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HSPFParm

An Interactive Database of HSPF Model Parameters, Version 1.0

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An Interactive Database of HSPF Model Parameters
Version 1.0

by

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Disclaimer

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Abstract

The Hydrological Simulation Program-FORTRAN, known as HSPF, is a mathematical model developed under EPA sponsorship to simulate hydrologic and associated water quality processes on pervious and impervious land surfaces and in streams and well-mixed impoundments. HSPF applications since its initial release in 1980 have been worldwide and number in the hundreds. The recent resurgence of government concern for nonpoint source issues and problems and the focus on watershed scale assessment and management, as catalyzed by various sections and amendments to the Clean Water Act, have renewed interest in nonpoint source and comprehensive watershed modeling. Interest in applying the HSPF has further expanded as a result of the model's inclusion as the core watershed model within the BASINS modeling system, which is the primary tool developed and supported by the EPA Office of Water for developing Total Maximum Daily Loads (TMDLs).

Successful application of HSPF requires modelers to evaluate parameters for a large number of process-based algorithms. One of the most pressing needs to support the expanding community of HSPF modelers is for a readily available source of model parameter values that can provide the best possible starting point for developing new watershed applications. To meet this need, EPA has funded the collection of HSPF parameter values from previous applications across North America, assimilation of the parameter values into a single database, and development of an interface that enables modelers to access and utilize the database.

The pilot HSPFParm database contains parameter values for model applications in over 40 watersheds in 14 states. The parameter values that are contained in the database characterize a broad variety of physical settings, land use practices and water quality constituents. The database has been provided with a simplified interactive interface that enables modelers to access and utilize HSPF parameter values developed and calibrated in various watersheds across the United States. It is anticipated that the HSPFParm database will be expanded as current and future model applications are completed.

Contents

Acknowledgments

The development of the HSPFParm database was made possible by the support of a number of individuals and organizations. At EPA's Office of Science and Technology Russell Kinerson was the Work Assignment Manager for the effort. In this capacity he provided focus and guidance that assured a successful product.

Equally important to the successful development of the HSPFParm database were the contributions of parameter data sets by modelers across the nation. Contributors to this first version of the database included David Chen (Chinese University of Hong Kong), James Sams (USGS, Pittsburgh), Larry Moore (University of Memphis), Thomas Fontaine (South Dakota School of Mines & Technology) and Scott Wells (Portland State University). Additional acknowledgments will be due as parameter values for numerous in-progress applications are added to the database.

AQUA TERRA Consultants was responsible for the collection of parameter values for HSPF applications, assimilation of the data into a unified database, and development of a user interface. For AQUA TERRA, Tony Donigian, Jr. was the Project Manager. In addition he developed the coarse characterization data for many of AQUA TERRA's HSPF applications that were included in the database. He provided guidance throughout the planning and development of the database and the database interface. John Imhoff was the Project Engineer and was responsible for establishing database and interface requirements, acquiring data from modelers, and coordinating documentation of the final product. John Kittle, Jr. was responsible for designing the data model for the parameter database, designing the user interface, and automating the extraction of parameter values from HSPF User Control Input files. Thomas Jobes and Paul Duda provided assistance in assembling the database; in addition Paul Duda prepared the documentation related to the data model and operational aspects of the database interface. Paul Hummel assisted in developing the initial list of requirements for the user interface, and Mark Gray provided assistance in implementing the interface.

Introduction

The Hydrological Simulation Program-FORTRAN, known as HSPF, is a mathematical model developed under EPA sponsorship for simulating hydrologic and associated water quality processes on pervious and impervious land surfaces and in streams and well-mixed impoundments. It is an analytical tool that has application in the planning, design, and operation of water resources systems. HSPF is considered the most complete and defensible process-based watershed model for addressing water quality impairments associated with combined diffuse and point source pollution.

HSPF applications since its initial release in 1980 have been worldwide and number in the hundreds. The recent resurgence of government concern for nonpoint source issues and problems and the focus on watershed scale assessment and management, as catalyzed by various sections and amendments to the Clean Water Act, have renewed interest in nonpoint source and comprehensive watershed modeling. Interest in applying the HSPF has further expanded as a result of the model's inclusion as the core watershed model within the BASINS modeling system, which is the primary tool developed and supported by the EPA Office of Water for developing Total Maximum Daily Loads (TMDLs).

Successful application of HSPF requires modelers to evaluate parameters for a large number of process-based algorithms. By doing so, modelers 'fine tune' the model to represent site-specific physical, chemical and biological conditions that determine the fate and transport of pollutants. Typical applications of HSPF require the development of parameter values numbering in the hundreds. As a result, one of the most pressing needs to support the expanding community of HSPF modelers is for a readily available source of model parameter values that can provide the best possible starting point for developing new watershed applications.

To meet this need, EPA has funded the collection of HSPF parameter values from previous applications across North America, assimilation of the parameter values into a single database, and development of an interface that enables modelers to access and utilize the database.

The basic goal of developing a water quality parameter database for HSPF applications is to provide model users with one of the tools they need to develop realistic input sequences to run the model at other sites. At some point in the future it will likely be possible to tie environment-dependent water quality parameter values directly to modeling units (e.g., USGS hydrologic units) across large areas of North America. (Efforts to do the same for HSPF's hydrology parameters have already been accomplished in some areas such as the Puget Sound Region.) Users' needs to refine these baseline values and to develop values for additional water quality parameters will likely be met by use of decision support and/or expert systems that utilize additional databases, estimation techniques and rules in order to generate the needed values. By providing an archive of HSPF parameter values from across North America, the current project is a first step in developing these future capabilities.

Purpose

The purpose of developing the model parameter database is to provide future BASINS and HSPF users with the best possible starting point for evaluating HSPF parameter values for calibration efforts on new watershed applications, or additional studies on watersheds that have already been modeled. Nearly two decades of HSPF applications provide a valuable resource for expediting and improving the parameter evaluation process for future model applications. The collection of available parameter values into a single database with straightforward user interaction capabilities enables modelers to efficiently identify and access calibrated parameter values for modeling studies performed on watersheds that may have similar characteristics/settings to the watersheds which they intend to model.

This pilot effort to collect and unify the collective body of HSPF parameter values for model applications in North America sets the groundwork for archiving the data that will be made available from a growing number of ongoing and future applications. It is anticipated that the HSPFParm database will be expanded as current and future model applications are completed; it is also anticipated that the ability to fully explore and utilize the data will be enhanced by expanding the capabilities of the user interface, and by providing direct links between the database and the Users Control Input for new model applications.

Scope

We have defined the scope of the database to include study sites that meet all the following requirements:

- Sites at any scale, anywhere in North America, where HSPF water quality simulation has been performed
- Modeling studies that include both hydrology and water quality calibration parameters; water quality simulations may include one or more water quality constituents (i.e., water temperature, sediment, conventional pollutants, pesticides, etc.)
- Calibrated model parameters are available as of September 1998

Limitations

Limitations to the database product resulting from this pilot effort include those related to (1) the type of assistance made available to modelers for evaluation of model parameters, (2) the completeness of the database of parameter values and (3) the capabilities currently available for exploring and efficiently using the data contained in the database. Each of these categories of limitations is addressed below.

Limitations to nature of parameter evaluation assistance

The basic goal of developing a water quality parameter database for HSPF applications is to provide model users with one of the tools they need to develop realistic input sequences to run the model at other sites. In defining and limiting the scope of this product, we recognize that additional tools are needed by model users in order to ensure the opportunity to develop the best possible values for the parameters that determine water quality simulation results. Other useful tools include the following:

- Parameter definitions
- Summary information relating parameter values to key environmental factors and/or management practices
- When available, parameter estimation techniques
- Decision support and/or expert system capabilities that recognize interdependence of parameters and provide a directed sequence for developing full input sequences and guiding calibration efforts

Capabilities listed above are not included in the HSPFParm database product.

The usefulness of the data contained in the HSPFParm database is wholly dependent on the users' ability to evaluate whether or not the values are appropriate, and hence transferable, to the site that they are modeling. To make this determination, users need to evaluate supplemental data (e.g., hydrology, soils, weather, topography, land use, chemical properties) that characterize their own modeling site and the modeling sites/scenarios contained in the database; further, users must be able to discern the relevance of the characterization data to specific water quality parameters.

The database product does not provide a sophisticated mechanism or specific guidance that allows users to identify the list of water quality parameter values that need to be adjusted to reflect basic differences between a site/scenario contained in the database and a similar site that needs to be modeled. The database does, however, provide a 'coarse characterization' of important factors influencing parameter transferability; the characterization includes such relevant information as a modeling site's physiographic setting (e.g., coastal piedmont), the climate regime, the baseline land use types that are represented in model segments, and the relative scale (i.e., drainage area) of the model segments.

Limitations to completeness of HSPF applications database

Acquisition of parameter data sets for past HSPF applications was a difficult process. Problems encountered included academic modelers that were on sabbatical, consultants that had subsequently left the firm that employed them during the modeling project, and reluctance by modelers with ongoing applications to provide values until a more thorough calibration process had been completed. Included among the HSPF applications for which data sets have not yet been successfully acquired are applications performed in additional states and unique settings. As a result, the breadth of data that are currently contained in the database is not comprehensive. There is an opportunity to include data for a number of additional applications, some already completed and others nearing completion in the near future.

Certain types of data included in the User Control Input for some HSPF model applications are not included in the current version of the parameter database. In particular, changes to parameter values implemented using HSPF Special Actions capabilities are not stored and made available in the HSPFParm database.

Limitations to capabilities for exploring and efficiently using the data

The pilot version of the database product does not enable robust interaction with the data. The data searching and reporting capabilities are rudimentary. However, the data model that has been used to structure the parameter database provides a framework that will enable rapid development of much more powerful search, reporting, and export capabilities at a future date.

Organization

The documentation for the HSPFParm database is organized into three major sections:

- Approach to developing the database and user interface
- Operational instructions for the database product
- Description of the data model

These three sections address the following topics:

Approach

- Identify HSPF applications
- Develop a characterization strategy
- Identify database requirements
- Produce database interface
- Evaluate model applications
- Produce database

Operational Instructions

- Database Search
- Database Output Reports
- Map

Data Model

- Tables
- Queries
- Relationships
- Report Formats

Approach

The approach used to develop the parameter database featured seven steps:

- Identify HSPF applications. A thorough search for HSPF applications in North America that included hydrologic and water quality calibration was performed. Those responsible for the model applications were contacted and needed data (HSPF User Control Input (UCIs), study reports) were requested.

- Develop a characterization strategy. A list of 'coarse characterization' attributes (predominantly information not contained in the HSPF User's Control Input) was established. Compilation of these attributes was deemed necessary in order for a user to assess whether the application might yield information relevant to the watershed he or she intends to model. A strategy was also developed to extract information from the application UCIs and enter it into the parameter database. (UCIs contain an additional level of modeling detail greater than that currently accommodated in the parameter database.)

- Identify database requirements. A data model was developed to define the contents of fields and parameter tables, the structure within tables, and the relationship between tables. Parameter values were organized first by watershed, and second by modeling scenario.

- Produce database user interface. Requirements for a simple user interface were identified, and the interface was implemented using Visual Basic and MapObjects LT. In addition, an interface to the native data in the UCIs was developed. The interface provides the capability to erase, rebuild and add data for additional applications. This simplifies the activities of the HSPFParm database maintainer.

- Evaluate model applications. This task entailed implementing the characterization strategy. Study reports and supplemental information sources were reviewed to compile coarse characterization data for each model application. UCIs were evaluated manually and electronically to assess completeness of data. UCIs that were only available in paper format were converted to electronic format.

- Produce database. A batch processor was developed and used to populate the parameter database; the processor extracted data from a 'master' flat file containing coarse characterization and UCI file data. Iterative use of the batch processor identified the need to accommodate additional input options. In response, the user interface and the data model were adjusted to accommodate the additional data options. Quality assurance was performed to check the ability of the processor to correctly transfer parameter values into the database.

- Report results. Documentation was developed to explain the project approach, the database, and the user interface embodied in the final product.

Identify HSPF Applications

This first collection of HSPF parameter values was restricted to model applications that satisfied the following requirements:

- Sites at any scale, anywhere in North America, where HSPF water quality simulation has been performed
- Modeling studies that include both hydrology and water quality calibration parameters; water quality simulations may include one or more water quality constituents (i.e., water temperature, sediment, conventional pollutants, pesticides, etc.)
- Calibrated model parameters are available as of September 1998

HSPF applications to more than 40 watersheds that satisfy the above criteria for inclusion were identified by phone inquiries, literature search, internet search, and a request for information posted on the HSPF User's Group List Server. Vigorous attempts were made to contact and obtain data from the parties responsible for all model applications. Acquisition of parameter data sets for past HSPF applications was a difficult process. Problems encountered included academic modelers that were on sabbatical, consultants that had subsequently left the firm that employed them during the modeling project, and reluctance by modelers with ongoing applications to provide values until a more thorough calibration process had been completed. Included among the HSPF applications for which data sets have not yet been successfully acquired are applications performed in additional states and unique settings. As a result, the breadth of data that are currently contained in the database is not comprehensive. We hope to continue to identify and add HSPF modeling studies made known to us through the methods noted above; it is anticipated that these additional studies will be included in future versions of the database.

In spite of difficulties encountered in obtaining data for a number of applications, this first version of the HSPFParm database contains parameter values for over 40 watersheds and numerous water quality constituents.

Develop Characterization Strategy

The goal of this task was to characterize HSPF applications that included modeling of one or more water quality constituent. Applications were restricted to North America. Water quality constituents included those simulated in any of the three HSPF process modules: PERLND (pervious land segments), IMPLND (impervious land segments), and/or RCHRES (free-flowing reaches or mixed reservoirs).

The characterization of water quality modeling sites/scenarios was accomplished by using a two-tiered characterization strategy: first a coarse characterization of the watershed, then a detailed characterization of the parameters. The coarse characterization provides 'first-cut' information a user needs in order to evaluate the transferability of a set of water quality parameter values developed in one watershed for use in a second watershed. For example, a modeling site's physiographic setting (e.g., coastal piedmont), the climate regime, the baseline land use types that are being represented in model segments, and the drainage area of the watershed are provided. The second tier of information, i.e. the detailed characterization, contains the actual hydrology and water quality parameter values that were contained in the User Control Input of the model applications.

An initial decision that was made was that water quality parameter information would be organized and saved according to watershed. In numerous cases, multiple HSPF applications have been made to the same watershed, or applications have been made in greater detail for sub-basins of larger watersheds. For example the Patuxent River Basin, which has been modeled at a large scale as part of the Chesapeake Bay watershed study, has also been modeled independently using a more detailed segmentation scheme. For this initial project, we have collected and stored all available parameter values within the framework of first, the watershed for which they were developed, and second, the modeling application or scenario for which they were developed. That is to say, there was no attempt to aggregate data from multiple applications at the same location.

Coarse characterization data were organized into two categories: (1) 'watershed data' that describes the general attributes of the area that was modeled and (2) 'scenario data' that were specific to a unique application of HSPF within the watershed. The coarse characterization 'watershed data' that were selected and included in the database for each modeled watershed include the following:

- Watershed name and location. Location indicators for the study site, in terms of both political and hydrologic boundaries, are provided.

- Physiographic setting. Proximity is not always the best indicator of similarity in environmental setting. For example, on the East Coast two sites that are 200 miles distant, but both in the Piedmont area, may share closer hydrologic and water quality characteristics than two sites that are 50 miles distant, with one in the Piedmont region and one in the Coastal region.

- Weather regime. Coarse summary information (e.g., 'climate region') are provided as a potential indicator of similarity.

- Watershed drainage area. The effects that differences in modeling scale have on selecting appropriate values for individual water quality parameters and sets of inter-related water quality parameters has continually been an important issue for modelers. Extreme values representative of small watersheds may never be appropriate for averaged conditions of larger scale basins. The watershed size is provided to support this assessment.

- Hydrologic unit code. The USGS hydrologic unit code(s) for the watershed are indicated.

- Latitude and longitude. The latitude and longitude for the centroid of the watershed are provided.

- Albers coordinates. The Albers map projection coordinates are provided.

The coarse characterization 'scenario data' that were selected and included in the database for each modeled scenario included the following:

- Scenario Type Each Scenario was categorized as one of the following types: calibration, baseline, or management.

- Start and end dates for the model simulation.

- Units used for simulation. English or metric (Note: Metric UCI files have not been processed at this time).

- Land use types. Land use types included in the modeling area are recorded in the terms defined by the original site modelers.

- Channel types. Entries identify whether channels are natural, concrete, or both and indicate any significant factors such as impoundments.

- Synopsis of chemical sources. A synopsis of chemical sources is provided to aid the database user in understanding the modeling scenario. Entries for this attribute include expressions such as 'STPs, industrial point sources, atmospheric deposition, and agricultural chemical applications'.

- Type or purpose of study. To the extent possible, users need to be understand differences in the amount of thought, effort and validation that have gone into developing the water quality parameter values for a model application. To this end a short phrase that indicates the application type or purpose (e.g., 'multi-year study to determine area-wide nutrient loading reduction strategy for state technical advisory committee', or 'evaluate use of TMDL modeling approach for sediment - master's thesis') was developed and included in the coarse characterization.

- Model version. Enhancements made to process algorithms for new versions of HSPF result in the addition of new parameters; hence the version of HSPF that was used for an application partially determines the parameter values for which data are available. To flag these potential differences, it was necessary to record the version of HSPF that was used for each application.

- Application reference. To aid database users in expanding their understanding of the water quality parameter values developed for an application, and to help them assess the transferability of the values, a citation for modeling study reports were included in the database. The references also serve to identify the source of the data (i.e. the person or group responsible for the modeling effort).

- Application contact. A primary contact for the model application was documented, if available. Documentation included name, organization and phone number or e-mail address.

In addition to developing the coarse characterization strategy, a strategy was also developed related to which information would be extracted from the application UCIs and entered into the parameter database. Methods for dealing with UCI formats/issues such as values that vary by month, multiple occurrences of parameter tables, and identification and processing of data for generalized constituents (gquals) were established. At the same time a decision was made not to include certain types of data included in the UCI. In particular, changes to parameter values implemented using HSPF Special Actions capabilities are not stored and made available in the parameter database.

Identify Database Requirements

A data model was developed to define the contents of fields and tables, the structure within tables, and the relationship between tables.

The data model resulted in the design and use of eight table types within the database. The table types are as follows:

- Watershed Data table: general information about each watershed in the database
- Scenario Data table: general information about each scenario or UCI file in the database
- Segment Data table: identification information about each segment and/or reach in each scenario
- Parameter Data table: information about each parameter in each segment and/or reach, including the parameter value
- Parameter Definition: information about each parameter, such as its minimum, maximum, or default value. A space has been left for parameter definitions, but definitions have not been included in this version of HSPFParm.
- Parameter Table Definition table: information which describes each UCI parameter table
- Operation Type Definition table: associates an operation type ID with an operation type name, such as PERLND, IMPLND, or RCHRES
- Parameter Type Definition: associates a parameter type ID with a parameter type name, such as character, long integer, real, or double precision
- Table Alias Definition table: information about each table alias, used when tables appear multiple times to define the meaning of a specific instance for the table

Further details on the contents of these tables, the structure within tables, and the relationship between tables is provided in the ‘Data Model’ section of this documentation.

Produce Database Interface

Requirements for a simple user interface were identified, and the interface was implemented using Visual Basic and MapObjects LT. Interface capabilities that were developed include two categories: (1) interaction with the watershed location map and (2) database search and reporting. A summary of each category of capabilities follows.

Map interface capabilities

Map toolbar buttons allow the user to change map extent, get information about points on the map, edit the display, save or get map specifications, and print a copy of the current map. A legend tab below the map displays the meaning of the coverages on the map.

Database search and reporting

The HSPFParm database includes a software package designed to assist the user in querying the database. Through this software the user can choose watersheds using location or other characteristics, choose particular scenarios within those watersheds, choose segments or reaches from within those scenarios, and choose parameter tables from within those segments or reaches. Particular parameter values from those tables can be displayed, saved to a file, or sent to a printer. The HSPFParm database software package allows a user to select an output file for reports, and to sequentially add values, or tables of values, to the file as output.

Further details on how to utilize the user interface are provided in the ‘Operational Instructions" section of this documentation.

The data model that has been used to structure the parameter database provides a framework that will enable rapid development of much more powerful search, reporting, and export capabilities in the future. The capability to export a UCI out of the HSPFParm database and into BASINS as a direct replacement of the BASINS default UCI will be considered for implementation in the near future.

Evaluate Model Applications

This task entailed implementing the watershed/scenario characterization strategy. Study reports and supplemental information sources were reviewed to compile coarse characterization data. A coarse characterization form was designed and filled out for each model application. In some cases, those responsible for model applications agreed to provide the coarse characterization data; in other cases the database developers filled out the coarse characterization forms based on study reports. In cases where the coarse characterization form was not filled out by the party responsible for the model application, certain attributes such as the physiographic setting and weather regime were most often derived from a single, standardized resource document rather than relying on inconsistent descriptions in the study reports; likewise, information related to latitude/longitude, Albers map coordinates, HUC codes etc. were developed for all watersheds represented in the database using standardized methods and resource documents.

To develop the detailed characterizations, the UCI for each modeling scenario was evaluated manually and electronically to assess availability and completeness of data. To populate the HSPFParm database, there was a need to process UCIs for model applications that used a number of different versions of HSPF. The batch processor evolved throughout the project to enable complete and accurate processing of the parameter values contained in UCIs corresponding to all versions of the model. UCIs that were only available in paper format were first converted into electronic format, and then checked for errors by passing them through the batch processor.

Produce Database

A batch processor was developed and used to populate the parameter database; the processor extracted data from a ‘master’ flat file containing coarse characterization and UCI file data. This approach to populating the database offered two distinct advantages.

First, iterative use of the batch processor identified the need to accommodate additional input options/issues such as multiple occurrences of parameter tables, identifying English or metric units, and identifying and processing data for generalized constituents (gquals). In response, the user interface and data model were adjusted to accommodate the additional data options. Quality assurance was performed to check the ability of the processor to correctly transfer parameter values into the database.

The second advantage afforded by populating and re-populating the database using the ‘master file’ and the batch processor was assuring the integrity and reproducibility of the database. This approach assures that the parameter values come directly from their native environment (i.e., the User Control Input of the model applications.)

Requirements for UCIs

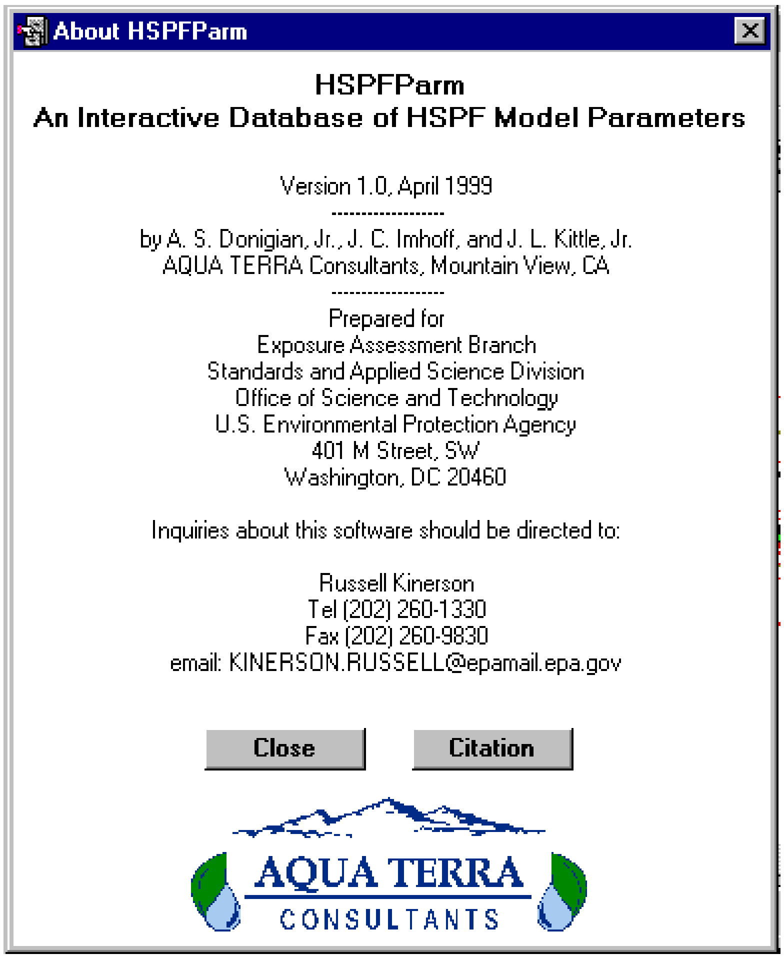
All scenarios to be included in the database must be described by UCI files. The WDM files referenced by the UCI files do not have to exist, but otherwise the UCI files must be complete so that they proceed through the HSPF run interpreter without error. In order to proceed through the run interpreter, all UCI files must contain a FILES block, and the paths to files referenced in the FILES block must be valid for the system on which the software is being run. In UCIs without a FILES block, a dummy FILES block was added.

Operational Instructions

The HSPFParm database and associated software must be installed on the machine where it is to be used.

Though it is not required to use the HSPFParm software, using Microsoft Access to view, query and report from the database may be beneficial to the user.

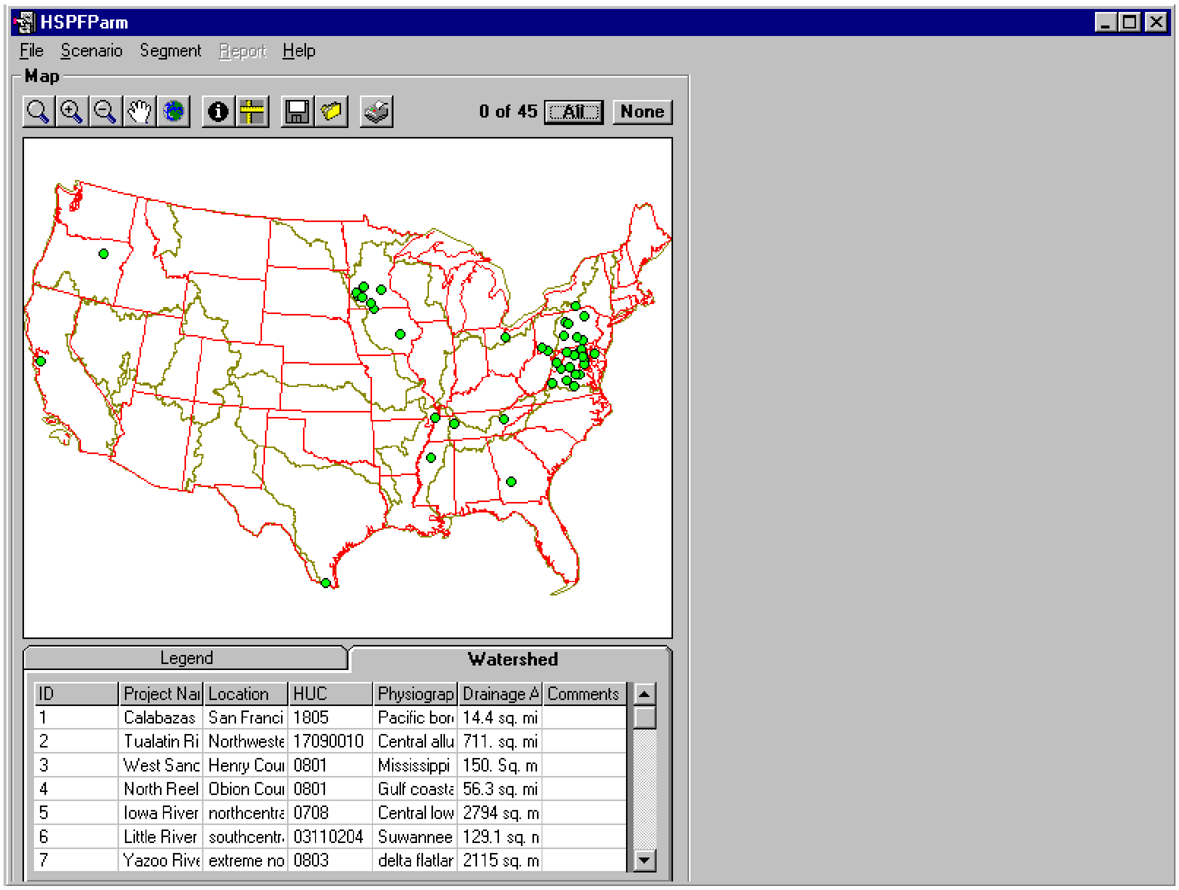
Obtain a HSPFParm installation package from EPA. Contact the distribution center shown below.



DBSearch

The HSPFParm database includes a software package designed to assist the user in querying the database. Through this software the user can choose watersheds using location or other characteristics, choose particular scenarios within those watersheds, choose segments or reaches from within those scenarios, and choose tables from within those segments. Particular parameter values from those tables can be displayed, saved to a file, or sent to a printer.

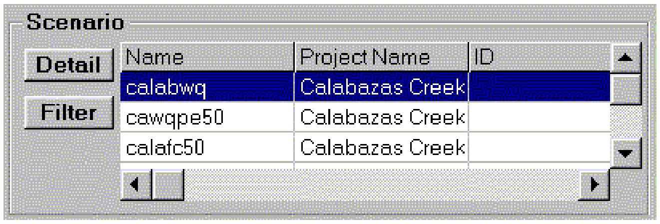
Double-click on the HSPFParm icon or choose HSPFParm in the Start Menu to invoke the HSPFParm database software. The HSPFParm main window will appear, displaying a map of locations where HSPF watershed applications exist.



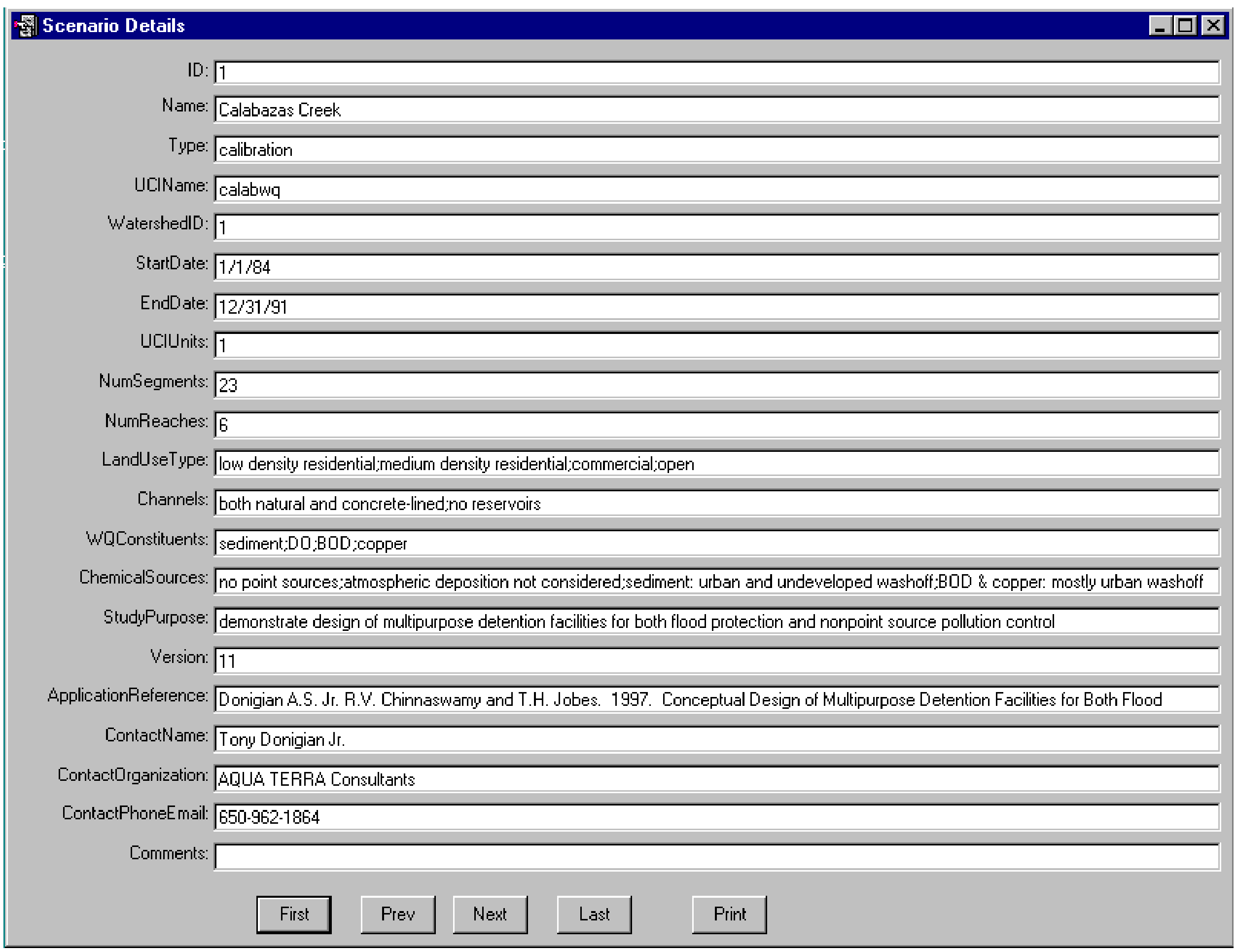
Note the Menu Bar at the top of the window. Online help is available by clicking on the Help menu item.

Scenarios

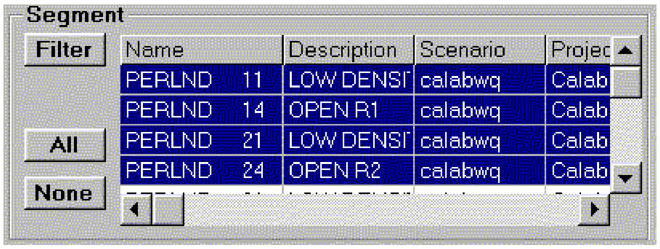
Clicking a site on the map or in the list below the map will select a watershed. One or multiple watersheds may be selected at once. When a watershed is selected the scenario frame will appear to the right of the map, displaying the scenarios within that watershed.



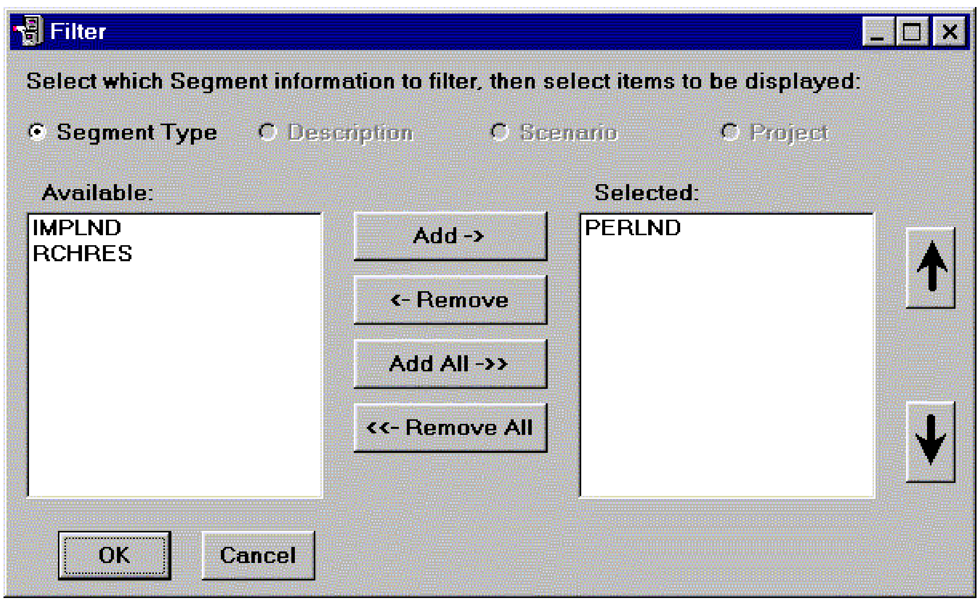
Clicking the ‘Detail’ button will produce a window showing the details of the selected scenario. In this window the user may review the characteristics of a particular scenario. The buttons at the bottom of the window allow the user to move through the available scenarios.



Clicking on a scenario name in the scenario frame will result in the segment frame appearing below the scenario frame. The segment frame contains all of the PERLND, IMPLND, or RCHRES segments within the selected scenario(s). Note: Within the HSPFParm database interface, and throughout this documentation, the term 'segment' connotes a modeling segment and is inclusive of both land surface segments <u>and</u> surface water reaches.

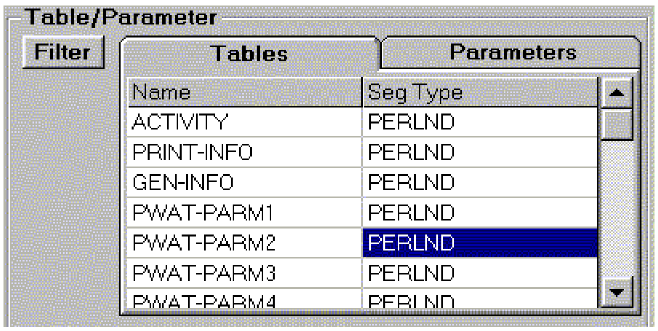


The 'Filter' button allows the user to select which HSPF operations to display in the Segment list. Only those segments in the selected portion of the filter window will be included in the Segment list.

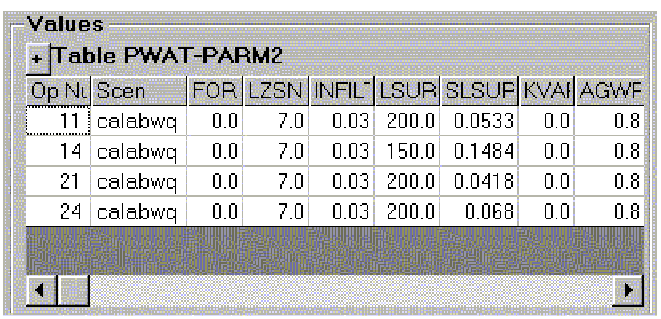


Values

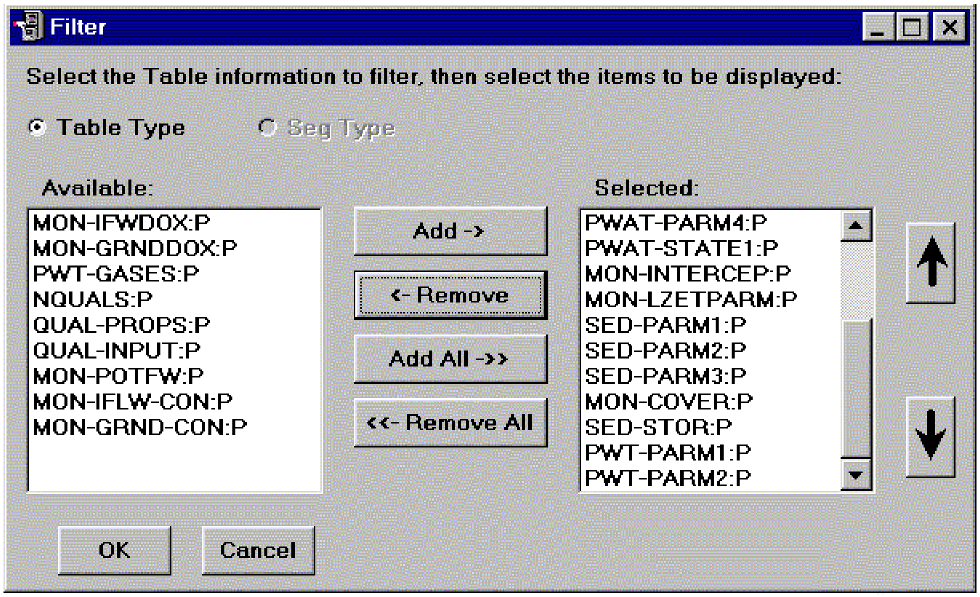
Clicking on one or more segments in the Segment frame results in the appearance of the Table/Parameter frame. If the Table tab is active within this frame, the user may scroll through a list of all of the tables which apply to the selected segments.



Clicking a table name will result in values being displayed for all parameters in that table for the selected segments in the values frame below the Table/Parameter frame. If the Parameter tab is active within this frame, the user may scroll through a list of all of the parameters which apply to the selected segments. Clicking a parameter name will result in values being displayed in the values frame for that parameter for the selected segments.

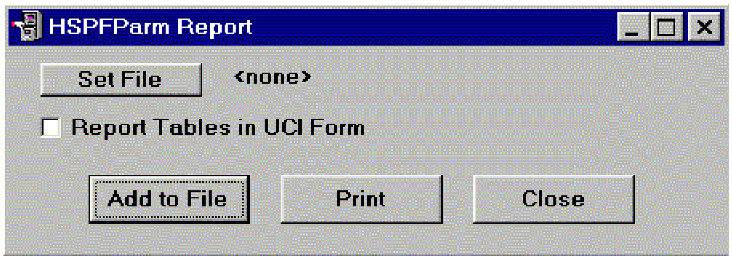


Clicking the ‘Filter’ button in the Table/Parameter frame produces a window with which the user may select tables to appear in the list. Only the tables in the ‘selected’ list will appear in the Table/Parameter list.



DBOutput Reports

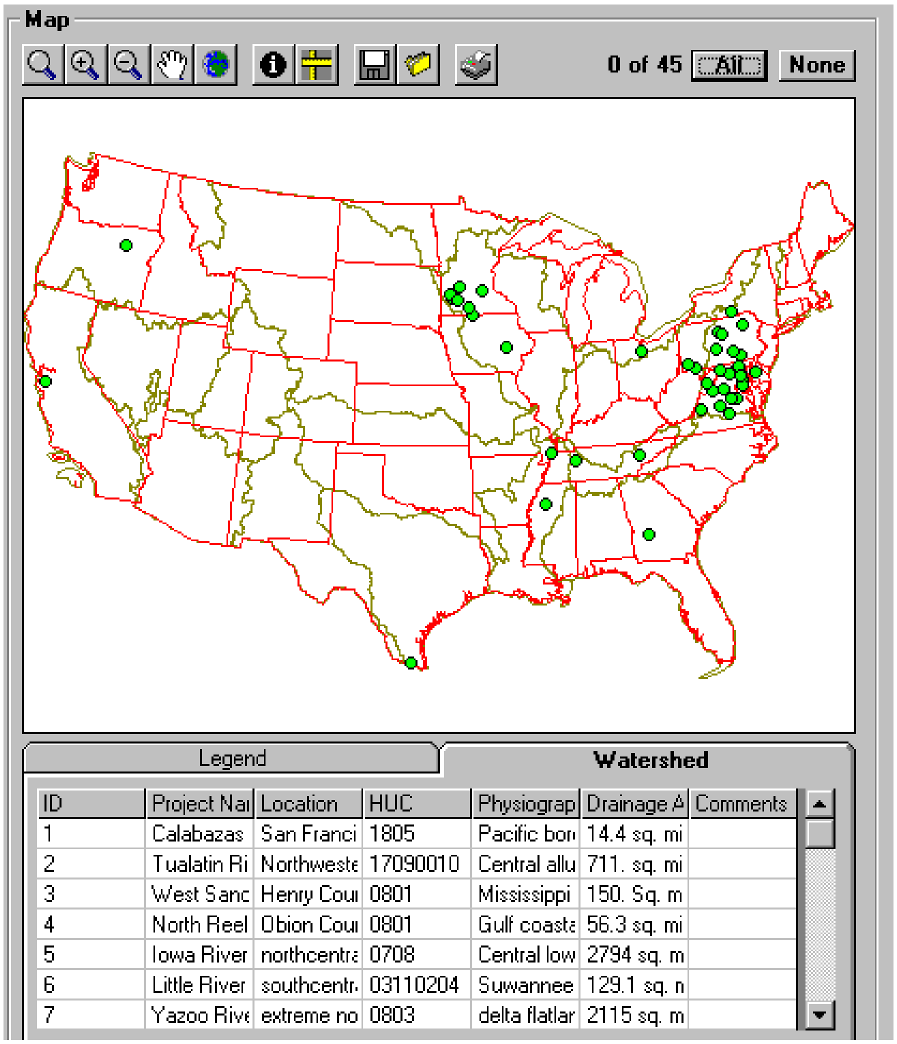
The HSPFParm software contains a report feature which is available whenever a table or parameter is displayed in the Values frame. To access the report feature, click on the 'Report' menu item.



Clicking the 'Set File' button allows the user to select an output file for reports. Once the output file is set, the user may click on the 'Add to File' button to add the contents of the Values frame to the output file. If a table is displayed in the Values frame, the user has the option of writing the output in the form of that table in the Values frame or in the form of a properly formatted UCI file table. Choosing the 'Report Tables in UCI Form' check box allows the tables to be written in such a way that the user may directly extract these tables from the output file to use in their own UCI file. If a parameter is displayed in the Values frame, the output report will be written in the format of the values in the Values frame. Table or parameter reports may also be printed directly using the 'Print' button.

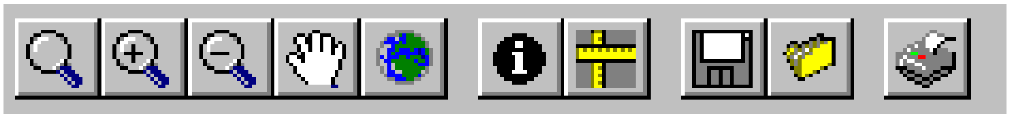
Map

A map of the United States is provided to visualize the locations of the watersheds in the database. The map shows state boundaries, hydrologic regions and watershed locations. The map is projected to the Albers coordinate system (US national parameters).



The user may choose watersheds by clicking on points on the map or by selecting items from the list below the map. A map toolbar is provided to allow the user to manipulate the map in a variety of ways.

Map Toolbar



The Map Toolbar contains buttons which allow the user to change the map extent , get information about points on the map, edit the display , on the map, save or get map specifications, and print a copy of a map.

Zoom, Pan, Full Extent

The leftmost grouping of five buttons on the map toolbar are used to display desired map extents. The Zoom button allows the user to specify an area of the map to display by drawing a box around the desired area. This is done by clicking and holding down the left mouse button in one corner and then dragging the pointer to the opposite corner and releasing the mouse button when the box is defined. The Zoom In button causes an incremental zoom to a smaller portion of the map. The Zoom Out button causes an incremental zoom to a larger portion of the map. The Pan button is used to pan left, right, up, and down on the map extent. This is done by clicking and holding down the left mouse button on the map and moving the map in the desired direction. The scroll bars on the right and bottom of the map may also be used to pan the visible portion of the map. The Full Extent button is used to display the full (largest available) extent of the map.

Identify

The Identify button is used to enter identify mode. This mode is indicated by having a "?" symbol attached to the pointer. In identify mode, a label is displayed just below the cursor for the map feature nearest to the cursor. The currently selected table below the map is the layer being identified. The table is automatically scrolled so the line of the table containing information about the closest map feature appears at the top of the table. The database field used for these labels can be changed in the Labels form, accessed through the Edit Map Display Attributes form.

While on the map, the mouse pointer will remain in identify mode until another button on the map toolbar is selected or the right mouse button is clicked.

Save Map

The Save Map button is used to save the current map settings to a map specifications file or to save an image of the map to a file or to the clipboard as a bitmap or Windows Metafile. The user will be prompted for the file name through a file open common dialog. Map settings include the current map extent and the coverages (and their characteristics) displayed. Once the map settings are saved they can

be retrieved at any time during this or any other HSPFParm run using the Get Map Specifications button. The Save as Type list in the save dialog is used to save an image of the current map. After choosing a format, the file name should end with the appropriate extension for that format, as indicated in parentheses in the Save as Type blank.

Get Map Specifications

The Get Map Specifications button is used to retrieve previously saved map settings from a map specifications file. The user will be prompted for the file name through a file open common dialog. Map settings include the current map extent and the coverages (and their characteristics) displayed. The retrieval of the map settings allows the user to recall a specific area of interest or a desired combination of coverages.

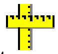
Print

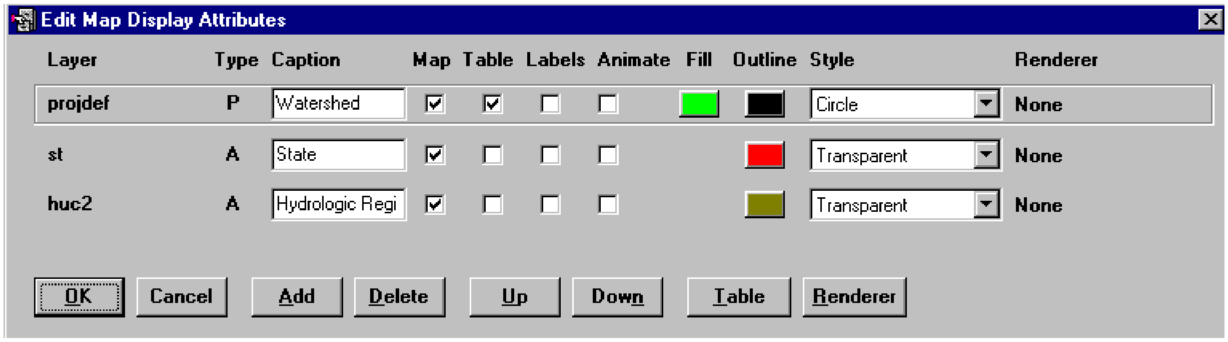
The Print Map button causes the map to be sent to the currently selected printer. No printer dialogue is displayed for selecting the printer, so the user should select the system printer from the operating system (if needed) before printing the map. For a black and white printer, gray scales will be used to indicate colors on the map.

Legend

The Legend tab below the map displays the meaning of the coverages on the map. Coverage symbols and their colors are displayed with a descriptive name next to each coverage.

Edit Map Display Attributes

Clicking the Edit Layers  button on the toolbar or clicking inside the legend will cause the Edit Map Display Attributes form to appear. This form displays all of the current coverages and their colors and styles.



The Layer column displays the name of the database containing each layer. The Type column displays ‘P’ for a point layer, ‘L’ for a line layer such as rivers, or ‘A’ for an area layer. In the Caption column, the text used to identify each table can be edited.

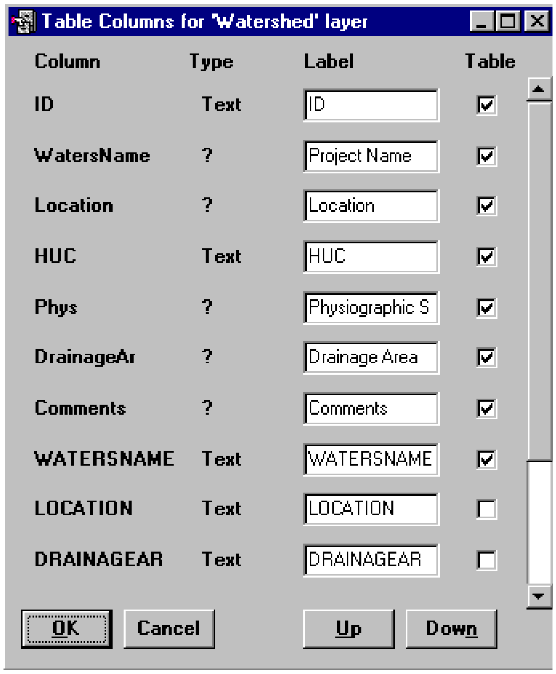
Clicking a check box in the Map column will change whether or not a layer will appear on the map. Table check boxes determine whether or not a table is displayed in a tab below the map. Checking a Table check box will cause the Table Columns form to appear so columns from the database can be selected for display. Clicking the ‘Table’ button while a layer is selected is another way to check a Table check box. Label check boxes are similar to Table check boxes. Checking a Label check box causes the Labels form to appear so the source and style of labels can be adjusted.

Clicking on the color patches next to a coverage will cause a color palette form to appear that will allow selection of the desired color for that coverage. Clicking on the Style list allows the user to modify the style of the coverage. Clicking the ‘Renderer’ button while a layer is selected causes the Renderer form to appear so different colors and styles can be used depending on data. When a renderer is in use, the fill and outline colors and style that appear on the Edit Map Display Attributes form will only be used for features that can not be drawn by the renderer. This usually happens because there is incomplete data in the shape database describing the features.

The currently selected layer is indicated by a rectangular outline. Clicking on any part of a row of information selects that layer. The layers are displayed in the order in which they appear on the map. The bottom layer in the list is drawn first and the top layer in the list is drawn on top of all the other layers. The ‘Up’ button and the ‘Down’ button move the currently selected layer up and down in the drawing order.

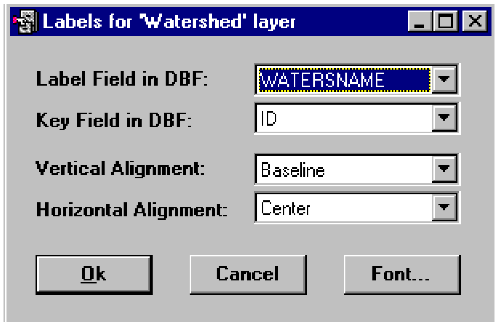
The ‘Add’ button uses a file open common dialog to locate an ESRI shape file to add to the map. The ‘Delete’ button removes the currently selected layer from the map. Changes to the coverages and their colors and styles will not take effect until the ‘OK’ button is clicked. Clicking the ‘Cancel’ button will nullify any changes to the map that had been specified.

Table Columns



Each row in this form corresponds to a field in the shape database and can be displayed as a column in a table below the map. Column labels can be edited in the Label text boxes and columns are selected for inclusion in the table with the Table check boxes. The ‘Up’ button and the ‘Down’ button can be used to change the order of the fields.

Labels



The Label Field in DBF control selects which database field to use for labeling. The same field will be used for the labels that appear in identify mode. The Key Field in DBF control sets the field to use for selecting features. This will typically be WATERSNAME for in the application. DBF files are simple databases associated with each shape file. Vertical and horizontal alignment of labels can be customized. The 'Font...' button will cause a common dialog to appear for specifying the size, color, and style of labels.

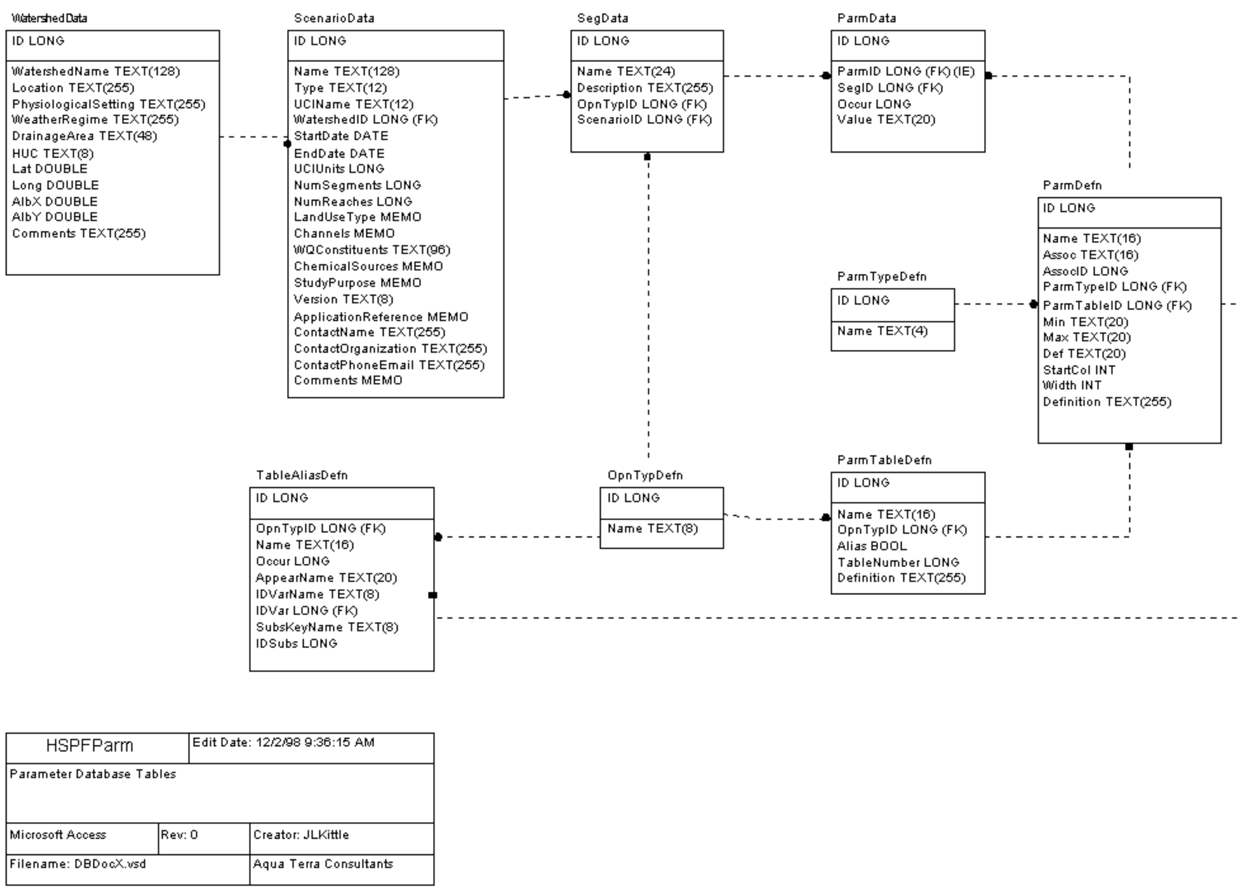
Data Model

The following sections provide technical details of the HSPFParm database. The database contains nine tables with ten relationships between them. Seven queries are used to update or extract data from the database. Three reports can be produced by the HSPFParm interface software.

Further details of the HSPFParm database can be obtained by reviewing it with Microsoft Access (version 7.0 or later).

Tables

The chart below shows the structure of the tables within the HSPFParm database.



Records in the WatershedData table contain information about each watershed in the database. In the HSPFParm interface, the location of these watersheds are shown on the map and described in the Watershed table below the map in the main window. The following are the fields, data types, and associated information in this table:

- ID - LONG - assigned automatically at record creation
- WatershedName - TEXT
- Location - TEXT
- PhysiographicSetting - TEXT
- WeatherRegime - TEXT
- DrainageArea - TEXT
- Hydrologic Unit Code - TEXT - 2 to 8 digits depending on watershed size
- Latitude - DOUBLE
- Longitude - DOUBLE
- Albers X Coordinate - DOUBLE - calculated from Latitude/Longitude
- Albers Y Coordinate - DOUBLE - calculated from Latitude/Longitude
- Comments - TEXT

The ScenarioData table contains information about each scenario or UCI file in the database. Each scenario is associated with one watershed; one watershed may have multiple scenarios associated with it. The following are the fields in this table:

- ID - LONG - assigned automatically at record creation
- Name - TEXT
- Type - TEXT - valid values are ‘calibration’, ‘management’ or ‘baseline’
- UCIName - TEXT - file with UCIName and suffix ‘.uci’ must exist to create database
- WatershedID - LONG - see WatershedData for valid values
- StartDate - DATE - obtained from UCI
- EndDate - DATA - obtained from UCI
- UCIUnits - LONG - English:1, obtained from UCI
- NumSegments - LONG - obtained from UCI

- NumReaches - LONG - obtained from UCI
- LandUseType - MEMO
- Channels - MEMO
- WQConstituents - TEXT
- ChemicalSources - MEMO
- StudyPurpose - MEMO
- Version - TEXT
- ApplicationReference - MEMO
- ContactName - TEXT
- ContactOrganization - TEXT
- ContactPhoneEmail - TEXT
- Comments - MEMO

The SegData table contains information about each segment in each scenario. Each segment is associated with one scenario; one scenario likely has multiple segments associated with it. The following are the fields in this table:

- ID - LONG - assigned automatically at record creation
- Name - TEXT - from UCI
- Description - TEXT - from UCI
- OpnTypID - LONG - see OpnTypDefn for valid values
- ScenarioID - LONG - see ScenarioData for valid values

The ParmData table contains information about each parameter in each segment, including the parameter value. Each parameter is associated with one segment; one segment will have multiple parameters associated with it. Some parameters may occur multiple times, hence each parameter has an occurrence field. The following are the fields in this table:

- ID - LONG - assigned automatically at record creation
- ParmID - LONG - see ParmDefn for valid values
- SegID - LONG - see SegData for valid values

- Occur - LONG
- Value - TEXT

The ParmDefn table contains information about each parameter, such as its minimum, maximum, default value, and definition. This table also associates each parameter with the UCI parameter table in which it is contained. Each parameter in the parameter data table is associated with one parameter definition. The following are the fields in this table:

- ID - LONG - assigned automatically at record creation
- Name - TEXT
- Assoc - TEXT - associated parameter name (ties monthly parameters to their constant cousin)
- AssocID - LONG - associated parameter ID
- ParmTypeID - LONG - see ParmTypeDefn for valid values
- ParmTableID - LONG - see ParmTableDefn for valid values
- Min - TEXT - minimum allowed value
- Max - TEXT - maximum allowed value
- Def - TEXT - default Value
- StartCol - INT - starting column in UCI file
- Width - INT - width of field in UCI File
- Definition - TEXT - not currently in use

The ParmTableDefn table contains information which describes each UCI parameter table. Each parameter table is associated with one parameter table definition. The following are the fields in this table:

- ID - LONG - assigned automatically at record creation
- Name - TEXT
- OpnTypID - LONG - see OpnTypDefn for valid values
- Alias - BOOL - indicates if an alias exists in TableAliasDefn
- TableNumber - LONG
- Definition - TEXT - not currently in use

The OpnTypDefn table associates an operation type ID with an operation type name. The following are the fields in this simple table:

- ID - LONG - valid are ‘1’,’2’,’3’
- Name - TEXT - valid are ‘PERLND’, ‘IMPLND’, ‘RCHRES’

The ParmTypeDefn table associates a parameter type ID with a parameter type name, such as character, long integer, real, or double precision. The following are the fields in this simple table:

- ID - LONG - valid are ‘1’,’2’,’3’,’4’
- Name - TEXT - valid are ‘Char’,’Long’,’Real’,’Dble’

The TableAliasDefn table contains information about each table alias. The following are the fields in this table:

- ID - LONG - assigned automatically at record creation
- OpnTypID - LONG - - see OpnTypDefn for valid values
- Name - TEXT - parameter table name, see ParmTableDefn for valid values
- Occur - LONG - occurrence of table
- AppearName - TEXT - occurrence name (such as ‘FIRST CROP’ for occurrence 1 of CROP-STAGES)
- IDVarName - TEXT - name of variable containing alias (such as QUALID for QUAL-PROPS)
- IDVar - LONG - ID in ParmDefn for IDVarName
- SubsKeyName - TEXT - name of supplemental variable
- IDSubs - LONG - ID in ParmDefn for SubsKeyName

Queries

Queries are used in the HSPFParm database to populate fields in tables in the interface and update fields when the HSPFParm database is being created. In the following sections the structured query language (SQL) for each query is shown along with a brief description of the purpose of the query.

Query: ParmTableAliasAvailable

This query changes the Alias value in the ParmTableDefn table to true where appropriate. It runs when the database is created.

```
SQL: UPDATE DISTINCTROW TableAliasDefn INNER JOIN ParmTableDefn ON
(TableAliasDefn.OpnTypID = ParmTableDefn.OpnTypID)
AND (TableAliasDefn.Name = ParmTableDefn.Name)
SET ParmTableDefn.Alias = Yes;
```

Query: ParmTableData

This query builds a result set containing all parameter values in the database. It is used with various criteria to populate the values frame in the interface

```
SQL: SELECT DISTINCTROW SegData.ID AS SegID, ParmDefn.Name, ParmData.Value,
ParmDefn.ID AS
ParmID, ParmDefn.AssocID AS AssocID, ParmDefn.ParmTableID AS TabID,
ParmTableDefn.Name AS [Table]
FROM (ScenarioData INNER JOIN SegData ON ScenarioData.ID = SegData.ScenarioID)
INNER JOIN
((ParmTableDefn INNER JOIN ParmDefn ON ParmTableDefn.ID =
ParmDefn.ParmTableID) INNER JOIN
ParmData ON ParmDefn.ID = ParmData.ParmID) ON SegData.ID = ParmData.SegID;
```

Query: ParmTableList

This query builds a result set containing information about all parameter tables in the database. It is used with a table id to get information about parameters in a particular table.

```
SQL: SELECT DISTINCTROW ParmDefn.Name, ParmDefn.ID, ParmTableDefn.ID AS TabID,
ParmTableDefn.Name AS TabName, ParmTableDefn.OpnTypID, ParmTypeDefn.Name AS
ParmType,
ParmDefn.Def, ParmDefn.Min, ParmDefn.Max, ParmDefn.StartCol, ParmDefn.Width
FROM ParmTypeDefn INNER JOIN (ParmTableDefn INNER JOIN ParmDefn ON
ParmTableDefn.ID =
ParmDefn.ParmTableID) ON ParmTypeDefn.ID = ParmDefn.ParmTypeID
ORDER BY ParmDefn.ID, ParmTableDefn.ID;
```

Query: ScenTableList

This query builds a result set containing information about available tables for scenarios which meet a id criteria.

```
SQL: SELECT DISTINCTROW SegData.ID AS SegID, ParmTableDefn.Name,
ParmTableDefn.ID AS TabID,
ParmTableDefn.OpnTypID
FROM (ScenarioData INNER JOIN SegData ON ScenarioData.ID = SegData.ScenarioID)
INNER JOIN
((ParmTableDefn INNER JOIN ParmDefn ON ParmTableDefn.ID =
ParmDefn.ParmTableID) INNER JOIN
ParmData ON ParmDefn.ID = ParmData.ParmID) ON SegData.ID = ParmData.SegID;
```

Query: UniqueName

This query builds a result set containing the different names found in parameters ‘PESTID’, ‘QUALID’ and ‘GQID’.

```
SQL: SELECT DISTINCTROW OpnTypDefn.Name AS OpnType, ParmDefn.Name AS ParmName,
ParmData.Value
FROM (ParmDefn INNER JOIN (OpnTypDefn INNER JOIN TableAliasDefn ON
OpnTypDefn.ID = TableAliasDefn.OpnTypID) ON ParmDefn.ID =
TableAliasDefn.IDVar)
INNER JOIN ParmData ON ParmDefn.ID = ParmData.ParmID
GROUP BY OpnTypDefn.Name, ParmDefn.Name, ParmData.Value,
TableAliasDefn.OpnTypID,
TableAliasDefn.IDVar
ORDER BY TableAliasDefn.OpnTypID, ParmDefn.Name, ParmData.Value;
```

Query: ParmListAll

This query lists all parameters in the database along with related text information like watershed name, scenario name, segment name, etc. Don’t run it unless you have lots of ram and disk space.

```
SQL: SELECT DISTINCTROW OpnTypDefn.Name AS OpnType,
ParmTableDefn.Name AS [Table],
ParmDefn.Name AS Parm,
WatershedData.WatershedName AS Watershed,
ScenarioData.Name AS Scenario,
SegData.Name AS Segment,
ParmData.Occur,
ParmData.Value
FROM ((WatershedData INNER JOIN ScenarioData ON WatershedData.ID =
ScenarioData.WatershedID)
INNER JOIN SegData ON ScenarioData.ID = SegData.ScenarioID)
INNER JOIN (OpnTypDefn
INNER JOIN ((ParmTableDefn
INNER JOIN ParmDefn ON ParmTableDefn.ID = ParmDefn.ParmTableID)
INNER JOIN ParmData ON ParmDefn.ID = ParmData.ParmID) ON OpnTypDefn.ID =
ParmTableDefn.OpnTypID) ON SegData.ID = ParmData.SegID
ORDER BY ParmDefn.ParmTableID, ParmData.ParmID, ParmData.Occur,
WatershedData.WatershedName, ScenarioData.Name, SegData.Name;
```

Relationships

Tables in the HSPFParm database have ten defined relationships. Each relationship in this database has many values in a field in the first table relating to one value in a field in the second table. A relationship is defined by a relationship name, first table name and field, and second table name and field. The relationships are as follows:

- OperationName: SegData!OpnTypID - OpnTypDefn!ID
- OpnTypDefnTableAliasDefn: TableAliasDefn!OpnTypID - OpnTypDefn!ID
- ParmDefnTableAliasDefn: TableAliasDefn!IDVar - ParmDefn!ID
- ScenarioName: SegData!ScenarioID - ScenarioData!ID
- ProjectName: ScenarioData!WatershedID - WatershedData!ID
- ParameterTypeName: ParmDefn!ParmTypeID - ParmDefn!ID
- ParameterTableName: ParmDefn!ParmTableID - ParmTableDefn!ID
- ParmName: ParmData!ParmID - ParmDefn!ID
- SegmentName: ParmData!SegID - SegData!ID
- ParmOperationName: ParmTableDefn!OpntypID - OpnTypDefn!ID

Report Formats

The HSPFParm interface can write files containing parameter values in either a text format which includes scenario name and associated header information or a UCI format which has just the information needed for the requested UCI table.

Example: Parameter Table With Associated Information

```
Table PWAT-PARM2
Op Type PERLND

Op Num    Scenario  FOREST    LZSN      INFILT    LSUR      SLSUR     KVARY     AGWRC
11        Calabazas 0.0       7.0       0.03      200.0     0.0533    0.0       0.8
14        Calabazas 0.0       7.0       0.03      150.0     0.1484    0.0       0.8
21        Calabazas 0.0       7.0       0.03      200.0     0.0418    0.0       0.8
24        Calabazas 0.0       7.0       0.03      200.0     0.068     0.0       0.8
31        Calabazas 0.0       7.0       0.03      200.0     0.0222    0.0       0.95
32        Calabazas 0.0       7.0       0.03      200.0     0.0307    0.0       0.95
34        Calabazas 0.0       7.0       0.03      150.0     0.28      0.0       0.95
42        Calabazas 0.0       7.0       0.03      225.0     0.0141    0.0       0.95
43        Calabazas 0.0       7.0       0.03      225.0     0.0141    0.0       0.95
51        Calabazas 0.0       7.0       0.03      250.0     0.0083    0.0       0.95
52        Calabazas 0.0       7.0       0.03      250.0     0.0083    0.0       0.95
53        Calabazas 0.0       7.0       0.03      250.0     0.0083    0.0       0.95
62        Calabazas 0.0       7.0       0.03      250.0     0.0065    0.0       0.95
1         Tualatin R0.98      7.82      0.210     17225.    0.250     1.0       0.988
2         Tualatin R0.56      7.82      0.210     9186.8    0.190     1.0       0.988
1         West Sandy0         6.0       0.05      350.      0.020     0.50      0.98
2         West Sandy0         6.0       0.05      350.      0.020     0.50      0.98
3         West Sandy0         6.0       0.05      350.      0.020     0.50      0.98
4         West Sandy0         6.0       0.05      350.      0.020     0.50      0.98
5         West Sandy0         6.0       0.05      350.      0.020     0.50      0.98

Min                 0         6         .03       150       .0065     0         .8
Max                 .98       7.82      .21       17225     .28       1         .988
Mean                .077      6.832     .053      1545.59   .0622     .225
.9312999
```

Example: Parameter Table in UCI Format

```
PWAT-PARM2
PERLND ***FOREST    LZSN      INFILT    LSUR      SLSUR     KVARY     AGWRC
11        0.0       7.0       0.03      200.0     0.0533    0.0       0.8
14        0.0       7.0       0.03      150.0     0.1484    0.0       0.8
21        0.0       7.0       0.03      200.0     0.0418    0.0       0.8
24        0.0       7.0       0.03      200.0     0.068     0.0       0.8
31        0.0       7.0       0.03      200.0     0.0222    0.0       0.95
32        0.0       7.0       0.03      200.0     0.0307    0.0       0.95
34        0.0       7.0       0.03      150.0     0.28      0.0       0.95
42        0.0       7.0       0.03      225.0     0.0141    0.0       0.95
43        0.0       7.0       0.03      225.0     0.0141    0.0       0.95
51        0.0       7.0       0.03      250.0     0.0083    0.0       0.95
52        0.0       7.0       0.03      250.0     0.0083    0.0       0.95
53        0.0       7.0       0.03      250.0     0.0083    0.0       0.95
62        0.0       7.0       0.03      250.0     0.0065    0.0       0.95
1         0.98      7.82      0.210     17225.    0.250     1.0       0.988
2         0.56      7.82      0.210     9186.8    0.190     1.0       0.988
1         0         6.0       0.05      350.      0.020     0.50      0.98
2         0         6.0       0.05      350.      0.020     0.50      0.98
3         0         6.0       0.05      350.      0.020     0.50      0.98
4         0         6.0       0.05      350.      0.020     0.50      0.98
5         0         6.0       0.05      350.      0.020     0.50      0.98
END PWAT-PARM2
```

Example: Parameter Values With Associated Information

```
Parameter LZSN

Name      Value     Segment             Scenario
LZSN      7.0       PERLND      11      Calabazas Creek Final Detention
LZSN      7.0       PERLND      14      Calabazas Creek Final Detention
LZSN      7.0       PERLND      21      Calabazas Creek Final Detention
LZSN      7.0       PERLND      24      Calabazas Creek Final Detention
LZSN      7.0       PERLND      31      Calabazas Creek Final Detention
LZSN      7.0       PERLND      32      Calabazas Creek Final Detention
LZSN      7.0       PERLND      34      Calabazas Creek Final Detention
LZSN      7.0       PERLND      42      Calabazas Creek Final Detention
LZSN      7.0       PERLND      43      Calabazas Creek Final Detention
LZSN      7.0       PERLND      51      Calabazas Creek Final Detention
LZSN      7.0       PERLND      52      Calabazas Creek Final Detention
LZSN      7.0       PERLND      53      Calabazas Creek Final Detention
LZSN      7.0       PERLND      62      Calabazas Creek Final Detention
LZSN      7.82      PERLND       1      Tualatin River
LZSN      7.82      PERLND       2      Tualatin River
LZSN      6.0       PERLND       1      West Sandy Creek
LZSN      6.0       PERLND       2      West Sandy Creek
LZSN      6.0       PERLND       3      West Sandy Creek
LZSN      6.0       PERLND       4      West Sandy Creek
LZSN      6.0       PERLND       5      West Sandy Creek
```

HSPF Application References

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Appendix A - Production of HSPFParm Database

The HSPFParm database software automatically generates the HSPFParm database from HSPF UCI files. Upon initialization, the software checks for the existence of the database (HSPFParm.mdb) in the 'Data' folder within the folder where the software was in stalled. If this database does not exist, the software builds the database using files in the 'Data/UciWdm' folder.

The 'Data/UciWdm' folder must contain all UCIs to be included in the database, as well as a control file named 'HSPFParmBat.inp'. The control file is a comma-delimited ASCII text file containing information about the watersheds and UCIs to be included in the database.

For each watershed to be included in the database, a line beginning with 'PRJ' must be added to the control file. The 'PRJ' designator must be followed by the fields below, in single quotes, with commas separating fields. Note that a comma must not be used within a field's contents.

- Watershed Name
- Location
- Physiographic Setting
- Weather Regime
- Drainage Area
- Latitude
- Longitude
- Hydrologic Unit Code

Following each 'PRJ' record should be a series of 'SCN' records representing each scenario (or UCI file) to be included in that watershed. The 'SCN' designator must be followed by the fields below, in single quotes, with commas separating fields. Like the 'PRJ' lines, a comma must not be used within a field's contents.

- Scenario Name
- Scenario Type
- UCI Name
- Land Use Categories
- Land Use Types
- Channel Types
- Water Quality Constituents
- Chemical Sources
- Study Purpose
- HSPF Version
- Application Reference
- Contact Name
- Contact Organization
- Contact Phone/Email
- Comments