12-, 24-, and 36-hour, and 5- or 10-day.

**Units of Channel Length**: The units that will be used to describe the channel length in the proceeding input screens. Enter "F" for feet or "M" for miles. (Enter "M" for meters or "K" for kilometers.)

**Units of Area:** The units that will be used to describe area in the proceeding input screens. Enter "A" for acres or "S" for square miles. (Enter "H" for hectares or "S" for square kilometers.)

**Total Basin Area:** The total area of all the subbasins to be modeled. The total storm depth is calculated based on this area. If more than one storm centering (Chapter 4) is required, a separate HEC-1 run is required for each centering. The total drainage area would be different in each case, and would be the area contributing to the concentration point above which the storm is centered.

**Output Control:** This option controls the level of detail of the HEC-1 output file. Enter 1,3, or 5; 1 = Print All, 3 = Input and Summaries, 5 = Master Summary Only.

**Diagram:** HEC-1 has an option to create a schematic diagram of the drainage basin network. Enter "Y" for diagram of basin network or "N" for no diagram.

## Option 1: Create Intermediate File (continued)

*Global Parameters*     After the *Global Parameters* screen is completed subsequent screens will
*Input Data*            appear for input of subbasin characteristics, hydrograph routing and hydrograph
*(continued)*           combining. The *Subbasin Characteristics* screen has additional submenus to aid
                        the computation of percent impervious, infiltration rate, and lag time. For more
                        detailed information on the subsequent screens see SACPRE Hydrograph
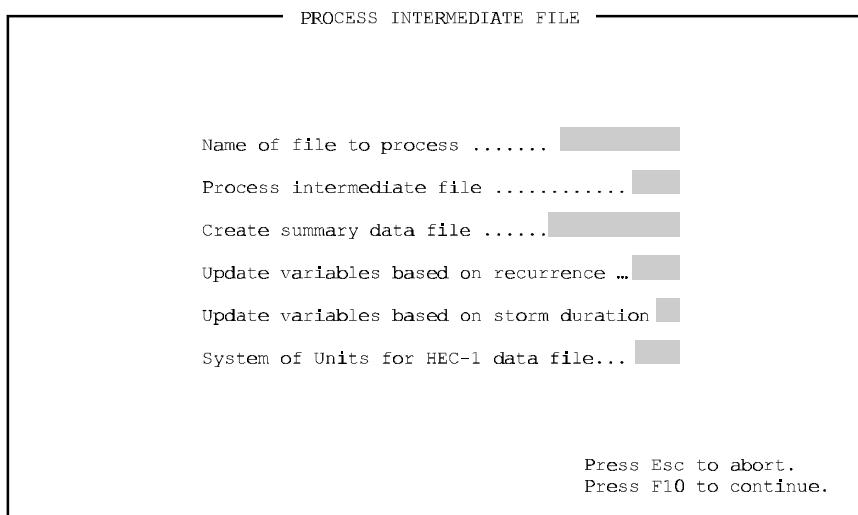                        Options in Chapter 12.

# Option 2: Process Intermediate File

*Process*
*Intermediate File*
*Screen*

The process intermediate file option transforms an intermediate file (filename.INT) into a data file that is acceptable as input to HEC-1 (filename.DAT). If the user chooses to process an intermediate file in the main menu the following screen will appear.

```
┌─────────────────── PROCESS INTERMEDIATE FILE ────────────────────┐
│                                                                   │
│                                                                   │
│                                                                   │
│        Name of file to process ....... ▓▓▓▓▓▓▓                    │
│                                                                   │
│        Process intermediate file ............▓▓▓                  │
│                                                                   │
│        Create summary data file ......▓▓▓▓▓▓▓                     │
│                                                                   │
│        Update variables based on recurrence …▓▓▓                  │
│                                                                   │
│        Update variables based on storm duration ▓▓               │
│                                                                   │
│        System of Units for HEC-1 data file... ▓▓▓                │
│                                                                   │
│                                                                   │
│                                                                   │
│                                    Press Esc to abort.            │
│                                    Press F10 to continue.         │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

# Option 2: Process Intermediate File (continued)

*Process
Intermediate File
Input Data*

A summary of the required parameter for the *Process Intermediate File* screen follows.

**Name of file to process:** The name of intermediate file to process.

**Process intermediate file:** This option allows the user to create a summary file only and not process an intermediate file. Enter "Y" to process intermediate file, "N" to suppress processing.

**Create summary file:** By entering "y", a summary file will be created (filename.PRN) that lists all the input used in processing the intermediate file.

**Update variables based on recurrence:** If the recurrence interval in the intermediate file has been edited this option will update variables dependent on the recurrence interval such as the initial loss.

**Update variables based on storm duration:** If the storm duration in the intermediate file has been edited this option will update the variables dependent on the storm duration such as computational interval and number of hydrograph ordinates. **Enter "n" to process an intermediate file at a time interval other than those given in Table 9-1, or to change the number of hydrograph ordinates.**
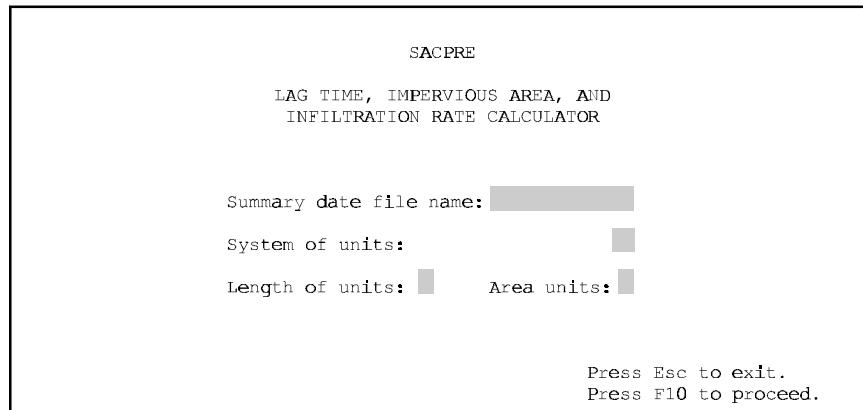
**System of Units for HEC-1 data file:** This option allows the user to choose the system of units for the HEC-1 input file. Enter "S" for International System units or "E" for English units.

# Option 3: Compute Lag, % Impervious, and Infiltration

*Lag Time, Impervious Area and Infiltration Rate Calculator Screen*

SACPRE has a third main menu option which allows the user to compute lag and/or percent impervious and infiltration rate separately from creating an intermediate file. If the user chooses to compute lag time, percent impervious and infiltration in the main menu the following two screens will appear.

```
                        SACPRE

            LAG TIME, IMPERVIOUS AREA, AND
              INFILTRATION RATE CALCULATOR



        Summary date file name: ▓▓▓▓▓▓

        System of units:                ▓

        Length of units: ▓     Area units: ▓



                              Press Esc to exit.
                              Press F10 to proceed.
```

*Lag Time, Impervious Area and Infiltration Rate Calculator Input Data*

A summary of the required input for the *Lag Time, Impervious Area and Infiltration Rate Calculator* screen follows.

**Summary Data Filename:** This option allows the user to create a summary file of all input. Enter name for summary data file or leave "NULL" for no summary.

**System of Units:** The user can indicate the system of units for data input. Enter "S" for International System or "E" for English.

**Length Units:** The units that will be used to describe channel length in the proceeding input screens. Enter "F" for feet or "M" for miles. (Enter "M" for meters or "K" for kilometers.)

**Area Units:** The units that will be used to describe area in the proceeding input screens. Enter "A" for acres or "S" for square miles. (Enter "H" for hectares or "S" for square kilometers.)

# Option 3: Compute Lag, % Impervious, and Infiltration (continued)

*Compute Lag,
Impervious Area
and Infiltration
Screen*

```
                Subbasin identification ......  [    ]

                Subbasin area ............[          ]

                Type of lag computation.......... [  ]

                Compute impervious, infiltration ..[ ]




                                        Press Esc to exit.
                                        Press F10 to continue.
```

*Compute Lag,
Impervious Area
and Infiltration
Input Data*

A summary of the input data required for the *Compute Lag, Impervious Area and Infiltration* screen follows.

**Subbasin Identification:** Enter subbasin identification.

**Subbasin Area:** Area of the subbasin.

**Type of Lag Computation:** Type of lag calculation. Enter N for basin "n" lag equation or C for lag calculations from travel time components.

**Compute Impervious, Infiltration:** Enter "Y" to compute percent impervious area and infiltration rate.

Subsequent screens used in this option are described in Chapter 12.