Better Assessment Science Integrating Point and Nonpoint Sources

BASINS

Version 1.0

User's Manual

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Disclaimer

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Acknowledgments

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ArcView Version 1.0 for Windows is a public domain query and display tool for geographic information. This software is provided on BASINS CD-ROMs as a data viewer. ArcView Version 1.0 does not support the extensive scripting used in BASINS. ArcView Version 1.0 was developed and made available by the Environmental Systems Research Institute, Inc. (ESRI).

EPA acknowledges the support of EarthInfo, Inc., which granted permission to import selected hourly precipitation data into BASINS from its CD-ROMs. EarthInfo, Inc. 5541 Central Avenue, Boulder, Colorado, (303) 938-1788.

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1 Introduction

Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) is a multipurpose environmental analysis system for use by regional, state, and local agencies in performing watershed- and water-quality-based studies. It was developed by the U.S. Environmental Protection Agency's (EPA's) Office of Water to address three objectives:

(1) To facilitate examination of environmental information
(2) To support analysis of environmental systems
(3) To provide a framework for examining management alternatives

Because many states and local agencies are moving toward a watershed-based approach, the BASINS system is configured to support environmental and ecological studies in a watershed context. The system is designed to be flexible. It can support analysis at a variety of scales using tools that range from simple to sophisticated.

BASINS was also conceived as a system for supporting the development of total maximum daily loads (TMDLs). Section 303(d) of the Clean Water Act requires states to develop TMDLs for waterbodies that are not meeting applicable water quality standards by using technology-based controls. Developing TMDLs requires a watershed-based approach that integrates both point and nonpoint sources. BASINS can support this type of watershed-based point and nonpoint source analysis for a variety of pollutants. It also lets the user test different management options.

Traditional approaches to watershed-based assessments typically involve many separate steps—preparing data, summarizing information, developing maps and tables, and applying and interpreting models. Each individual step is performed using a variety of tools and computer systems. The isolated implementation of steps can result in a lack of integration, limited coordination, and time-intensive execution. BASINS makes watershed and water quality studies easier by bringing key data and analytical components under one roof. Using the familiar Windows® environment, analysts can efficiently access national environmental information, apply assessment and planning tools, and run a variety of proven, robust nonpoint loading and water quality models. With many of the necessary components together in one system, the analysis time is significantly reduced, a greater variety of questions can be answered, and data and management needs can be more efficiently identified. BASINS takes advantage of recent developments in software, data management technologies, and computer capabilities to provide the user with a fully comprehensive watershed management tool.

A geographic information system (GIS) provides the integrating framework for BASINS. GIS organizes spatial information so it can be displayed as maps, tables, or graphics. GIS provides techniques for analyzing landscape information and displaying relationships. Through the use of GIS, BASINS has the flexibility to display and integrate a wide range of information (e.g., land use, point source discharges, water supply withdrawals) at a scale chosen by the user. For example, some users will need to examine data at a multistate scale to determine problem areas, compare watersheds, or investigate gaps in data. Others will want to work at a much smaller scale, such as investigating a particular

river segment impaired by multiple point source discharges. This "zooming" capability makes BASINS a unique and powerful environmental analysis tool.

Some agencies might want to perform analyses at a variety of scales, in a nested fashion, to meet several objectives at once. BASINS is designed to facilitate all of these scenarios because it incorporates tools that operate on both large and small watersheds. Adding locally developed, high-resolution data sources to existing data layers is an option that expands the local-scale evaluation capabilities.

The analytical tools in BASINS are organized into two modules. The assessment and planning module, working under the GIS umbrella, allow users to quickly evaluate selected areas, organize information, and display results. The modeling module allows users to examine the impacts of pollutant loadings from point and nonpoint sources. Working together, these modules support several specific types of watershed-based analyses (including the development of TMDLs) by:

- Identifying and prioritizing water-quality-limited waters.
- Supplying data characterizing point and nonpoint sources and evaluating their magnitudes and potential significance.
- Integrating point source and nonpoint source loadings for fate and transport modeling.
- Evaluating and comparing the relative value of potential control strategies.
- Visualizing environmental conditions and communicating them to the public through tables, graphs, and maps.

This user's guide provides information on the systems and procedures in BASINS Version 1.0. Since this is the first release of the system, the user is encouraged to provide EPA with comments and recommendations for future development. Future enhancements to the system might include adding additional types of information, using higher-resolution data, expanding assessment and evaluation capabilities, and adding a wider range of nonpoint source water quality and ecological modeling techniques.

2 System Overview

The BASINS system combines several components essential to performing watershed and water quality analyses. These components are interrelated and can be summarized as follows:

- Spatially distributed data describing physical landscape conditions
- Historical monitoring data describing the status of and temporal changes in environmental conditions
- Locational information on pollution sources and activities indicating potential watershed/water quality stressors
- Environmental assessment tools allowing integration and processing of various types of data to generate value-added information
- Watershed nonpoint source and water quality models for source-impact analysis.

A graphical representation of BASINS' components and their operating platform is provided in Figure 1.

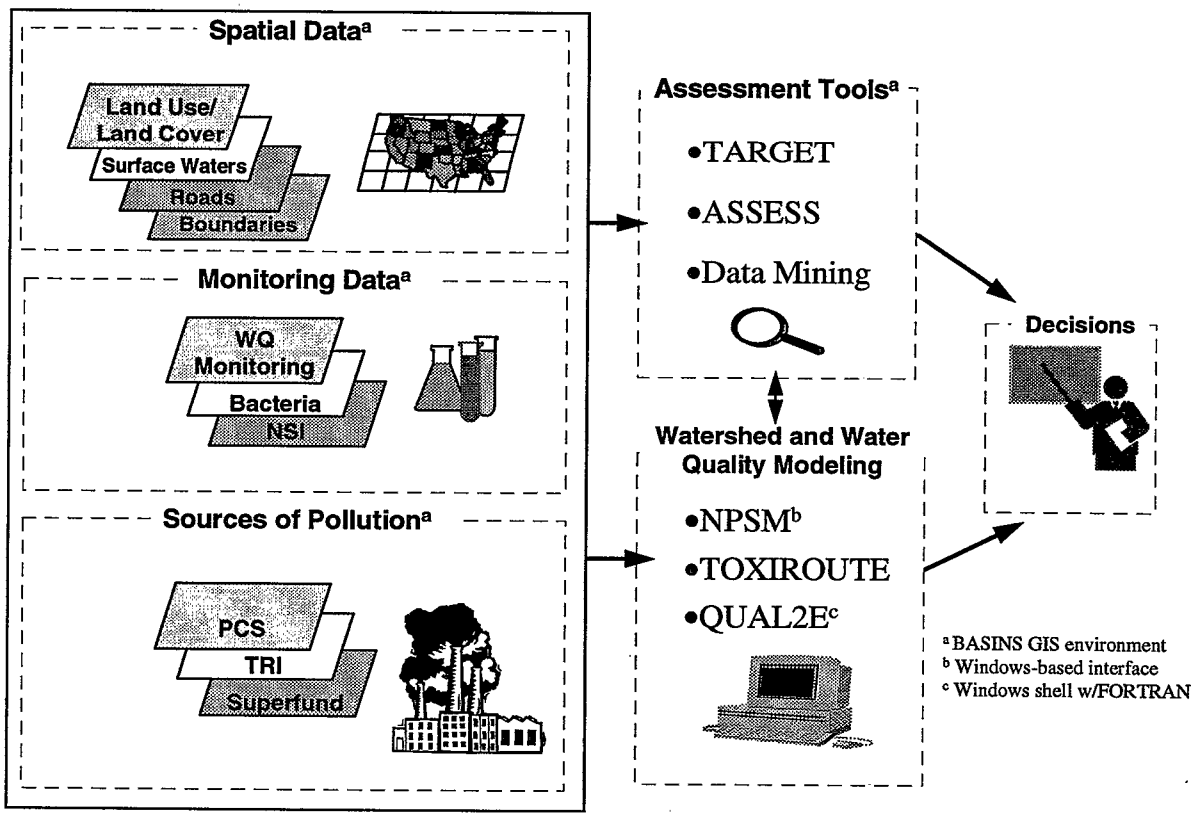


Figure 1. BASINS overview.

The BASINS physiographic data, monitoring data, and associated assessment tools are integrated in a geographic information system (GIS) environment. (The GIS used is ArcView® 2.1, developed by Environmental Systems Research Institute, Inc.). The simulation models are integrated into this GIS environment through a dynamic link in which the data required to build the input files are generated in the ArcView environment and then passed directly to the models. The models themselves run in either a Windows or a DOS environment. The results of the simulation models can also be displayed visually and can be used to perform further analysis and interpretation.

The modeling tools include the following:

- QUAL2E, version 3.2, a water quality and eutrophication model
- TOXIROUTE, a model for routing pollutants through a stream system
- NPSM_HSPF, version 10, a nonpoint source model for estimating loadings.

The latest versions of both QUAL2E and HSPF (as released by EPA's Center for Exposure Assessment Modeling in Athens, Georgia) are included in the BASINS package. These models were both written in the FORTRAN programming language. However, to facilitate the use of these models and their integration into the GIS environment, Windows-based interfaces were developed using C and C++ as programming languages.

The BASINS GIS, which is driven by the ArcView 2.1 environment, provides built-in additional procedures for data query, spatial analysis, and map generation. These standard procedures allow a user to visualize, explore, query available data, and perform individualized and targeted analysis. Therefore, some familiarity with ArcView is helpful. Moreover, as users become familiar with ArcView's standard operations, environmental relationships can be further investigated using complex queries, overlays, proximity analyses, and buffer analyses. Experienced users can also incorporate their own environmental data to supplement or supersede the BASINS data products.

2.1 BASINS' Spatially Distributed Data

BASINS' spatially distributed data include administrative boundaries, hydrologic boundaries, land use distributions, and major road systems. These data are essential for defining study areas, performing proximity analyses, analyzing land uses, and determining surface water flow pathways. The spatially distributed data products included in BASINS are presented in Table 1.

2.2 Historical Time Series of Monitoring Data

BASINS contains several environmental data products developed from existing national water quality databases. These databases were converted into locational data layers to facilitate the assessment of water quality conditions and the prioritization and targeting of waterbodies and watersheds. These data can be used to assess the current status and historical trends of a given waterbody and also to evaluate the results of management actions like the upgrade of a wastewater treatment plant or the adoption of a phosphorus ban. Table 2 lists the environmental monitoring data included in BASINS.

Table 1. BASINS Spatially Distributed Data Products

BASINS Data Product	Content Overview
Land Use and Land Cover	Boundaries associated with land use classifications such as residential, deciduous forest land, and forested wetland.
Urbanized Areas	Boundaries of census-defined urbanized areas.
Populated Place Locations	Locations of populated places as represented on USGS topographic maps.
Reach File, version 1 (RF1)	Hydrographic database containing over 68,000 reaches to represent surface waters of the continental United States.
Major Roads	Interstate and state highway network.
USGS Hydrologic Unit Boundaries (accounting unit)	Nationally consistent delineations of the hydrographic boundaries associated with major U.S. river basins.
U.S. Geological Survey Hydrologic Unit Boundaries (cataloging unit)	Nationally consistent delineations of the hydrographic boundaries associated with major U.S. watersheds.
Drinking Water Supply (DWS) Sites	Location of public water supplies, their intakes, and sources of surface water supply.
Dam Sites	Inventory of U.S. dams with associated data such as impoundment volume and maximum depth.
EPA Region Boundaries	Administrative boundaries.
State Boundaries	Administrative boundaries.
County Boundaries	Administrative boundaries.

2.3 Potential Pollution Sources

In addition to landscape data that can be used to assess potential nonpoint sources of pollution (such as pesticide runoff or sediment loading from pasture areas), BASINS includes information on point sources. This information has been retrieved from existing national databases and processed as geographic data layers for integration into the BASINS GIS environment. These data layers allow analysts to investigate the significance of individual sources by evaluating loadings using geographic overlay techniques. Table 3 presents point source data products included in BASINS.

2.4 Environmental Assessment Tools

Three geographically based analytical tools were developed in the BASINS GIS environment to perform both regional and site-specific analyses: TARGET, ASSESS, and Data Mining. TARGET is a targeting tool that operates on multiple watersheds to allow state- and regional-level analyses; ASSESS is a simple assessment tool that operates on a single watershed or a limited number of watersheds; and Data Mining lets BASINS users more

Table 2. BASINS Environmental Monitoring Data

BASINS Data Product	Content Overview
Drinking Water Supply (DWS) Sites	Location of public water supplies, their intakes, and sources of surface water supply.
Water Quality Monitoring Station Summaries	Statistical summaries of water quality monitoring for 50 physical and chemical-related parameters. Parameter-specific statistics computed by station for 5-year intervals from 1970 to 1994.
Bacteria Monitoring Station Summaries	Statistical summaries of water quality monitoring for 10 bacteria-related parameters. Parameter-specific statistics computed by station for 5-year intervals from 1970 to 1994.
National Sediment Inventory (NSI)	Sediment chemistry, tissue residue, and benthic abundance monitoring data for freshwater and coastal sediments.
Weather Station Sites	Location of first-order National Oceanic and Atmospheric Administration (NOAA) weather stations used by the SWRRB model.
U.S. Geological Survey (USGS) gaging stations	Inventory of surface water gaging station data including 7Q10 low and monthly mean stream flow.
Dam Sites	Inventory of U.S. dams with associated data such as impoundment volume and maximum depth.

Table 3. BASINS Point Source Data

BASINS Data Product	Content Overview
Permit Compliance System (PCS) Sites and Computed Loadings	NPDES permit-holding facility information. Contains parameter-specific loadings to surface waters computed using the EPA Effluent Decision Support System (EDSS).
Industrial Facilities Discharge (IFD) Sites	Facility information on industrial point source dischargers to surface waters.
Toxic Release Inventory (TRI) Sites, 1992 Release	Facility information from the 1992 TRI public data release. Contains Y/N flags for each facility indicating media- specific reported releases.
Superfund National Priority List Sites	Location of Superfund National Priority List sites.

fully access the water quality and point source databases. In this release of BASINS, the three geographically based analytical tools are fully developed to operate on the water quality and point source data layers, as described in Section 2.3. BASINS operates on hydrologic units or watersheds as defined by the U.S. Geological Survey delineations referred to as "cataloging units." These watersheds can vary in size from 10 square miles to several hundred square miles.

TARGET

TARGET is a watershed targeting tool that allows environmental managers to make a broad-based evaluation of a watershed's water quality and/or point source loadings. It operates on a large scale, addressing an area such as a region or a state. TARGET is designed to integrate and process a large amount of detailed, site-specific data associated with a particular region and to summarize the results on a watershed basis. Using these water quality or point source loading summaries, watersheds are then ranked based on the level of selected evaluation parameters (e.g., DO, BOD, zinc). This analysis allows users to draw preliminary conclusions on the wide range of environmental data included in BASINS (e.g., 50 water quality parameters and most of the parameters associated with point source dischargers).

ASSESS

The second geographically based tool, ASSESS, uses the same data as TARGET but provides a different perspective on the locational distribution of potential pollution problems. ASSESS operates on a single watershed (cataloging unit) or a limited set of watersheds and focuses on the status of specific water quality stations or discharge facilities and their proximity to waterbodies. This proximity analysis (stream reaches, water quality stations, point dischargers, land uses, etc.) is important because it allows analysts to establish the interrelationships between the condition of a waterbody in a watershed and potential pollution sources. The level of detail provided by ASSESS lets users visually focus on the status of specific stream reaches, assess their changes over time, evaluate data availability, and evaluate the need for source characterization and analysis of cause-effect relationships.

Data Mining

Data Mining dynamically links different data elements using a combination of tables and maps. This unique dynamic linkage of data elements adds a significant informational value to the raw data on water quality and loadings. This process makes Data Mining a powerful tool that can assist in the integration and environmental interpretation of both geographic and historical information simultaneously. Data Mining complements both TARGET and ASSESS by letting users move progressively from a regional analysis (provided by TARGET) to a watershed-scale analysis (provided by ASSESS) to a more detailed analysis at the station level (provided by Data Mining). This logical progression of the analysis from regional to site-specific is illustrated in Figure 2.

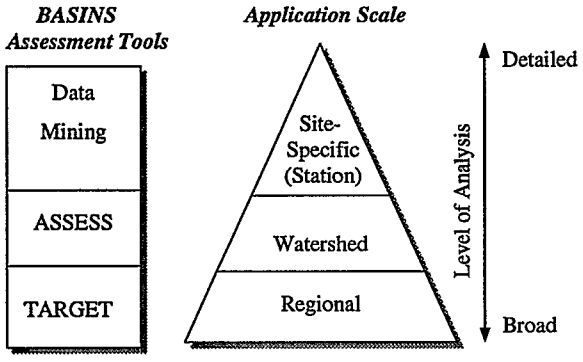


Figure 2. Progression of analysis from regional to site-specific.

2.5 Watershed Nonpoint Source and Water Quality Models

Three models are integrated into BASINS to allow the user to estimate watershed nonpoint loading and to simulate the behavior of toxic chemicals, conventional pollutants, and nutrients. The models included were selected to allow users to assess watershed loadings and receiving water impacts at various levels of complexity. Data preparation, selection routines, and output display tools (for visualization) streamline the use of the models.

NPSM Model

The Nonpoint Source Model (NPSM) estimates land use nonpoint source loadings for selected pollutants at a watershed (cataloging unit) scale. The model uses BASINS landscape data such as watershed boundaries and land use distribution to automatically prepare many of the input data it requires. The NPSM combines a Windows-based interface with EPA's Hydrologic Simulation Program-FORTRAN model (HSPF Version 10; Bicknell et al., 1993). In this first release of BASINS, only selected simulation options of the HSPF model are fully supported. Additional features of the HSPF interface are being developed. The HSPF model is a comprehensive package developed by EPA for simulating water quantity and quality for a wide range of organic and inorganic pollutants from mixed-land-use watersheds. The model uses continuous simulations to predict water balance and pollutant loadings, transformation, and transport.

QUAL2E

The QUAL2E model is provided to allow analysis of pollutant fate and transport through selected stream systems. It is a one-dimensional water quality model that assumes steady-state flow but allows simulation of diurnal (day-night) variations in temperature, algal photosynthesis, and respiration (Brown and Barnwell, 1987). The algorithms used in QUAL2E are based on the advection-dispersion mass transport equation solved using an implicit, backward difference scheme, averaged over time and space. QUAL2E represents the stream system as a series of computational elements of constant length. The

model is integrated with BASINS through a Windows-based interface, and it allows fate and transport modeling of both point and nonpoint source loadings. Nonpoint source loadings can be generated by NPSM and then fed into QUAL2E by using an internal procedure.

TOXIROUTE

TOXIROUTE is a modified version of Pollutant Route (PROUTE), an EPA water quality model. TOXIROUTE provides a screening-level stream routing model that performs simple dilution/decay calculations under mean and low flow conditions for a stream system within a given watershed (cataloging unit). TOXIROUTE can also integrate nonpoint source loadings calculated by NPSM within BASINS, as well as point source loadings computed from the effluent monitoring data stored in the Permit Compliance System (PCS).

3 Hardware and Software Requirements

BASINS is a customized GIS application with integrated environmental analysis and modeling systems. Therefore, BASINS' hardware and software requirements are similar to those of the PC-based ArcView system. BASINS can be installed and operated on IBM-compatible personal computers (PCs) equipped with the software, random access memory (RAM), virtual memory, and hard disk space presented in Table 4. Because the performance (response time) under these minimum requirements might be too slow for some users (especially when dealing with large data sets), a preferred set of requirements is also included in Table 4.

Table 4. BASINS Hardware and Software Requirements

Hardware/Software	Minimum Requirements	Preferred Requirements
Computer	486 processor, 33-MHz IBM-compatible personal computer	Pentium processor, 133-MHz IBM-compatible personal computer
Available hard disk space (After ArcView is installed and 16 megabytes (mb) of permanent virtual memory "swap space" is established)	75 mb (26 mb BASINS system, 9 mb temporary file processing space, and 40 mb BASINS Environmental Data for approximately 1 hydrologic cataloging unit)	235 mb (26 mb BASINS system, 9 mb temporary file processing space, and 200 mb BASINS environmental data for approximately 1 state)
Random access memory (RAM)	16 mb of RAM plus 16 mb of permanent virtual memory swap space	32 mb of RAM plus 16 mb of permanent virtual memory swap space
Compact disc reader	Dual speed reader	Quad speed reader
Color monitor	Configured for 16 colors	Configured for 256 colors
Operating system	MS-DOS 5.0 (or later), and Microsoft Windows 3.1 (or later) or Windows for Workgroups 3.11 (or later)	MS-DOS 5.0 (or later), and Microsoft Windows 3.1 (or later) or Windows for Workgroups 3.11 (or later)
ArcView	ArcView 2.1	ArcView 2.1

4 Installation

IMPORTANT: ArcView 2.1 must be installed on the computer before BASINS can be installed.

The procedure for installing BASINS from CD(s) is described in this section. The installation process can take up to 30 minutes, depending on computer processor speed and CD reader speed.

Running Setup

1. Start Windows. Insert the BASINS CD (CD No. 1 if BASINS is supplied with two CDs) into a CD drive (e.g., drive D). From the Windows Program Manager, choose *Run* from the File menu. In the Command Line box, type **d:\setup**. Click on *OK*.

2. When setup starts, follow the instructions on your screen. You will be prompted to select a hard drive where BASINS will be installed. After you select a drive, setup will create a BASINS subdirectory on that drive. (Note: The BASINS environmental data, which you will select later, will also be placed in this subdirectory. Keep this in mind if your computer has multiple hard drives.)

Setup checks your computer for ArcView software and evaluates the available hard disk space. It will inform you if it does not find at least 26 megabytes of space available to install the base software or if it cannot locate ArcView.

At completion, setup will have created a BASINS directory structure on the selected hard drive, as shown in Table 5. Setup also will have created a Windows program group labeled BASINS that contains six program items: BASINS, Data Extraction, Project Builder, NPSM, TOXIROUTE, and QUAL2E. (See Section 5, BASINS Tutorial, for more information on the BASINS program items.)

NOTE: While running the setup program you may choose to install tutorial data. This option is recommended for first-time users. Sample applications illustrated in Section 5 use these tutorial data.

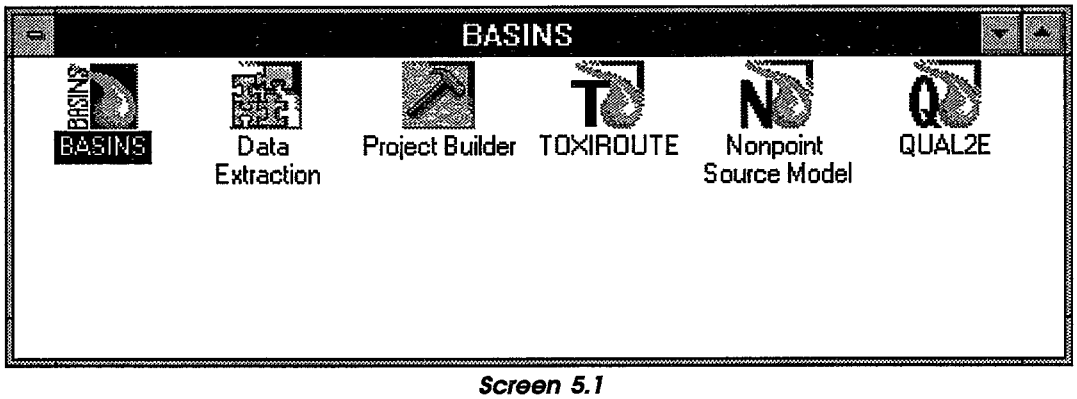
Table 5. BASINS Directory Structure

BASINS Directory	Content or Purpose
drive:\BASINS\APR	BASINS-related ArcView project files (*.APR)
drive:\BASINS\CLASSES	Classification schemes for BASINS charts and maps
drive:\BASINS\DATA	BASINS environmental data in user-named subdirectories (See Section 5.1, BASINS Data Extraction and Project Builder, for more information)
drive:\BASINS\ETC	BASINS internal system files
drive:\BASINS\MODELS\NPSM	Nonpoint Source Model system files
drive:\BASINS\MODELS\QUAL2E	QUAL2E model system files
drive:\BASINS\MODELS\TOXIROUTE	TOXIROUTE model system files
drive:\BASINS\MODELOUT	Output files from BASINS modeling sessions (except QUAL2E)
drive:\BASINS\TEMP	BASINS temporary system files

5 BASINS Tutorial

This tutorial outlines the steps involved in using the major components of the BASINS system: (1) Data Extraction; (2) Project Builder; (3) the geographically based analysis tools TARGET, ASSESS, and Data Mining; and (4) the three watershed and water quality modeling programs (NPSM, TOXIROUTE, and QUAL2E). The tutorial assumes that you already have some familiarity with Microsoft Windows and ArcView, as well as a basic understanding of water quality analysis techniques and modeling.

After you have installed BASINS, a BASINS Windows program group (Screen 5.1) will be created. It contains the six program icons: BASINS, Data Extraction, Project Builder, TOXIROUTE, Nonpoint Source Model (NPSM), and QUAL2E. The BASINS icon facilitates the use of BASINS projects with ArcView. You can use the Data Extraction and Project Builder program icons to generate BASINS-driven projects. The other three icons let you launch the three modeling programs independently without BASINS; this feature is included for those who want to perform simulations using user-supplied data. Executing the models from within the BASINS environment offers the benefit of BASINS' data preparation and visualization capabilities.



Screen 5.1

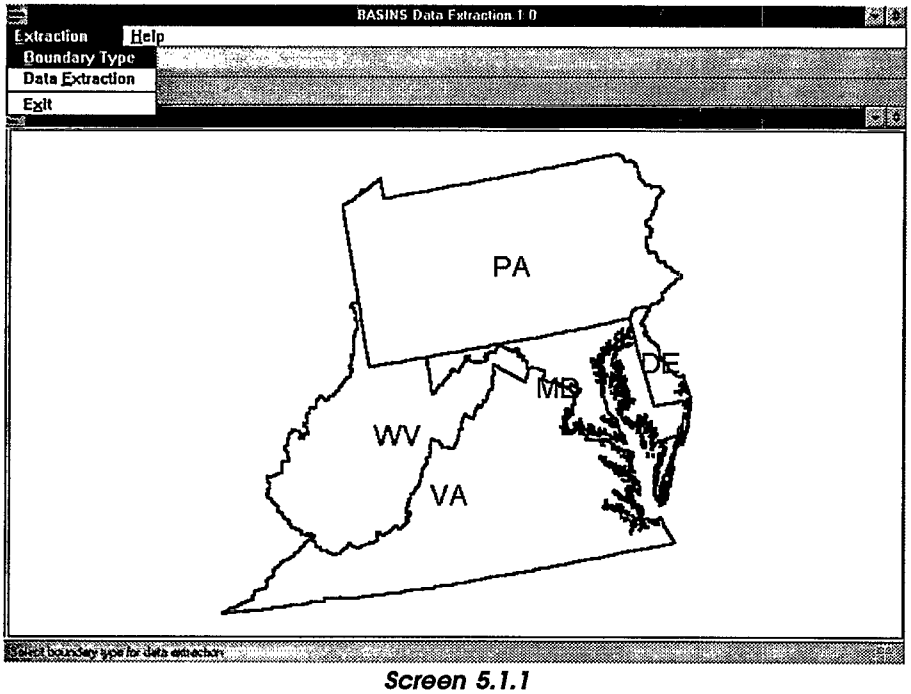
5.1 Data Extraction and Project Builder

The BASINS customized GIS environment is contained in a file referred to as the "project file." To begin using BASINS, you'll need a project file, which is created using a two-step process. First, you'll need to retrieve BASINS data layers and corresponding attribute tables for a specified study area (for example, you might extract a portion of data from the regional BASINS CD(s)) using the Data Extraction tool. This process places the retrieved data into the BASINS data directory on the selected hard drive. Second, you'll need to create a project file using the Project Builder tool. This tool creates a BASINS project file that contains links to your retrieved data.

Data Extraction Steps

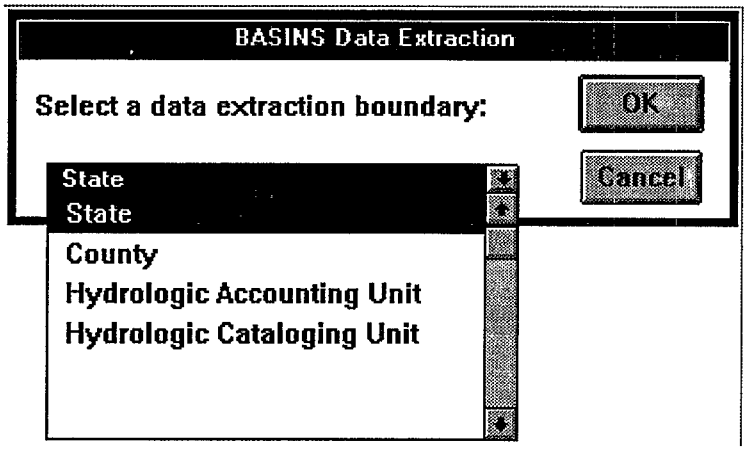
1. Double-click the Data Extraction icon in the BASINS Windows program group (Screen 5.1). This initiates the BASINS Data Extraction subsystem (Screen 5.1.1).

   A view of EPA Region 3 is shown here. Your view will differ, depending on which EPA Regional CD you are using.



Screen 5.1.1

2. Pull down the Extraction menu and select *Boundary Type*. This displays the Boundary Selection List (Screen 5.1.2).

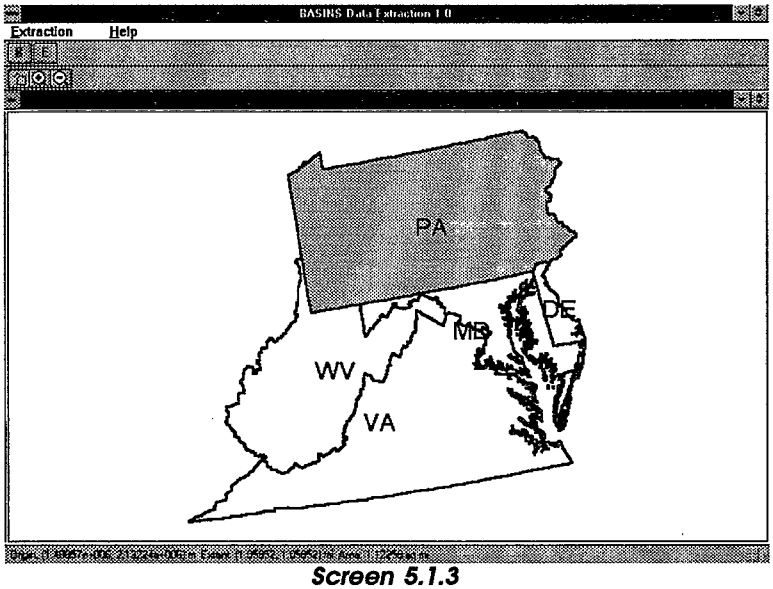


Screen 5.1.2

3. Select the boundary type that most effectively defines the area for which data are needed. The default boundary is a state. Click on *OK* after selection.

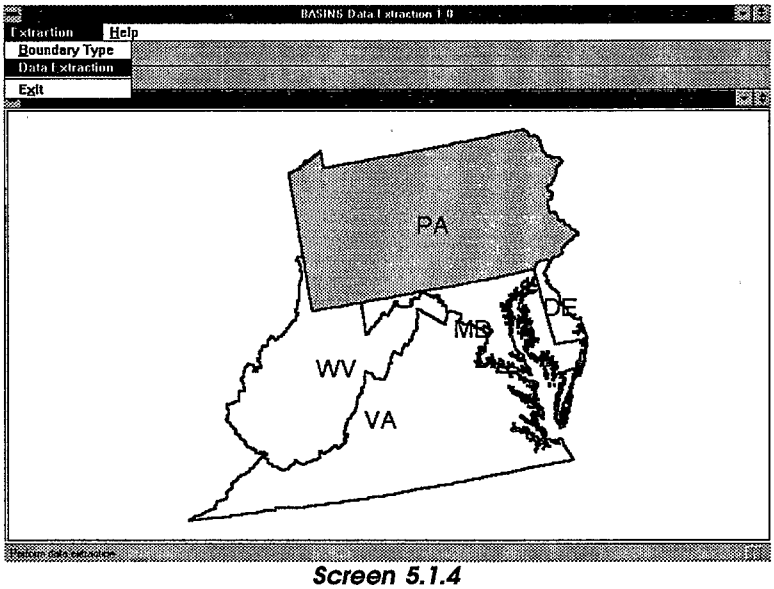
4. Using the BASINS Select Area tool from the ArcView menu, point and click or drag a box to select the area for which data are needed. The area will become highlighted in yellow (Screen 5.1.3).

TIP: It is recommended that you not extract data for areas greater than a state in size (e.g., a multistate extraction or multiple counties or watersheds that add up to an area greater than a state). Extracting data for too large an area can slow down performance (response time) of the BASINS analytical tools, especially on computers that don't meet the "preferred" hardware requirements.



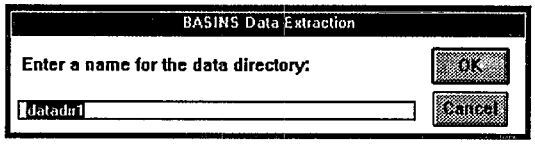
Screen 5.1.3

5. Pull down the Extraction menu and select *Data Extraction* (Screen 5.1.4).



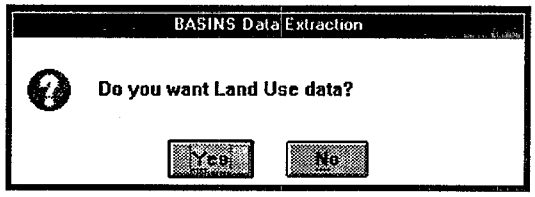
Screen 5.1.4

6. Enter a name for the directory that will contain the resulting extracted data (Screen 5.1.5). This directory will be a subdirectory in the \BASINS\DATA directory. Click on *OK* after you enter a name.



Screen 5.1.5

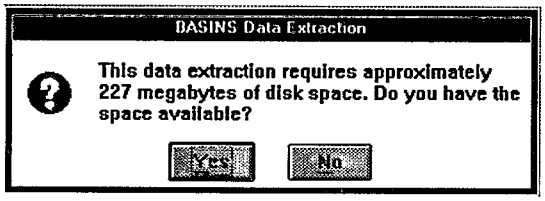
7. Decide whether you want to include land use data in the data extraction (Screen 5.1.6). Land use data provide very useful information for water resource analyses. They are also necessary for computing nonpoint source loadings using the Nonpoint Source Model (NPSM). However, using land use data will double the hard drive storage space requirements.



Screen 5.1.6

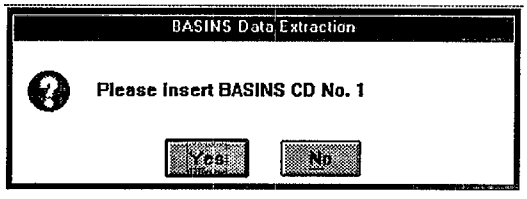
TIP: To gain experience with the use of land use data and nonpoint source modeling, you might want to choose *Yes* the first time you use BASINS.

8. The Data Extraction system will estimate the hard disk space necessary to perform the extraction (Screen 5.1.7). You can verify the space available by toggling (press the Alt and Tab keys simultaneously) to access the Windows File Manager or another suitable plication before clicking on *Yes*. If the available space is insufficient, click on *No* and reduce the size of the extraction area by redefining the area using an alternative boundary type. For example, if an extraction of a state's data requires more storage space than that available on the hard disk, select only a portion of the state using multiple counties or hydrologic units.



Screen 5.1.7

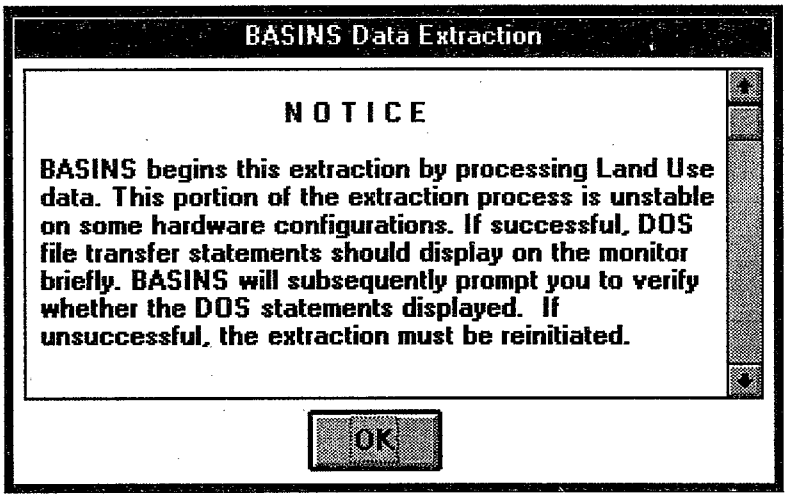
9. Insert BASINS CD No. 1 into the CD reader (Screen 5.1.8). Choose *Yes* after you place the CD in the reader. Choose *No* if you want to cancel the data extraction.



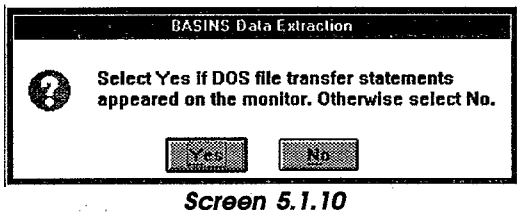
Screen 5.1.8

10. If you requested land use data (see Step 7), an informational notice appears. It explains the

user verification step required as part of the land use data extraction process (Screens 5.1.9 and 5.1.10). If you did not request land use data, this step (Step 10) will be omitted.

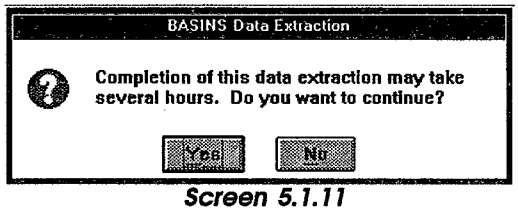


Screen 5.1.9



Screen 5.1.10

11. The rest of the BASINS data extraction process varies greatly depending on the speed of your computer's processor and compact disc reader and the available random access memory (RAM). The processing might take less than an hour or close to 8 hours depending on the size of the retrieved area and your hardware specifications. Click on *Yes* to confirm or *No* to end this extraction session (Screen 5.1.11).



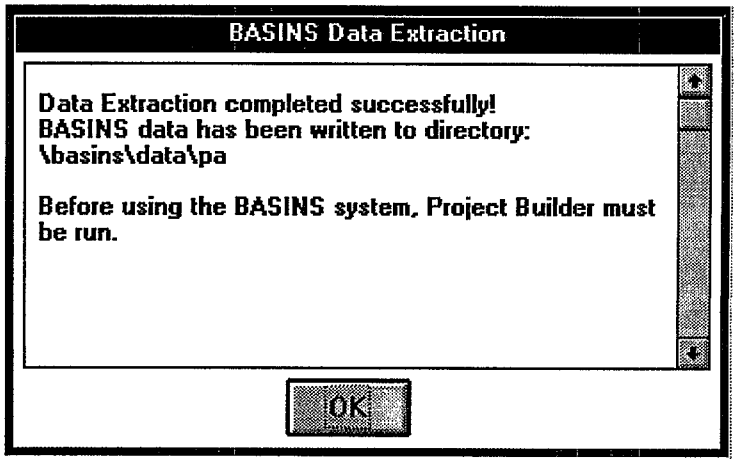
Screen 5.1.11

12. A dialog box indicates completion of the data extraction (Screen 5.1.12). If the data extraction is not completed successfully, check the following:

    a) Verify that there is enough free space on the destination drive (the drive that has the BASINS directory).

    b) Verify that the computer has at least 16 megabytes of RAM installed.

    c) Verify that the swap file is at least 16 megabytes in size.

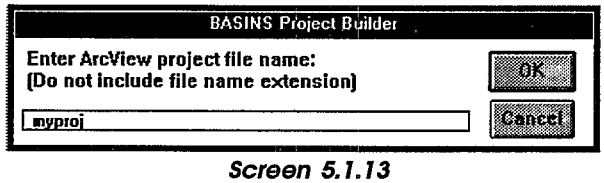


Screen 5.1.12

d) Some CD readers spin down when not in use. Check to see that the CD-ROM can be accessed by BASINS. One way to do this is to open a DOS session and type **Dir d:** (or whatever letter the CD drive is).

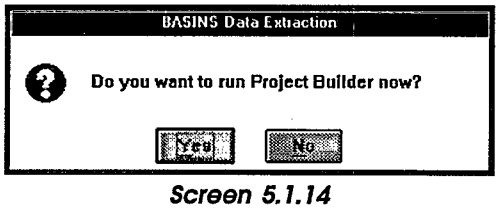
e) Clean any fingerprints, dust, or smudges from the surface of the BASINS CD using a soft, dry cloth and CD cleaning liquid or ethyl alcohol.

Project Builder Steps



Screen 5.1.13

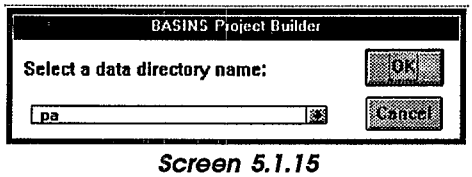
1. Double-click on the Project Builder icon in the BASINS Windows program group (Screen 5.1). This initiates the BASINS Project Builder subsystem (Screen 5.1.13). You can also initiate Project Builder by clicking on *Yes* at the user dialog immediately following the data extraction completion status (Screen 5.1.14).



Screen 5.1.14

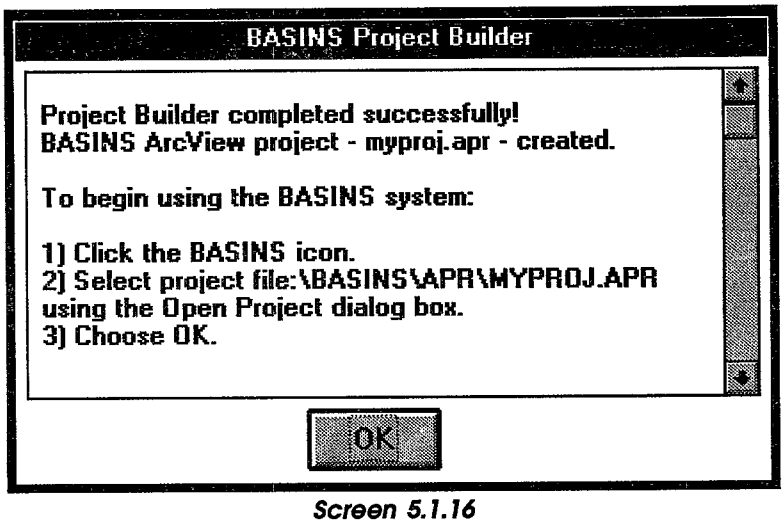
2. Supply a name for the project file to be created. The file name may be up to eight characters in length. Do not provide a file name extension. The file name will be assigned an APR extension. Click on *OK* after you enter a project file name (Screen 5.1.13).

3. Select a data directory from the drop-down list (Screen 5.1.15). The data directory list contains all the directories created as a result of completing a BASINS data extraction. Click on *OK* after you make your selection.



Screen 5.1.15

4) A dialog box indicates the completion of Project Builder (Screen 5.1.16).



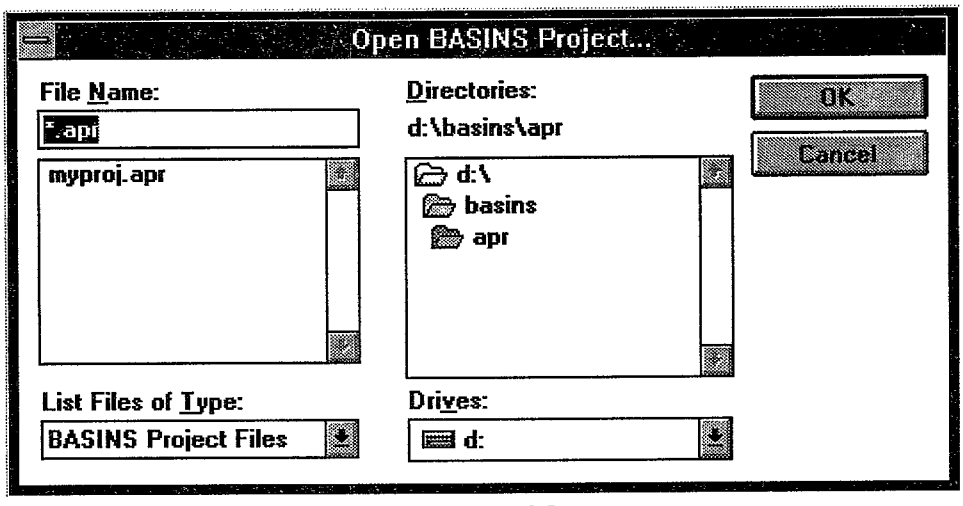
Screen 5.1.16

5.2 Opening a BASINS Project

Completing a Data Extraction and Project Builder session produces a BASINS project. The project file contains instructions for ArcView that generate the BASINS custom environment, which consists of a specialized user interface, access to water analysis tools, and BASINS-supplied data. To begin using BASINS, you need to open a BASINS project.

Steps for Opening a BASINS Project

1. Double-click on the BASINS icon in the BASINS Windows program group (Screen 5.1). This initiates the Open BASINS Project dialog box (Screen 5.2.1).



Screen 5.2.1

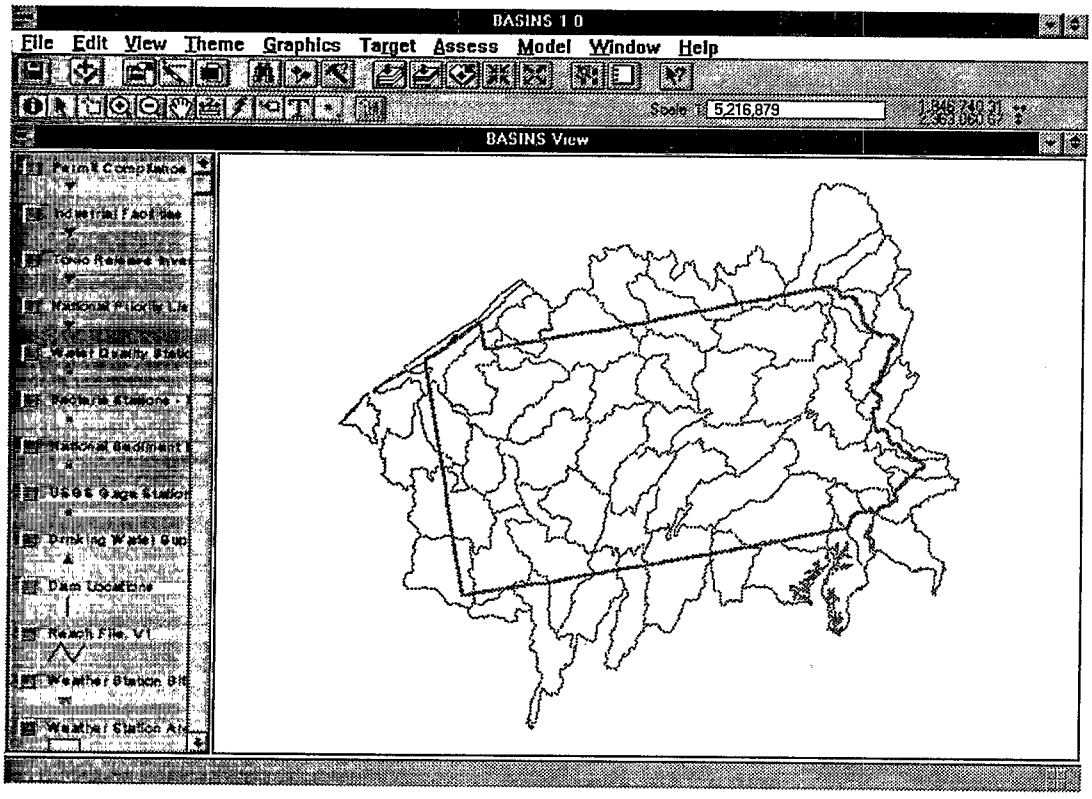
NOTE: Reset the computer before you open a BASINS project file. Do not run any other applications in order to minimize the occurrence of ArcView memory-related errors (e.g., segmentation violations, assertion errors).

2. Select a project file from the \BASINS\APR directory. Click on *OK* after you have made a selection. This will open the BASINS project.

IMPORTANT: It is better to select project files by using the BASINS program icon than by using ArcView alone because the BASINS program cleans up temporary files when it is started.

5.2.1 BASINS Customized ArcView Interface

The BASINS user interface contains all of the menu, button, and tool bar items that are present in the standard ArcView interface. These standard components provide access to ArcView's data query, spatial analysis, and map generation tools. The BASINS interface also has three additional menus and one additional tool bar item, which provide the BASINS water quality analysis and modeling functions (Screen 5.2.2).



Screen 5.2.2

5.2.2 BASINS Data Products

The BASINS Version 1.0 system is distributed with 20 data products. The data consist of base cartographic products (such as state and county boundaries) and environmental products (such as water quality monitoring and industrial facility locations). These data are accessible from any of the BASINS-generated views. A view is an interactive map in the BASINS ArcView environment. Table 6 provides a list of the BASINS Version 1.0 data products.

Table 6. BASINS Version 1.0 Data Products

BASINS Data Product	Theme Name	Related Table Names	File Name
Permit Compliance System (PCS) Sites and Computed Loadings	Permit Compliance System		pcs.dbf pcs.shp pcs.shx
		Permitted Discharges 1991	pcsld91.dbf
		Permitted Discharges 1992	pcsld92.dbf
		Permitted Discharges 1993	pcsld93.dbf
		Permitted Discharges Loadings Over Permits 1991	pcsop91.dbf
		Permitted Discharges Loadings Over Permits 1992	pcsop92.dbf
		Permitted Discharges Loadings Over Permits 1993	pcsop93.dbf
		Permitted Discharges Parameter Table	pcs_prm.dbf
		Permitted Discharges Parameter Table 1991	pcs_p91.dbf
		Permitted Discharges Parameter Table 1992	pcs_p92.dbf
		Permitted Discharges Parameter Table 1993	pcs_p93.dbf
Industrial Facilities Discharge (IFD) Sites	Industrial Facilities Discharge Sites	[None]	ifd.dbf ifd.shp ifd.shx
Toxic Release Inventory (TRI) Sites, 1992 Release	Toxic Release Inventory-92 Sites	[None]	tri92.dbf tri92.shp tri92.shx
Superfund National Priority List Sites	National Priority List Sites	[None]	npl.dbf npl.shp npl.shx
Water Quality Monitoring Stations & Data Summaries	Water Quality Stations		wq_stat.dbf wq_stat.shp wq_stat.shx
		Water Quality Data 70-74	wq_d7074.dbf
		Water Quality Data 75-79	wq_d7579.dbf
		Water Quality Data 80-84	wq_d8084.dbf
		Water Quality Data 85-89	wq_d8589.dbf
		Water Quality Data 90-94	wq_d9094.dbf
		Water Quality Parameter Table	wq_parm.dbf
		Water Quality Parameter Table 70-74	wq_p7074.dbf
		Water Quality Parameter Table 75-79	wq_p7579.dbf
		Water Quality Parameter Table 80-84	wq_p8084.dbf
		Water Quality Parameter Table 85-89	wq_p8589.dbf
		Water Quality Parameter Table 90-94	wq_p9094.dbf

Table 6. (Continued)

BASINS Data Product	Theme Name	Related Table Names	File Name
Bacteria Monitoring Stations & Data Summaries	Bacteria Stations - DRAFT		bc_stat.dbf bc_stat.shp bc_stat.shx
		Bacteria Data 70-74	bc_d7074.dbf
		Bacteria Data 75-79	bc_d7579.dbf
		Bacteria Data 80-84	bc_d8084.dbf
		Bacteria Data 85-89	bc_d8589.dbf
		Bacteria Data 90-94	bc_d9094.dbf
		Bacteria Parameter Table	bc_parm.dbf
		Bacteria Parameter Table 70-74	bc_p7074.dbf
		Bacteria Parameter Table 75-79	bc_p7579.dbf
		Bacteria Parameter Table 80-84	bc_p8084.dbf
		Bacteria Parameter Table 85-89	bc_p8589.dbf
		Bacteria Parameter Table 90-94	bc_p9094.dbf
National Sediment Inventory (NSI) Stations & Database	National Sediment Inventory Stations		nsi.dbf nsi.shp nsi.shx
		NSI Biotoxicity Data	nsibiot.dbf
		NSI Biotoxicity Phase Table	nbi_spc.dbf
		NSI Elutriate Data	nsielut.dbf
		NSI Elutriate Parameter Table	nel_prm.dbf
		NSI ODES & DMATS Remark Codes	nsirmk1.dbf
		NSI Sediment Chemistry Data	nsisedi.dbf
		NSI Sediment Chemistry Parameter Table	nsd_prm.dbf
		NSI STORET & Other Remark Codes	nsirmk1.dbf
		NSI Tissue Residue Data	nsitiss.dbf
		NSI Tissue Residue Parameter Table	nti_prm.dbf
		NSI Tissue Residue Species Table	nti_spc.dbf
Reach File, Version 1 (RF1)	Reach File, V1	[None]	rf1.dbf rf1.shp rf1.shx
Gage Sites	USGS Gage Sites	[None]	gage.dbf gage.shp gage.shx
Drinking Water Supply (DWS) Sites	Drinking Water Supply Sites	[None]	rf1.dbf rf1.shp rf1.shx
Dam Locations	Dam Locations	[None]	dam.dbf dam.shp dam.shx
Weather Station Sites	Weather Station Sites	[None]	metpt.dbf metpt.shp metpt.shx
	Weather Station Areas	[None]	met_stat.dbf met_stat.shp met_stat.shx
Watershed Data Stations & Database (sample set)	Watershed Data Stations	[None]	wdm.dbf wdm.shp wdm.shx

Table 6. (Continued)

BASINS Data Product	Theme Name	Related Table Names	File Name
Hydrologic Unit Boundaries	Cataloging Unit Boundaries	[None]	cat.dbf cat.shp cat.shx
	Cataloging Unit Codes	[None]	catpt.dbf catpt.shp catpt.shx
	Accounting Unit Boundaries	[None]	acc.dbf acc.shp acc.shx
Land Use and Land Cover	Land Use Index	[None]	lulcndx.dbf lulcndx.shp lulcndx.shx
	L_(USGS Quadrangle Name)	[None]	l_(quad name) A/I coverage format
Major Roads	Major Roads	[None]	roads.dbf roads.shp roads.shx
Populated Place Locations	Place Names - (state postal abbreviation)	[None]	(ST)ppl.dbf (ST)ppl.shp (ST)ppl.shx
Urbanized Areas	Urban Area Boundaries	[None]	urban.dbf urban.shp urban.shx
	Urban Area Names	[None]	urban_nm.dbf urban_nm.shp urban_nm.shx
EPA Regions	EPA Region Boundaries	[None]	epa_reg.dbf epa_reg.shp epa_reg.shx
State and County Boundaries	State Boundaries	[None]	st.dbf st.shp st.shx
	County Boundaries	[None]	cnty.dbf cnty.shp cnty.shx
	County Names	[None]	cntypt.dbf cntypt.shp cntypt.shx

5.2.3 BASINS General Use Guidance

Before you explore the BASINS water resource analysis tools, you should know some general rules and guidelines.

1. Check the U.S. Environmental Protection Agency's Internet home page for the current list of answers to frequently asked BASINS questions and for other BASINS information. World Wide Web: http://www.epa.gov/ow/ost

2. Do not rename the BASINS data directories. Project Builder can't create projects using a data directory whose name has been altered from the original name supplied during the Data Extraction session.

3. Do not rename or delete themes or tables containing data supplied by BASINS. This can affect the use of BASINS' tools. You can, however, copy themes within BASINS and manipulate them without a problem.

4. Do not rename or delete field names associated with the data tables supplied by BASINS. This can affect the use of BASINS' tools.

5. If you perform a data extraction for an area of the country where one or more BASINS-supplied data themes contain no data, a "NO" will precede the theme name in the views theme list (e.g., NO Water Quality Monitoring Stations).

6. If you work with a BASINS project for prolonged periods, ArcView might generate a "Segmentation Violation" or "f:handles" error message. If an error message occurs, simply close the project and reopen it using the BASINS Open Project icon.

7. In general, it is good not to save changes to a project file. If you need to save an analysis at a certain stage, save the file under a new name.

8. If an APR project file becomes damaged or is deleted, you can easily regenerate it by running the Project Builder again.

5.3 TARGET

The BASINS TARGET tool lets you make a broad-based evaluation of watershed conditions using water quality and/or point source loadings data included in the BASINS system. TARGET is designed to operate on a large-scale area such as a region or a state. TARGET performs analysis on the entire project area extracted (e.g., EPA Region, state). TARGET is best suited for project areas that include more than one watershed (cataloging unit). It is designed to integrate and process a large amount of detailed, site-specific data associated with a project area and to summarize the results on a watershed basis. Using water quality or loading summaries, TARGET ranks watersheds based on the evaluation parameters and thresholds you've selected. This analysis can be used to draw preliminary conclusions based on the wide range of environmental data included in BASINS (e.g., 50 water quality

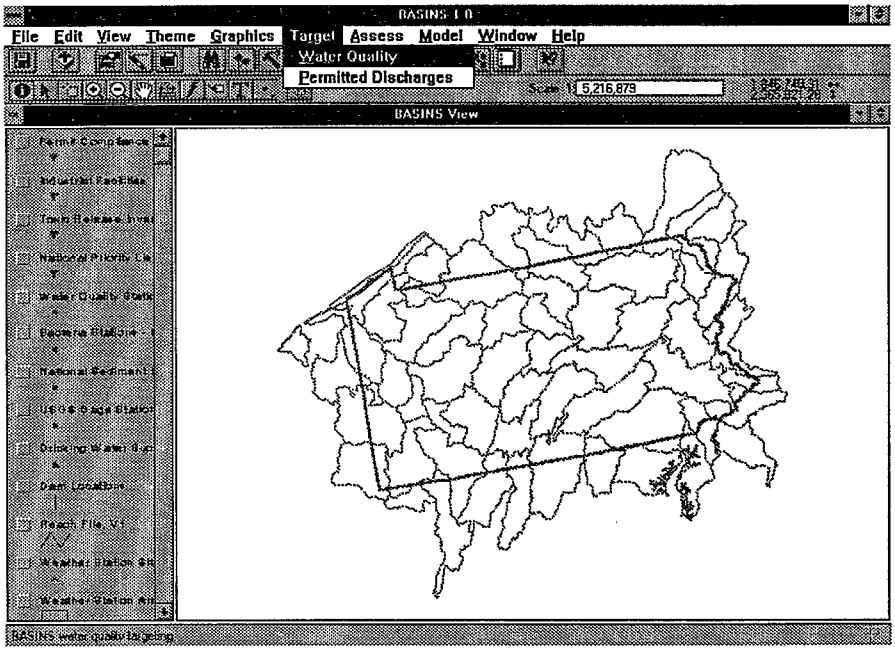
parameters and most of the parameters associated with point source dischargers). The available data are analyzed for each watershed by computing a mean value for the selected parameter. These computed values are then used for comparisons between watersheds.

TARGET Steps

1. Pull down the TARGET menu and select either *Water Quality* or *Permitted Discharges* (Screen 5.3.1).

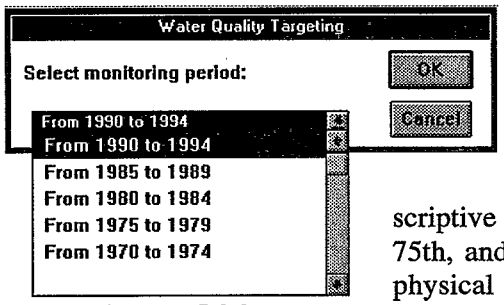
   The remaining TARGET steps and associated screen captures are similar for both Water Quality and Permitted Discharges. The following examples correspond to a TARGET session using the Water Quality option.

NOTE: TARGET automatically performs the analysis for the entire extracted project area. There is no need to select an area for analysis.



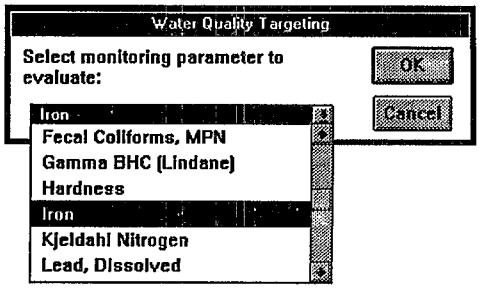
Screen 5.3.1

2. Water quality data summaries are included for five time periods. Select one of the 5-year water quality monitoring periods for TARGET to use for this session (Screen 5.3.2). BASINS water quality monitoring data are statistical summaries of station data spanning each 5-year period. Descriptive statistics (mean; 15th, 25th, 50th, 75th, and 85th percentiles) are provided for 50 physical and chemical-related parameters at

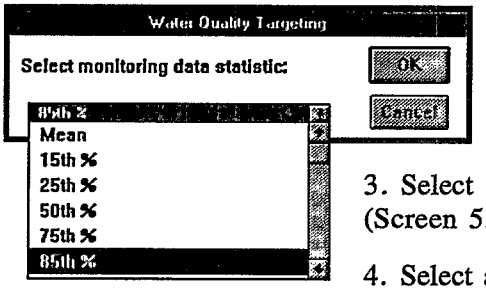


Screen 5.3.2

each water quality monitoring station. Refer to the appendices for additional information on water quality monitoring and permitted discharge data included in BASINS.



Screen 5.3.3

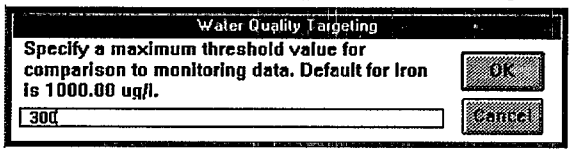


Screen 5.3.4

3. Select 1 of the 50 available parameters to evaluate (Screen 5.3.3).

4. Select a water quality summary statistic to use for TARGET analysis (Screen 5.3.4).

5. Specify a threshold value for use in evaluating the water quality monitoring data selected for the TARGET session (Screen 5.3.5).



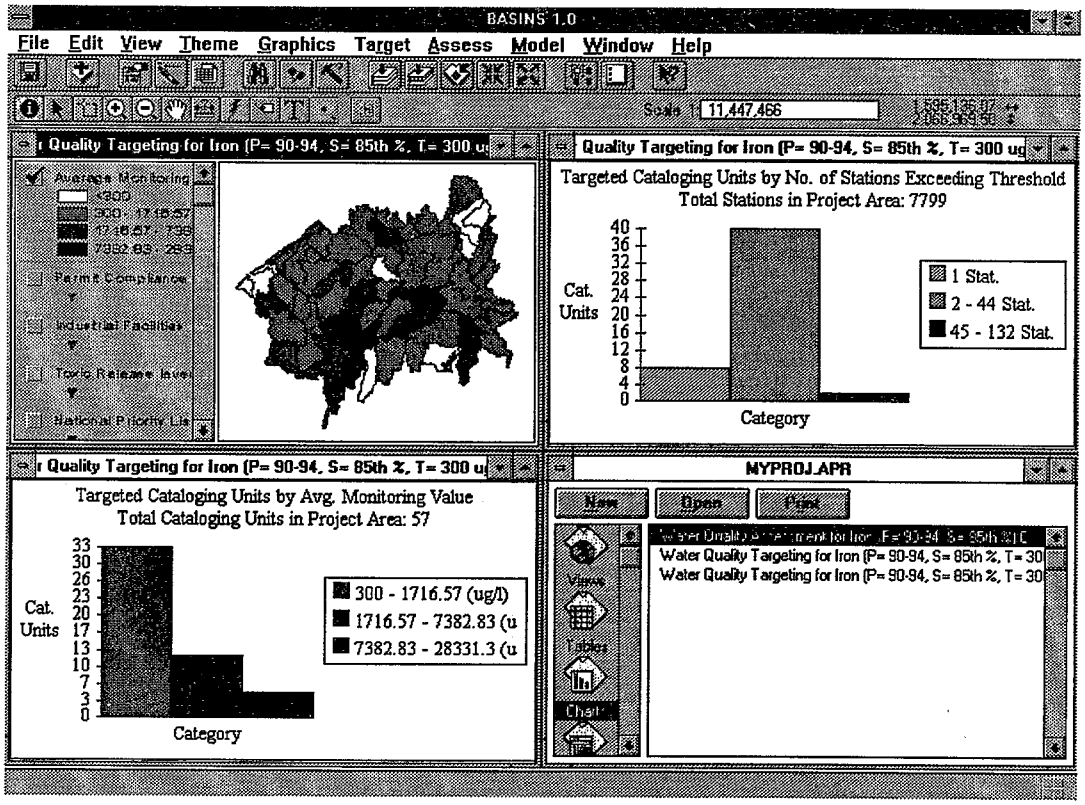
Screen 5.3.5

In this example, iron is selected as the evaluation parameter and the 85th percentile is selected as the summary statistic. The selected threshold value will be used to evaluate the 85th percentile data for iron for each of the project watersheds. In this case the threshold is a maximum and the number of instances where the station values exceed the threshold will be counted.

Default threshold values are included for the user's reference. The default threshold values come from the BASINS Water Quality Parameter table. Refer to Appendix A for additional information on the default reference values contained in the BASINS Water Quality Parameter table.

6. The TARGET session ends by generating three output windows that summarize the results in map and graphical form (Screen 5.3.6):

- A map with watersheds shaded based on the average monitoring value computed for each watershed (hydrologic cataloging unit) from the user-specified parameter, station statistic, and threshold.
- A bar chart that shows the distribution of cataloging units based on the number of stations for each cataloging unit that exceed the selected threshold.
- A bar chart that summarizes the ranges of average monitoring values by cataloging unit.



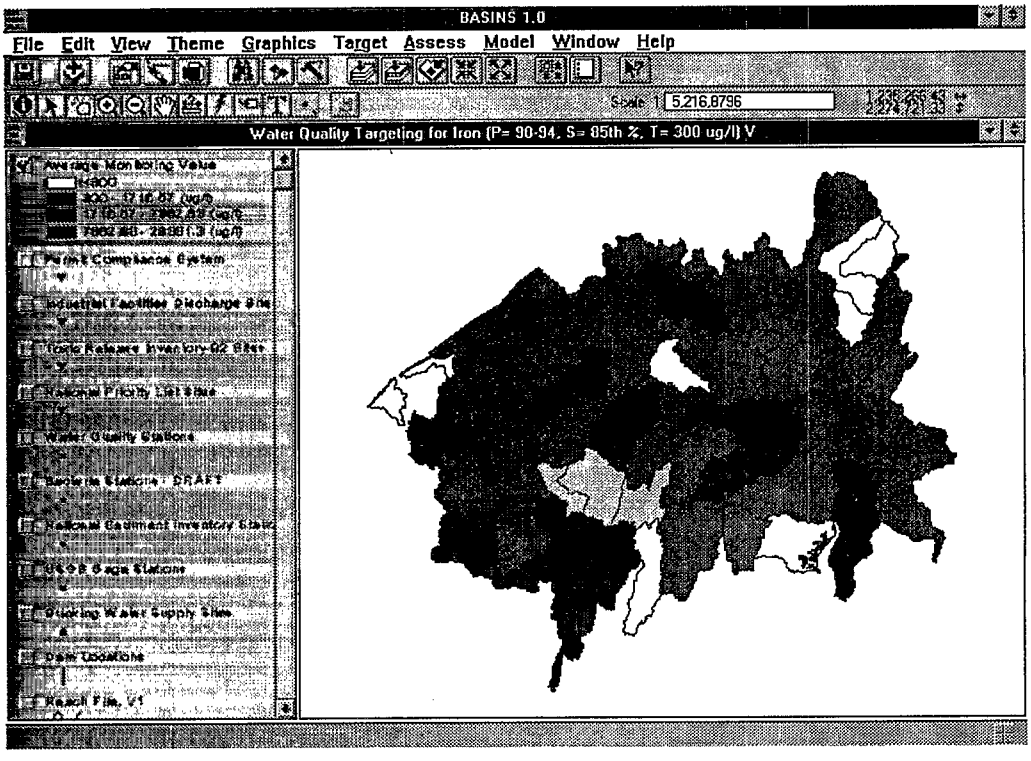
Screen 5.3.6

You can repeat TARGET using different parameters, water quality time periods, and threshold values. You can also apply TARGET to the evaluation of point source information. TARGET will notify you if no data are available for the parameter you select.

5.4 ASSESS

ASSESS is the second geographically based analytical tool developed in the BASINS GIS environment. It is a simple assessment tool that lets you evaluate water quality and point source loadings in a given watershed. After performing a targeting analysis on a regional or state level, you can use ASSESS to examine watersheds that have been identified as high priorities in more detail. You can examine them individually or as a group. Although ASSESS uses the same data as TARGET, it provides a different perspective by adding consideration of the spatial distribution of potential pollution problems, and it helps you to focus on the environmental condition of specific stream reach(es) and a stream's proximity to other pollution sources (point sources, agricultural areas, Superfund sites, etc.). Because of the finer resolution used in ASSESS compared to TARGET, you can more effectively analyze status as well as changes over time. You can compare individual stream reaches based on their water quality condition. In addition, ASSESS provides a tool for evaluating data availability. It can reveal where further investigations of the sources, as well as analyses of cause-effect relationships, are appropriate. Using water quality or

loading summaries, water quality monitoring stations or discharge facilities are ranked with the evaluation parameters and thresholds that you select. A wide range of environmental data included in BASINS can be used for this analysis (e.g., 50 water quality parameters and most of the parameters associated with point source discharges).

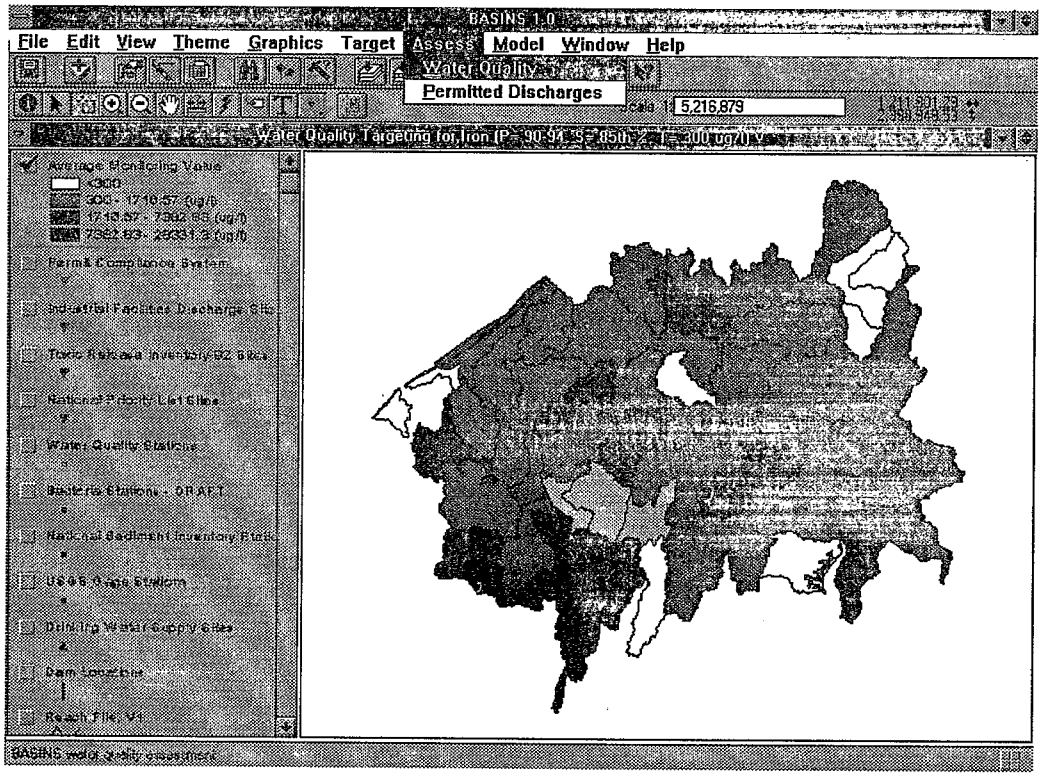


Screen 5.4.1

ASSESS Steps

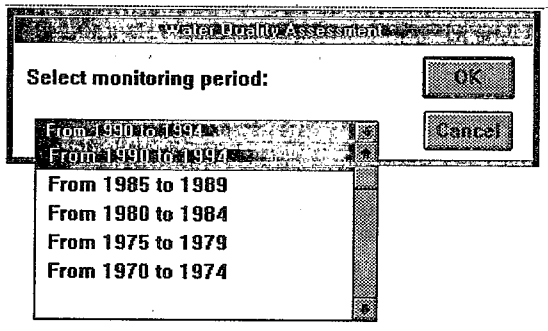
1. Select one or more watersheds of interest using the Select Feature tool. Watersheds can be selected following a targeting analysis, as shown in Screen 5.4.1, or simply from BASINS View.

2. Pull down the ASSESS menu and select either *Water Quality* or *Permitted Discharges* (Screen 5.4.2). The remaining ASSESS steps and associated screen captures are similar for both Water Quality and Permitted Discharges. The following examples correspond to an ASSESS session using the Water Quality option.

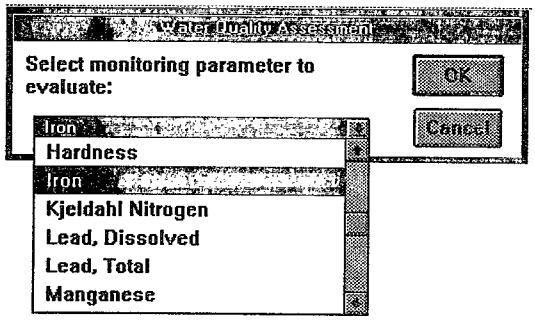


Screen 5.4.2

3. Water quality data are summarized for five time periods (1970 to 1994). Select the 5-year water quality monitoring period that ASSESS will use for this session (Screen 5.4.3). BASINS' water quality monitoring data are statistical summaries of station data spanning each 5-year period. Descriptive statistics (mean; 15th, 25th, 50th, 75th, and 85th percentiles) are provided for 50 physical and chemical-related parameters at each water quality monitoring station. Refer to the appendices for additional information on water quality monitoring and permitted discharge data included with BASINS.



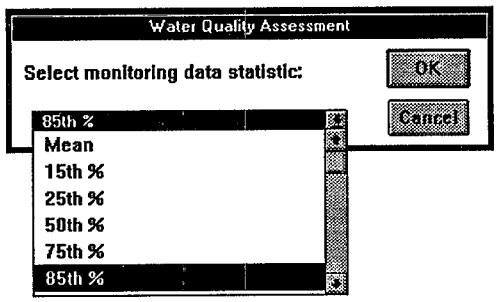
Screen 5.4.3



Screen 5.4.4

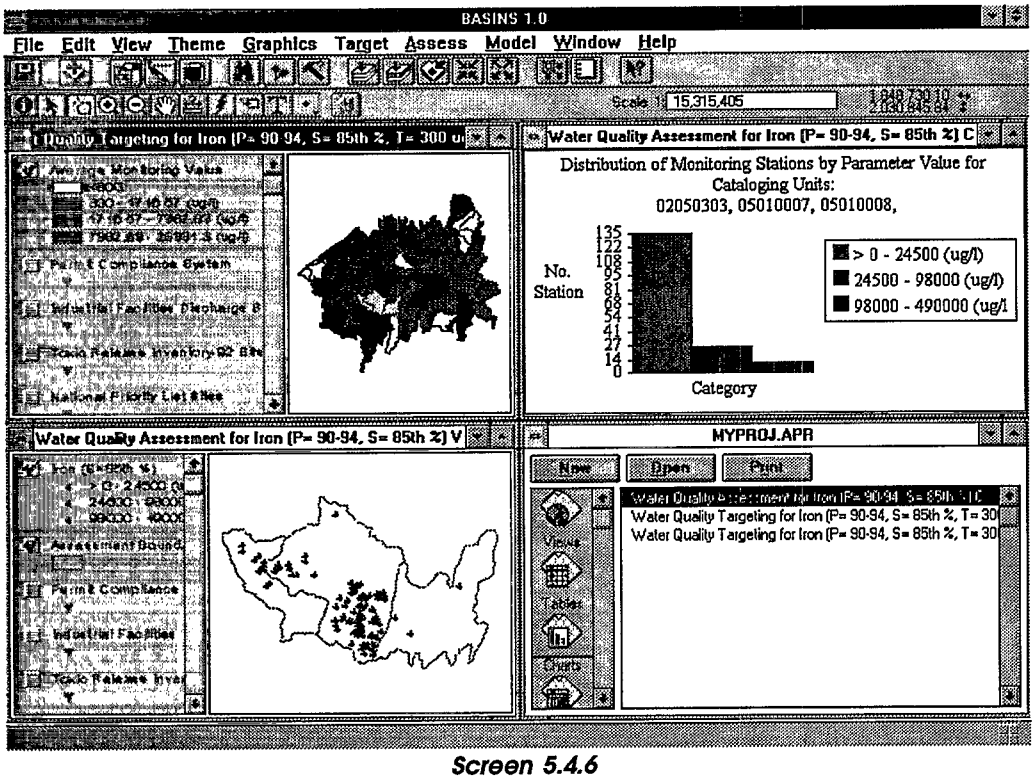
4. Select one of the 50 available parameters to evaluate (Screen 5.4.4).

5. Select a water quality summary statistic to use for ASSESS analysis (Screen 5.4.5).



Screen 5.4.5

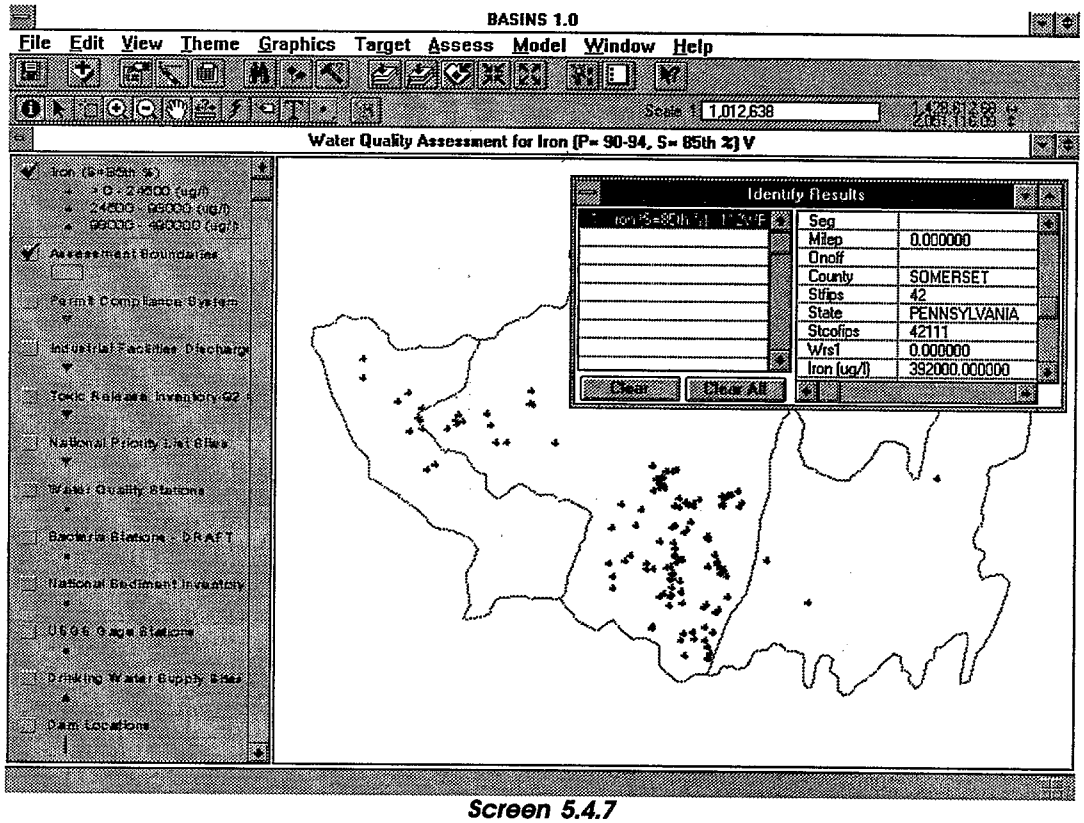
6. The ASSESS session ends by generating two output windows that summarize the results. Screen 5.4.6 presents a map with water quality stations ranked according to their concentrations for the selected parameter. This screen also displays the original map showing the selected watersheds and a chart displaying the distribution of the stations according to their level of concentration.



Screen 5.4.6

7. Use the Feature Information tool to examine selected stations. Screen 5.4.7 shows an expanded view of the station distribution map and the information table for a selected station containing the station reference, concentration value, and the parameter measurement unit.

TIP: Land use coverages and locations of monitoring stations and pollution discharges can help provide a good sense of what is happening in a watershed. Use the land use index to find the correct land use tile.



Screen 5.4.7

8. Depending on the type of analysis (water quality or point source discharges), you can display supplemental BASINS environmental data to perform additional spatial analyses.

5.5 Data Mining

Data Mining is a powerful tool that lets you retrieve and visually analyze BASINS water quality and loading data using a dynamic linkage between the watershed, stream reaches, stations or facility locations, pollutant names and codes, and corresponding statistics for all the time periods. It operates on individual water quality stations or PCS listed facilities. A dynamic linkage lets you analyze related information from various databases with no direct manipulation of the data bars. Once the links are established, you can retrieve several data elements at once through a single operation. This unique relational process provides an integrated approach to data management and makes full use of the GIS capabilities. It brings environmental data closer to watershed and water quality analysts and allows for a detailed analysis at the station level.

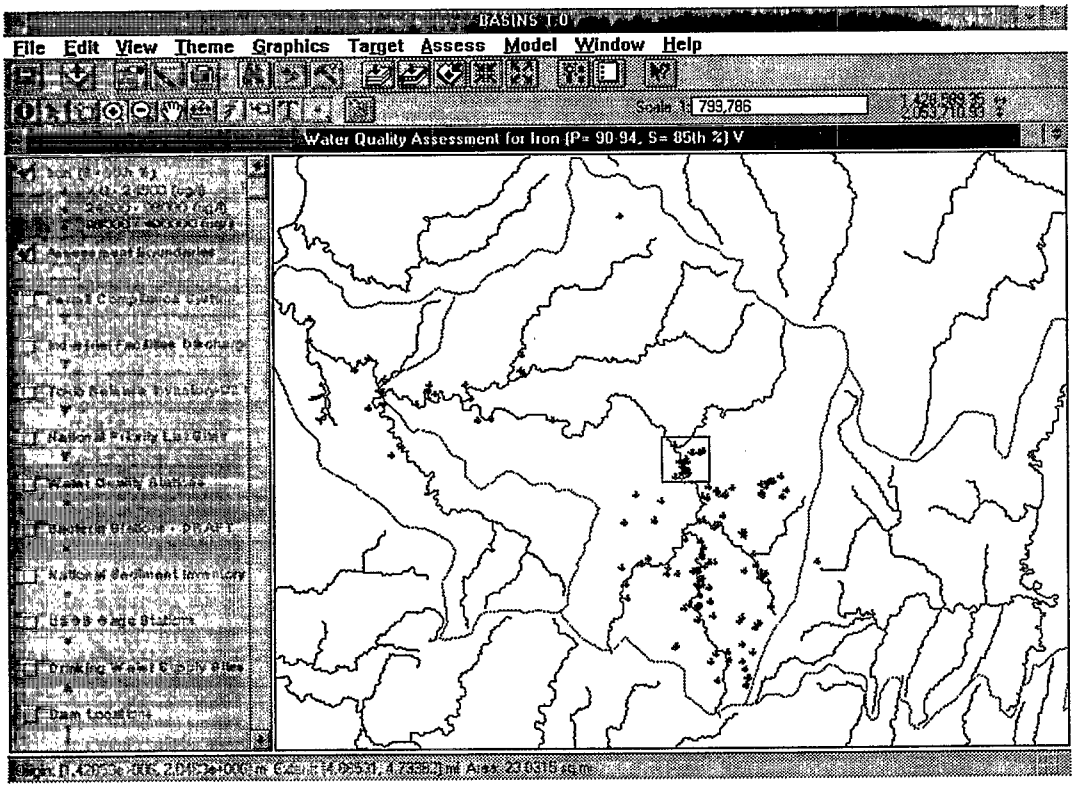
Data Mining complements both the TARGET and ASSESS tools by allowing you to move progressively from a regional analysis (provided by TARGET) to a watershed-scale analysis (provided by ASSESS) to a more detailed analysis at the station level

(using Data Mining.) The components of this tool include an interactive Data Mining map and a series of linked data tables describing the status and trends of the water quality conditions. Examining Data Mining windows also helps you to evaluate monitoring programs, identify data gaps, and assess total point source loading to a given waterbody. Currently, Data Mining can be used on three BASINS relational data layers: water quality stations, bacteria stations, and Permit Compliance System.

Data Mining Steps

1. To begin, check the box next to the water quality stations theme. Click on the text of the theme to select it. Water quality data are used in the following example to illustrate the steps used in the Data Mining process.

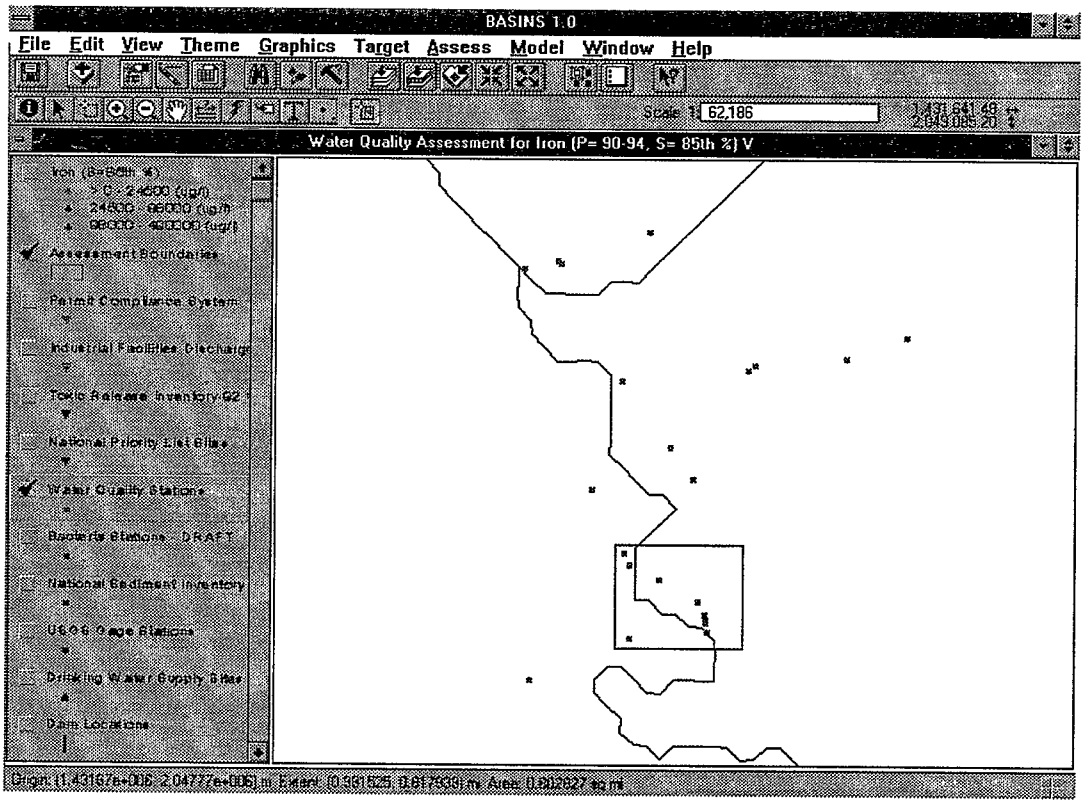
2. Zoom to a scale suitable for selecting 5 to 10 water quality stations (Screen 5.5.1).



Screen 5.5.1

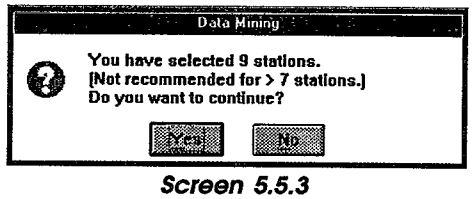
3. Click on the Data Mining feature selection tool button. 

4. Select one or more stations by pointing the cursor to the region of interest and, while holding the left mouse button down, dragging the cursor to create a window encompassing one or more stations (Screen 5.5.2).



Screen 5.5.2

5. The system determines the number of stations selected and prompts you for confirmation. (Screen 5.5.3).

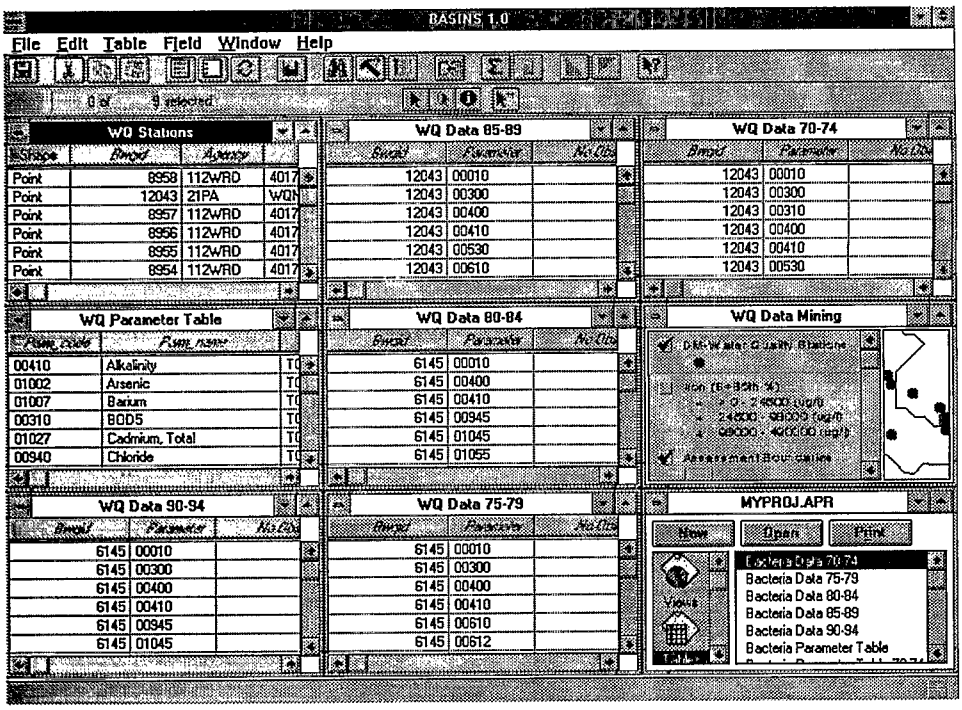


Screen 5.5.3

6. Upon confirmation, Data Mining builds the appropriate relational data tables and corresponding Data Mining map (Screen 5.5.4).

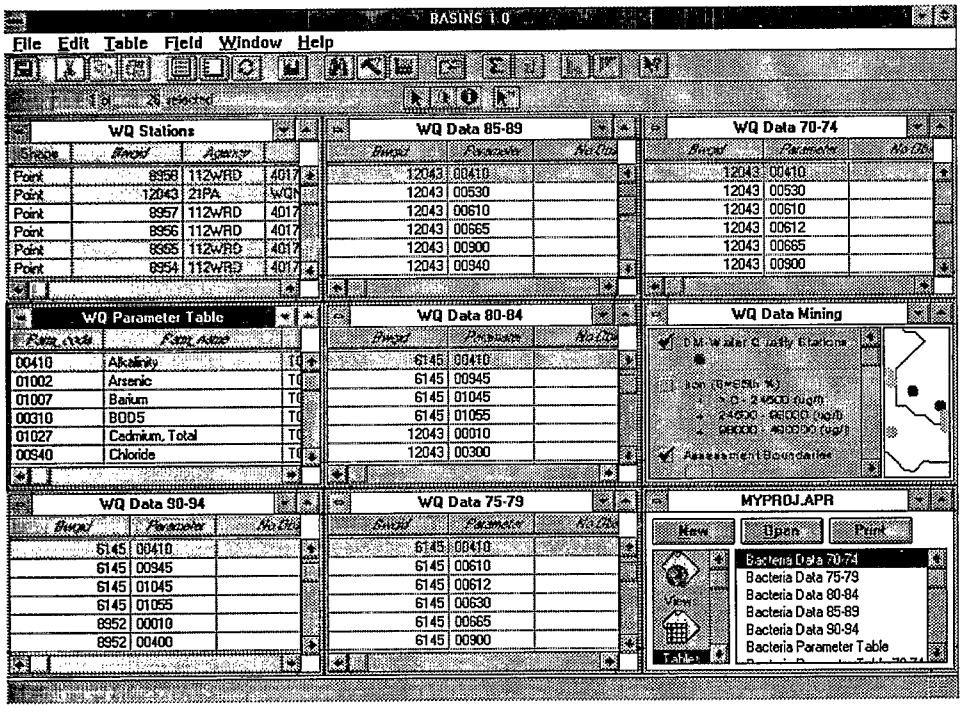
7. Using the Data Mining record selection tool button (located within the BASINS table window), initiate the dynamic linkages to analyze the interrelationships between the selected stations and corresponding concentrations for the 5-year periods included in BASINS. Screen 5.5.5 is an illustration of the resulting output. Click on the WQ parameter table. Now all subsequent answers will be focused on parameters. Click on Parm_name BOD5. All the stations that measured BOD5 will be highlighted in the WQ stations table and in the WQ Data Mining map. Records will also be highlighted in each of the WQ data tables, showing which data records are for BOD in each time period.

   Click on the WQ Stations title box. This changes the focus from parameters to stations. Click on a record. Now all the parameters measured by this station are highlighted in the WQ parameter table and all the data time periods during which one of these parameters was measured are also highlighted in separate



Screen 5.5.4

WQ station tables. Also, the selected stations are highlighted on the Data Mining map. If you select a station on the Data Mining map, the data records corresponding to the selected station will be highlighted.



Screen 5.5.5

5.6 Activating and Operating Models

The BASINS system includes two stream water quality models and a watershed nonpoint source model. The models are linked by the BASINS interface so that all three models can be launched interactively from a graphical interface to simulate point and nonpoint source discharges into streams. Integration of these models with GIS gives BASINS the ability to generate model input files by extracting data from the Reach File (RF1) and other databases.

NOTE: Each of these models can be run independently of BASINS by selecting the appropriate icon from the BASINS program group.

5.6.1 NPSM

The Nonpoint Source Model (NPSM) simulates nonpoint source runoff, pollutant loadings, and dissolved oxygen levels in runoff for the selected watershed. NPSM is a Windows interface that works with the EPA-supported HSPF model (Version 10.0). Although the HSPF model is a comprehensive watershed loading and transport model, NPSM currently supports only selected features of the model. NPSM does not currently include the stream simulation portions of HSPF. Future releases of NPSM are expected to include expanded model capabilities.

NPSM requires land use data, weather data, and information on the pollutants of concern. When the model is run from BASINS View, BASINS automatically creates a model project file and prepares a land use data file for NPSM. Data preparation for NPSM extracts land use information from BASINS View and groups it into general pervious and impervious categories for simulation by NPSM. These general land use categories provide a starting point for simulation using NPSM. You can create more specific land use breakdowns by the user within NPSM. Weather-related data for each region are bundled with the model. For example, the EPA Region 3 CD includes REG03.WDM, which contains weather data collected at five weather stations. You need to assign the WDM file and each of the associated land units to one of the available weather stations to run the model. You also need to select which pollutant(s) are to be simulated and provide specific land use and pollutant data.

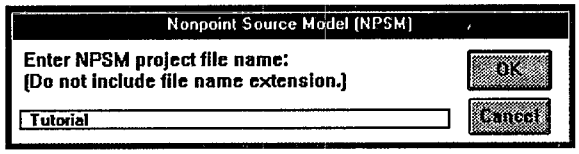
Default values for the basic land use categories and selected pollutants are provided by NPSM. These default values are based on a limited sampling of literature values and on applications within the Mid-Atlantic region. Currently, default data are available for the following pollutants: CBODU, nutrient parameters, total zinc, lead, and copper. You are encouraged to build your own locally applicable default data sets. Initial default values are provided only to facilitate input file preparation. Modification and testing of input files are required for application to specific watersheds. The CD(s) come with a file (DEFAULT.DEF) that contains default data for different land uses and pollutants. This file can be modified or a new file can be created using the default data editor in NPSM. To use NPSM, you need to load these data from the DEFAULT.DEF file or a user-created file.

NPSM Steps

1. In BASINS View make the *Cataloging Unit Boundary* theme active and select a cataloging unit. Select the *Cataloging Unit Boundary* theme by clicking the box next to the theme legend and make it active by clicking on the legend text.

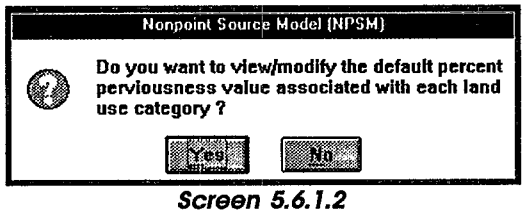
2. Pull down the Models menu and select *NPSM*.

3. Type a name for the NPSM input file in the NPSM Input File window (Screen 5.6.1.1). Do not include a file name extension. The cataloging unit number appears as the default file name. Click on *OK* when you are ready to accept a file name. NPSM adds different extensions to name the various files that it uses or generates.

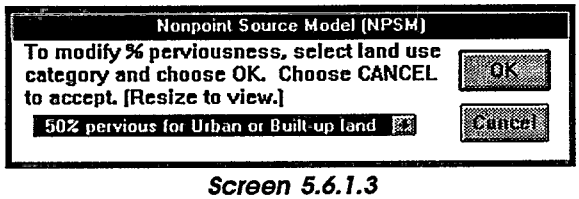


Screen 5.6.1.1

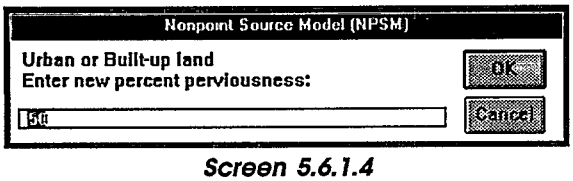
4. The next screen (Screen 5.6.1.2) gives you the option to view and/or modify the default imperviousness ratios. Select a land use type to modify from the *Imperviousness Ratio Selection* screen (Screen 5.6.1.3) and enter a value in the following screen (Screen 5.6.1.4). Click on *OK* to accept new values. You can repeat this procedure until you are finished modifying all of your desired land uses. After you finish, click on *Cancel* in the *Imperviousness Ratio Selection* screen.



Screen 5.6.1.2

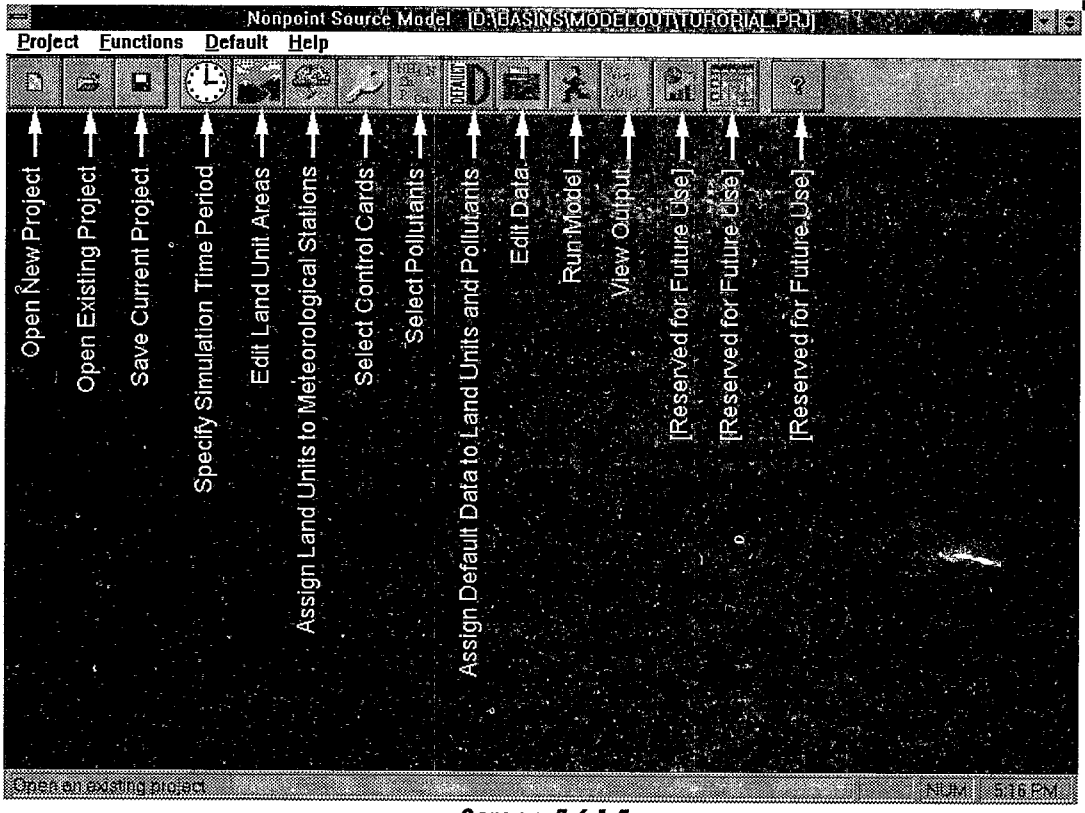


Screen 5.6.1.3



Screen 5.6.1.4

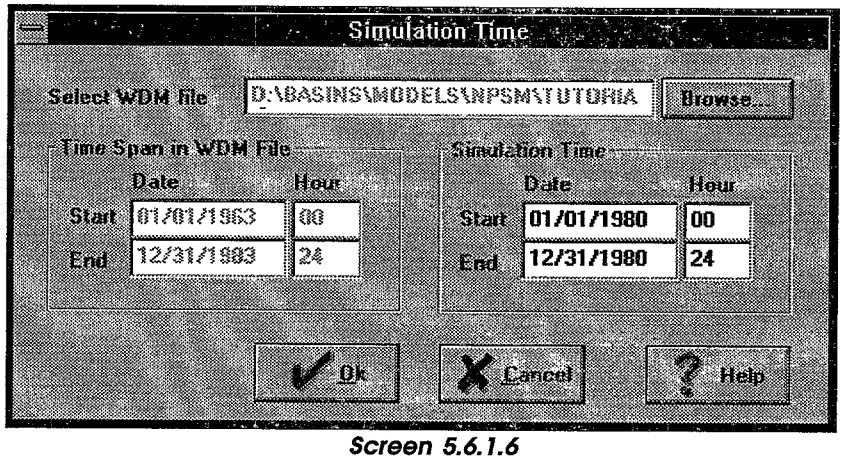
5. You are now in the NPSM model (Screen 5.6.1.5). A series of buttons appears immediately below the menu bar. If you move the cursor on top of any of these buttons, a brief description of the button function appears at the bottom left corner of the screen (status bar). The first three buttons from the left open a new file, open an existing file, and save the current project file, respectively. Other buttons and their functions are described below.



Screen 5.6.1.5

Specify Simulation Time Period

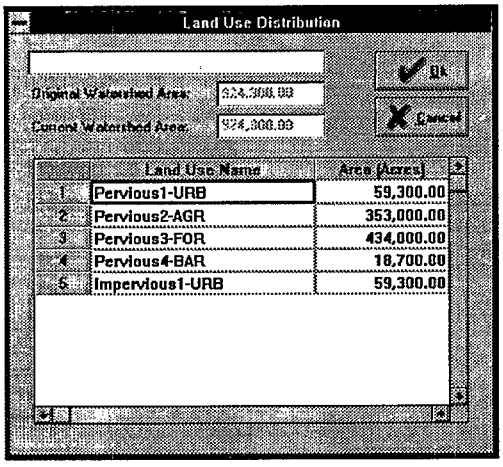
Click on this button to specify the meteorological data file (WDM file) and the simulation period. The button will open the *Simulation Time* screen (Screen 5.6.1.6). When you type or browse for the name of the WDM file, you will see the time span of the WDM file. You can specify any time period as long as it falls within the time span in the WDM file. Longer time periods (e.g., 5 years) will extend the time required for HSPF to run and for TOXIROUTE and QUAL2E to integrate.



Screen 5.6.1.6

Edit Land Use Areas

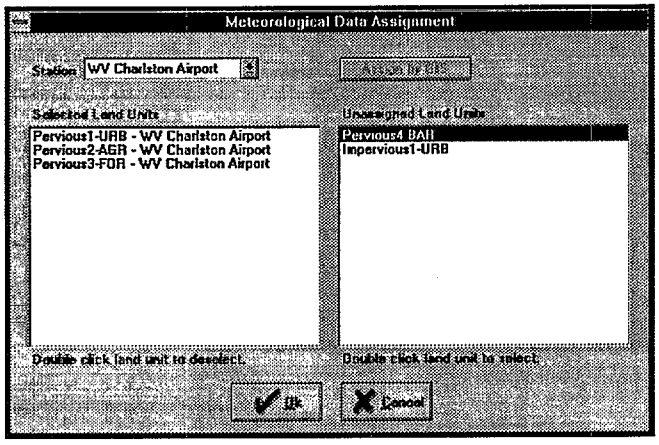
Use this button to enter/edit land use distributions. The *Land Use Distribution* screen (Screen 5.6.1.7) shows the data automatically generated from the GIS part of BASINS. You may skip this button if you do not want to view or modify land use areas. You can edit the data on this screen for the areas associated with each land use.



Screen 5.6.1.7

Assign Land Units to Meteorological Stations

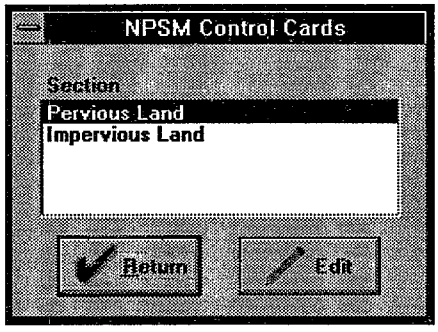
This button opens the *Meteorological Data Assignment* screen (Screen 5.6.1.8). All of the meteorological stations in the selected WDM file appear in the Station drop-down list. Select a meteorological station from this list and specify those land units which you want to associate with this station. Double-click on an unassigned land unit to assign it to the selected meteorological station or double-click on a selected land unit to cancel its assignment. Assignment of all land uses to one or more weather stations is required to run NPSM. The ability to assign the stations via GIS is currently not available.



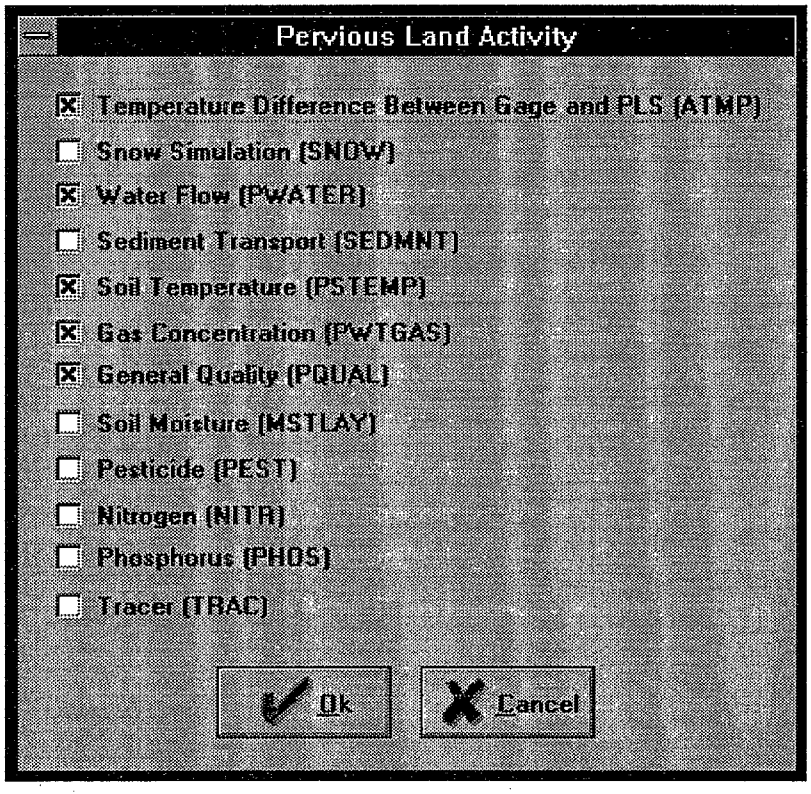
Screen 5.6.1.8

Select Control Cards

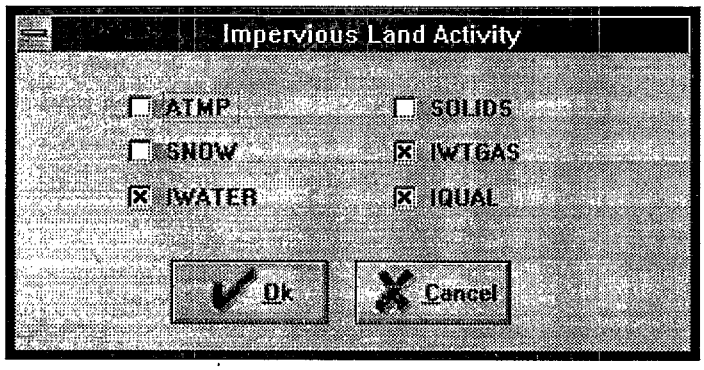
Click this button to edit the *NPSM Control Cards* (Screen 5.6.1.9). You will be given the option to edit either Pervious Land (Screen 5.6.1.10) or Impervious Land (Screen 5.6.1.11). In these screens you may select a combination of different activities to simulate. Some of the activities are turned on by default when you run NPSM from BASINS View. Only the items marked on screens 5.6.1.10 and 5.6.1.11 are currently fully supported by NPSM. Therefore, you may skip this button if you wish. If you turn on additional activities in the *Pervious Land Activity* or in the *Impervious Land Activity* screen, you will also need to provide additional data to support these options.



Screen 5.6.1.9



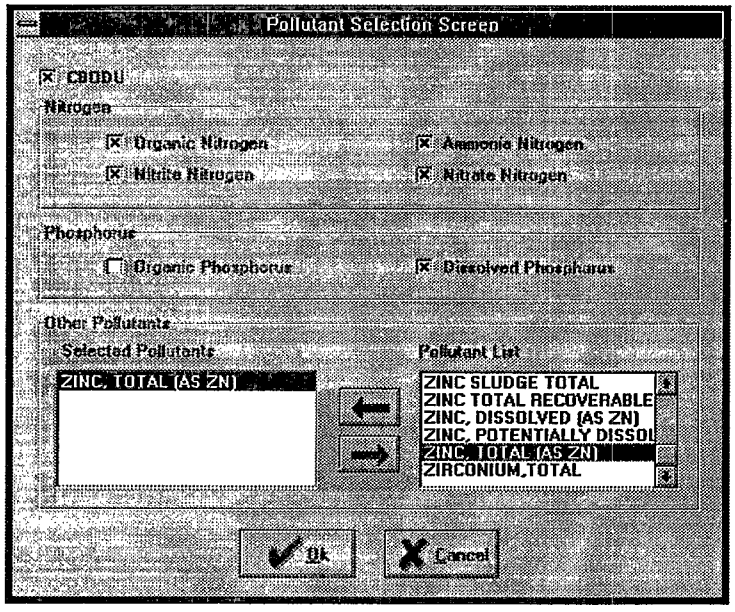
Screen 5.6.1.10



Screen 5.6.1.11

Select Pollutants

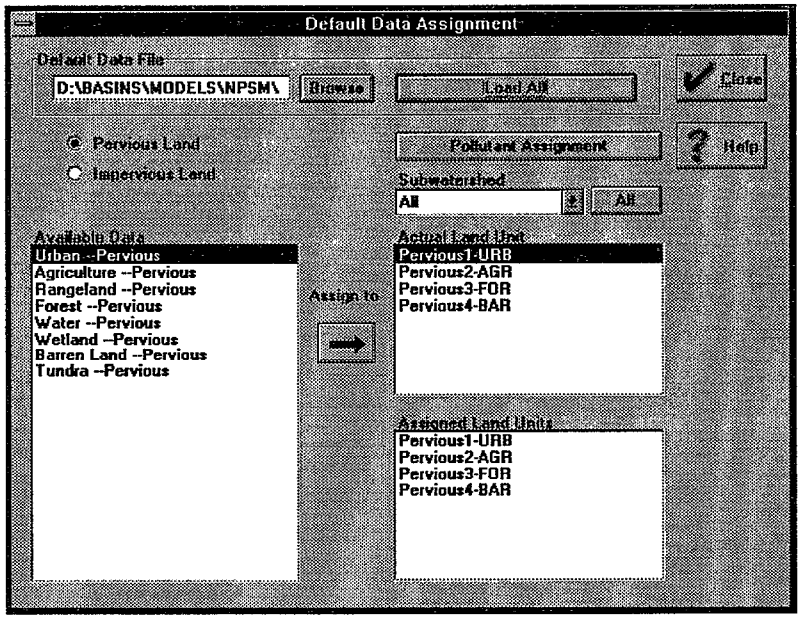
This button opens the *Pollutant Selection Screen* (Screen 5.6.1.12). Default data are available for the seven conventional pollutants (CBOD, organic nitrogen, nitrite nitrogen, ammonia nitrogen, nitrate nitrogen, organic phosphorus, and dissolved phosphorus) and three metals (zinc, copper, and lead). If you choose to model other pollutants, you will have to provide additional data. The maximum number of pollutants that can be simulated at once is seven. Dissolved oxygen does not appear on this screen since it is always simulated.



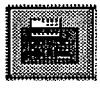
Screen 5.6.1.12

Assign Default Data to Land Units and Pollutants

Click on this button to open the *Default Data Assignment* screen (Screen 5.6.1.13). First, specify the default data file by browsing or entering its name. You can load all the default data at once by clicking on *Load All.* Alternatively, you can assign available data for one land use type or a pollutant to any one of the land units or pollutants selected. You **must** assign data to all actual land units and pollutants if you do not use the *Load All* command. Select either the *Pervious Land* or *Impervious Land* radio button (found in the upper left portion of the *Default Data Assignment* screen) to view or assign land units of a particular type. To check or manually assign default data for pollutants, click on *Pollutant Assignment.* If you selected a pollutant other than the 10 pollutants for which default data are available, you will need to manually assign data for that pollutant.

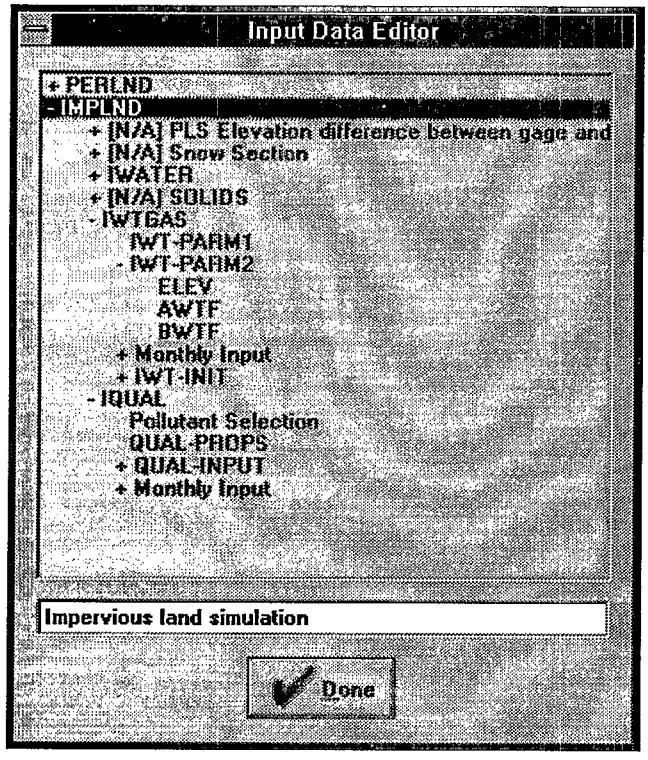


Screen 5.6.1.13



Edit Data

This button leads you to the *Input Data Editor* screen (Screen 5.6.1.14). This screen displays a nested list of the various data items that can be edited. A "+" indicates that the item is expandable and more options are hidden under it. Double-click on an expandable item to reveal these options. A "-" indicates that the item is already fully expanded. Double-click on an expanded item to hide the options under it. Items marked "[N/A]" do not apply to the current simulation due to selections made in the control cards. A leaf-level item is called a data item, for example, QUAL-PROPS under IMPLAND on Screen 5.6.1.14.



Screen 5.6.1.14

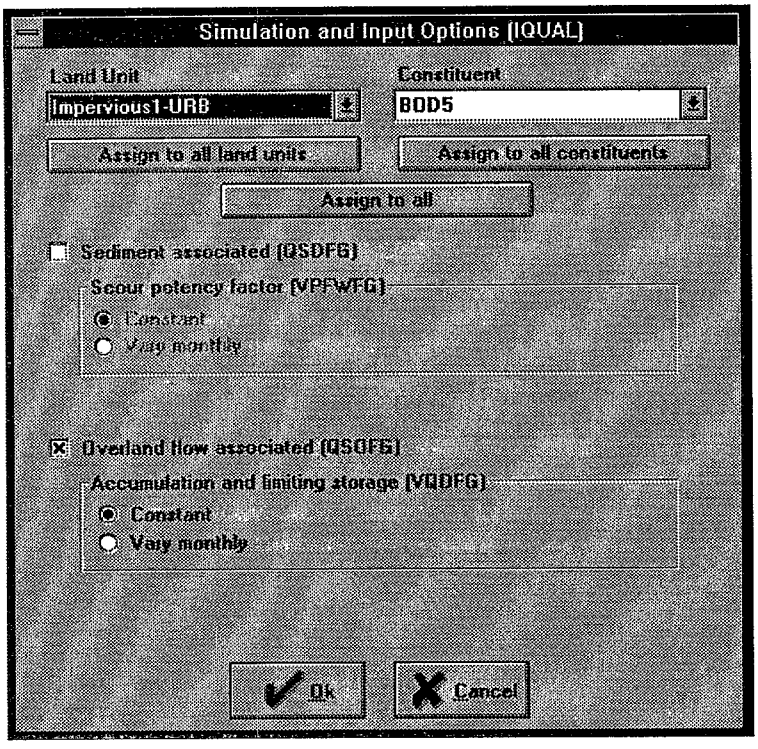
Double-clicking a data item will display its editor window. You can double-click QUAL-PROPS to further explore the *Simulation and Input Options* screen (Screen 5.6.1.15). Here you specify which components of the model you want to include in the simulation for a land unit and a pollutant. You can select different land units and pollutants from the drop-down lists. You can assign the settings to all water quality constituents for one land unit by clicking on *Assign to all constituents*. You can assign the same settings to all land units for all constituents by clicking on *Assign to all land units*. The necessary options will already be established if you are using default data. Therefore, you may skip this step unless you want to change some of the default settings. If you change some values or options using the Input Data Editor, the new values or options are saved under the current project only. The DEFAULT.DEF file or any other file you have used instead remains unchanged. To make a permanent change in the DEFAULT.DEF file, follow the steps provided below under "How to Create a Default Data File."

Run Model

Run the model when input file preparation is complete. The model run is performed by executing a DOS-based program (HSPF v10).

View Output

You will be prompted to view the model output after each successful run. You may also use this button to view model output anytime after you run the model.



Screen 5.6.1.15

How to Create a Default Data File:

1. If there is a project currently open, select *Close* from the Project menu.

2. Choose *Open* under the Default menu. Open the DEFAULT.DEF file. Click *Save As* (under the Project menu) to save this file with a new name and the DEF extension.

3. Modify the file using active buttons. For example, if you add a pollutant to the list of selected pollutants using the pollutant selection button, you will have to enter all the data for the pollutant using the input data editor button. Double-click on each item under PERLND/PQUAL and IMPLND/IQUAL, select the new pollutant from the list, and select/enter the corresponding information. You can assign this information to the selected land use or to all land uses.

4. Save the file and close it. You may use this file instead of the DEFAULT.DEF file in future NPSM simulations.

5.6.2 TOXIROUTE

TOXIROUTE provides a modeling tool for performing simple assessments of pollutant concentrations in rivers. TOXIROUTE uses a simple first-order decay solution to simulate the transport of selected pollutants in streams and rivers. This simplification provides an initial approach for examining concentrations of

discharged pollutants in receiving waters. TOXIROUTE does not explicitly consider nutrient or chemical reactions or transformations. In cases where algal growth or other significant chemical processes are a concern, this simplified model might be inappropriate. The TOXIROUTE model assumes steady state conditions, where the system has reached equilibrium. The methodology may have limitations in cases where wet-weather processes, such as nonpoint source runoff, predominate. Future enhancements to TOXIROUTE will include expansion of the chemical simulation capabilities and the use of daily time steps.

When you apply the TOXIROUTE model within BASINS, the model receives point source discharge and reach data from BASINS View. You may also choose to include nonpoint source information generated by the NPSM model. If you want to include NPS flow and load, you need to run the NPSM model for the particular pollutant and the desired cataloging unit before a TOXIROUTE run. The NPS flow and load are automatically distributed by BASINS across the simulated reaches.

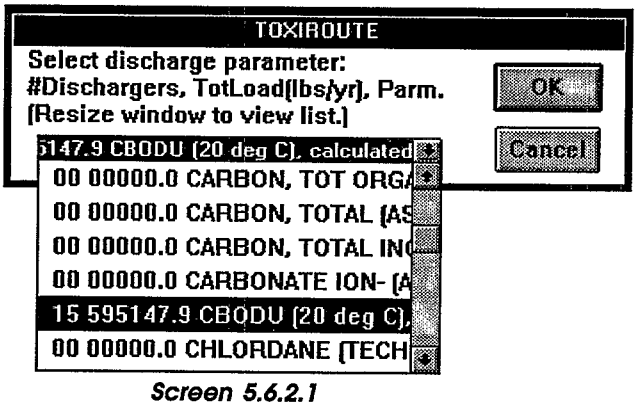
TOXIROUTE Steps

1. In BASINS View make *Cataloging Unit Boundary* the active theme and select a cataloging unit.

2. Pull down the Models menu and select *TOXIROUTE.*

3. Select the year of point source data you want to model.

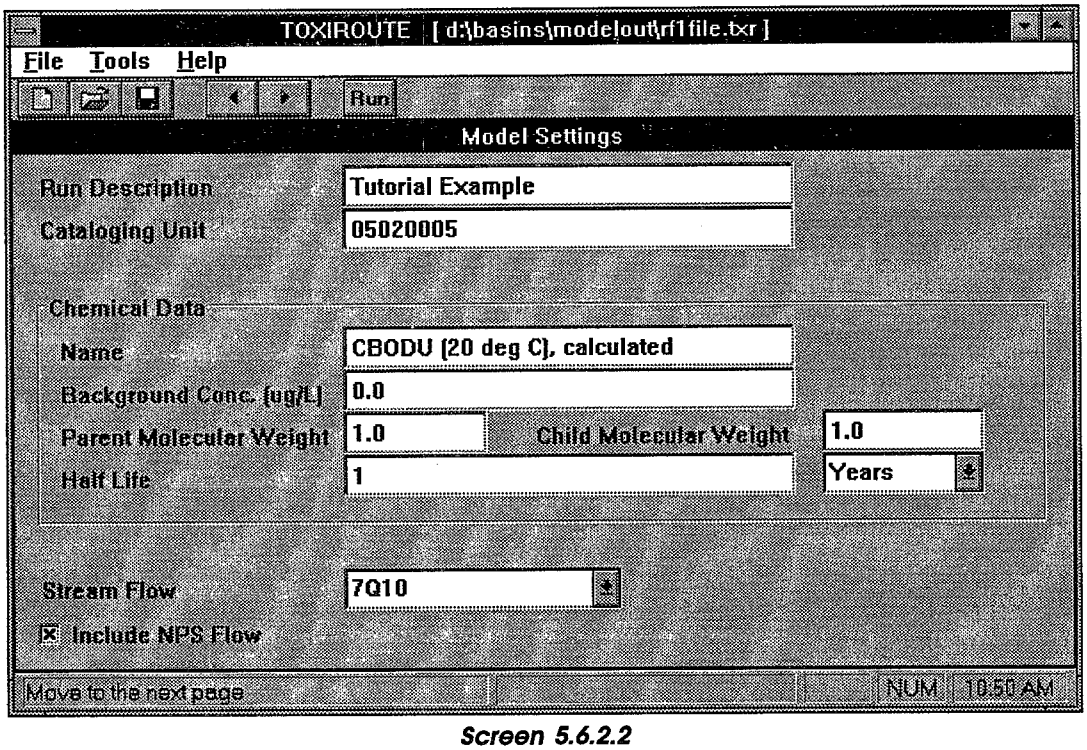
4. You will be prompted to select a pollutant from a list of pollutants (Screen 5.6.2.1). If available, BASINS View generates the point source data for the selected cataloging unit. TOXIROUTE automatically loads the information provided by BASINS View.



Screen 5.6.2.1

To help you select a pollutant, the two numbers before the pollutant name indicate the total number of facilities in the cataloging unit and the total estimated load of all discharges combined in pounds per year, respectively.

5. The first screen of TOXIROUTE (Screen 5.6.2.2) allows you to select pollutant-specific parameters for simulation. There are six buttons immediately below the menu bar of each screen. If you place the cursor on any of these



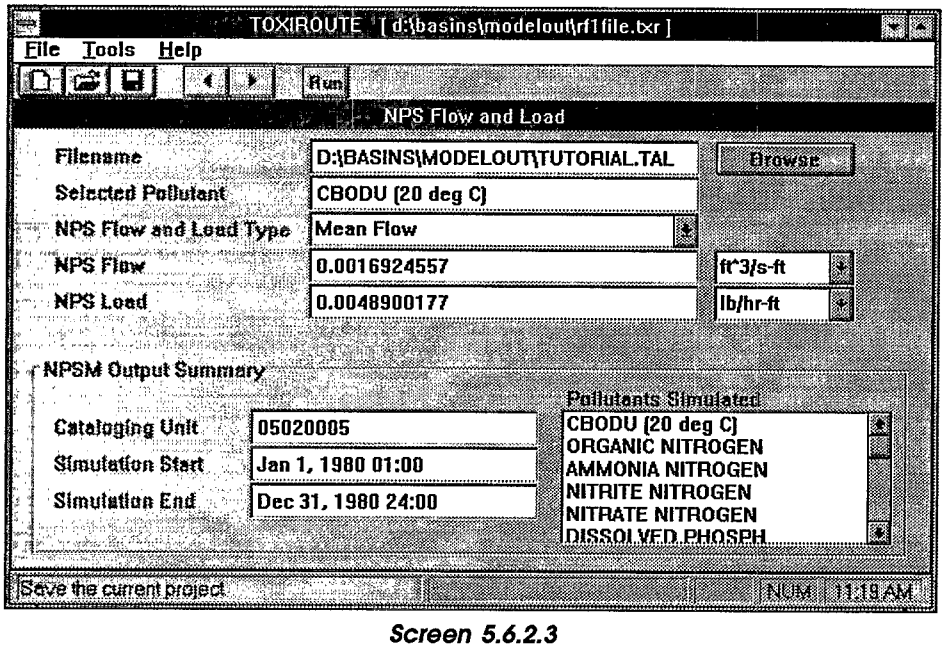
Screen 5.6.2.2

buttons, you will see a brief description of the button in the status bar at the bottom left corner of the screen. The buttons are, from left to right, open a new project file (TXR file), open an existing project file, save the project file, go to the previous screen, go to the next screen, and run the model.

For the selected pollutant, enter the background concentration, parent molecular weight, child molecular weight, and half life. *Background concentration* refers to the concentration observed at the upstream end of simulated reaches. Available monitoring data are typically used to estimate the background concentration. The *Parent Molecular Weight* and *Child Molecular Weight* are not significant if there is no chemical of interest (child chemical) produced during the decay of the selected pollutant (parent chemical) (USEPA, 1985). Check the *Include NPS Flow* box to model the potential effect of nonpoint source flow and load on instream pollutant concentrations. The *NPS Flow and Load* screen will appear as the second screen only if you check this box on the first screen. The stream flow selection box lets you select 7-day 10-year low flow (7Q10) or mean flow. The 7Q10 is representative of dry summer conditions based on a statistical analysis of flow data. If you choose to use 7Q10 stream flow, the nonpoint source flow is added to the 7Q10 flow. If mean flow is chosen in the *Stream Flow* selection box, nonpoint source flow is not incorporated. Nonpoint source loads are included in either case. Click on the right arrow button.

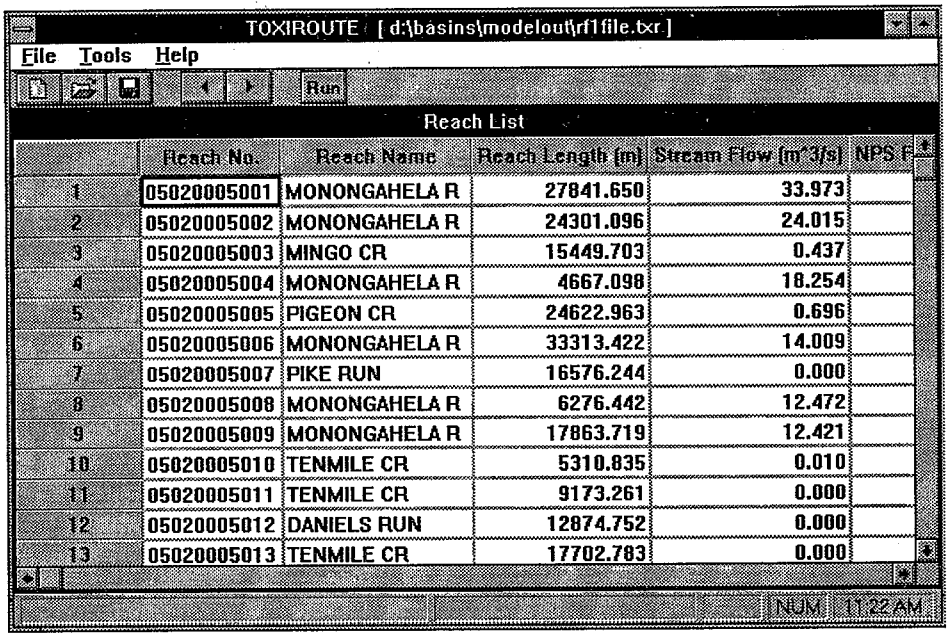
NOTE: The point source data in BASINS are currently available only for 1991, 1992, and 1993, whereas the weather data used in the NPSM simulation (*.WDM* file) usually range from 1963 to 1983. When combining point source and nonpoint source flow and load data, therefore, you are implicitly assuming that weather conditions from 1991 to 1993 were similar to those from 1963 to 1983. (Alternatively, when running the model for the earlier time period, you are assuming that point source discharges from 1963 to 1983 were similar to discharges occurring from 1991 to 1993.)

6. The *NPS Flow and Load* screen (Screen 5.6.2.3) is divided into two parts. The top part of the screen displays parameters selected for TOXIROUTE simulation from NPSM simulation, and the bottom part (the *NPSM Output Summary*) shows the summary of NPSM output. First browse or type the NPSM output file name (.TAL). After you select the NPSM output file, you will be asked to choose a pollutant from a list. These are the pollutants simulated by NPSM and written to the selected NPSM output file. Select the pollutant you are modeling in TOXIROUTE. All the information is automatically loaded in this screen. You may change the *NPS Flow and Load Type*. Selections are available for NPS flow on an annual basis or on a monthly basis. This allows you to examine average conditions or analyze selected months under different flow conditions. If you select the mean flow of a particular month, make sure that the month lies within the NPSM simulation time range. The start and end time of NPSM simulation are provided in the *NPSM Output Summary*. Click on the right arrow button to move to the next screen.



Screen 5.6.2.3

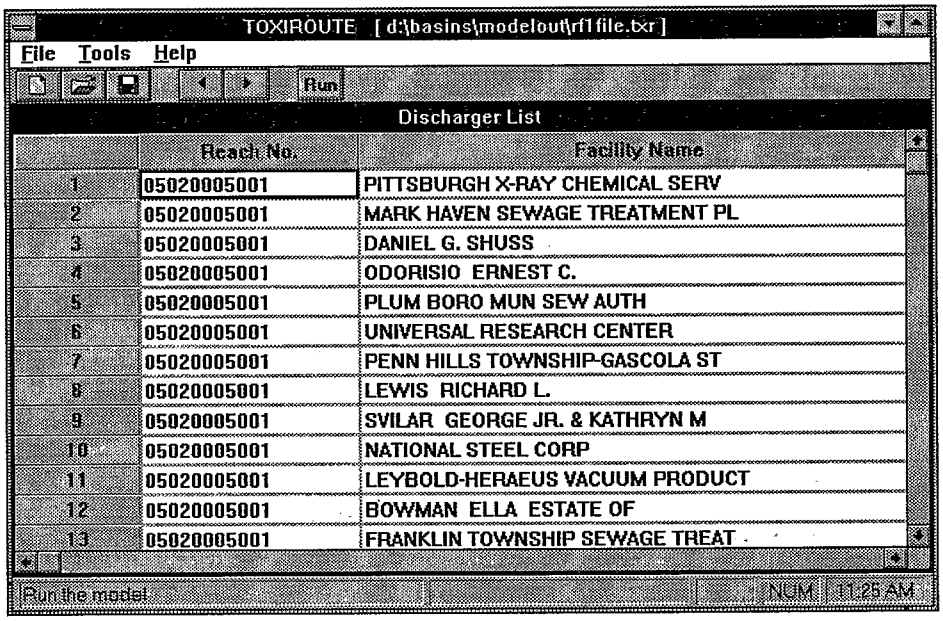
7. In the *Reach List* screen (Screen 5.6.2.4) you can view information about all of the reaches in the cataloging unit, including their lengths, stream flows, NPS flows, and NPS loads. Use the horizontal and vertical scroll bars to view other parts of the screen. You cannot currently edit any data on this screen. Click on the right arrow button to move to the next screen.



	Reach No.	Reach Name	Reach Length (m)	Stream Flow (m^3/s)	NPS F
1	05020005001	MONONGAHELA R	27841.650	33.973	
2	05020005002	MONONGAHELA R	24301.096	24.015	
3	05020005003	MINGO CR	15449.703	0.437	
4	05020005004	MONONGAHELA R	4667.098	18.254	
5	05020005005	PIGEON CR	24622.963	0.696	
6	05020005006	MONONGAHELA R	33313.422	14.009	
7	05020005007	PIKE RUN	16576.244	0.000	
8	05020005008	MONONGAHELA R	6276.442	12.472	
9	05020005009	MONONGAHELA R	17863.719	12.421	
10	05020005010	TENMILE CR	5310.835	0.010	
11	05020005011	TENMILE CR	9173.261	0.000	
12	05020005012	DANIELS RUN	12874.752	0.000	
13	05020005013	TENMILE CR	17702.783	0.000	

Screen 5.6.2.4

8. In the *Discharger List* screen (Screen 5.6.2.5) you can view/edit point source loading information. All of the facilities (or dischargers) in the cataloging unit are listed regardless of their discharge of the particular pollutant. You can edit the load limits from a facility by clicking on the cell and typing a number. If a discharger is located at the most downstream point of a reach (i.e., the distance of the discharger location from the endpoint of the reach is 0.0), TOXIROUTE assigns the lesser of 1 meter or 1 percent of the reach length as the distance from the bottom of the reach.

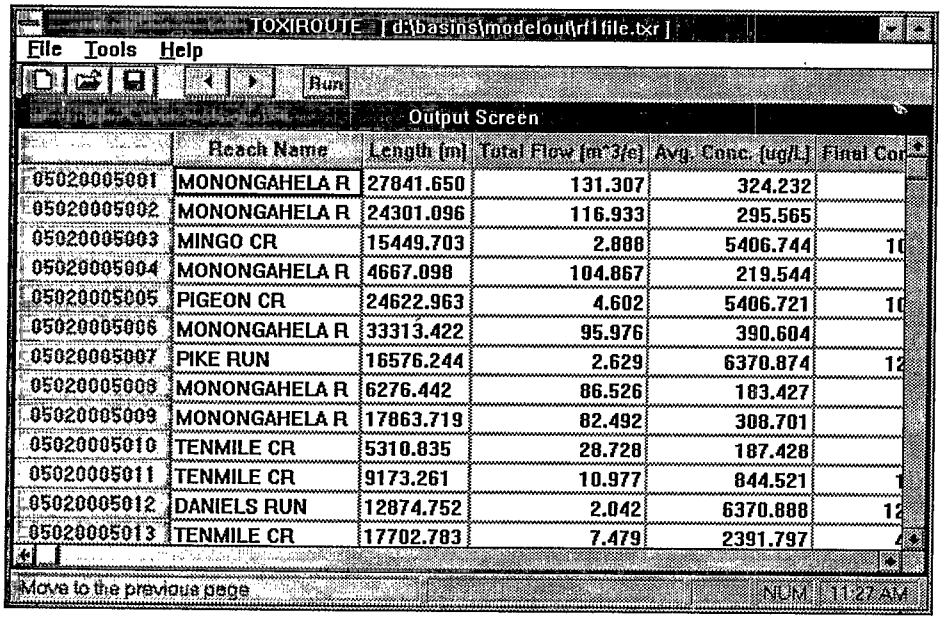


	Reach No.	Facility Name
1	05020005001	PITTSBURGH X-RAY CHEMICAL SERV
2	05020005001	MARK HAVEN SEWAGE TREATMENT PL
3	05020005001	DANIEL G. SHUSS
4	05020005001	ODORISIO ERNEST C.
5	05020005001	PLUM BORO MUN SEW AUTH
6	05020005001	UNIVERSAL RESEARCH CENTER
7	05020005001	PENN HILLS TOWNSHIP-GASCOLA ST
8	05020005001	LEWIS RICHARD L.
9	05020005001	SVILAR GEORGE JR. & KATHRYN M
10	05020005001	NATIONAL STEEL CORP
11	05020005001	LEYBOLD-HERAEUS VACUUM PRODUCT
12	05020005001	BOWMAN ELLA ESTATE OF
13	05020005001	FRANKLIN TOWNSHIP SEWAGE TREAT

Screen 5.6.2.5

You can also add or delete a facility by clicking the right mouse button once. When you click the right mouse button, a pop-up menu appears with two options—*Add Discharger* and *Remove Discharger*. If you choose to add a discharger, a blank line will appear at the bottom of the table. By default the model will assign a value of 0.0 to the distance and load columns and will specify the type as *Discharger*. You can edit the load and distance. After you enter data in any column for the new discharger, press Enter/Return to accept. BASINS will then automatically activate the next cell to the right. If you want to delete a facility, make any cell in the row of the facility active (click left mouse button on the cell) before you click the rightmouse button and then select *Remove Discharger* from the pop-up box. This is the last screen for TOXIROUTE input. You can run the model by clicking on *Run*.

9. The *Output* screen (Screen 5.6.2.6) lists concentrations on a reach basis. The Average Concentration column lists average concentrations of the pollutant in reaches, whereas the Final Concentration column lists the concentrations of the pollutant at the end of the reaches. The average concentration of a reach is the mean value integrated for the total length of the reach. The final concentration is the concentration at the downstream end of the reach. It should be noted that when one discharge or several discharges are located at the extreme end of a stream reach, the resulting final concentration of this reach is usually significantly higher than the average concentration due in large part to the location of the discharges. The Child Concentration column shows the final concentrations of the chemical produced during the decay of the parent chemical. Use the scroll bars to view the hidden parts of the screen. You need not save the output file. Each time you run the model it generates an output file with the project name as the file name and OUT as the filename extension. You



	Reach Name	Length [m]	Total Flow [m^3/s]	Avg. Conc. [ug/L]	Final Con
05020005001	MONONGAHELA R	27841.650	131.307	324.232	
05020005002	MONONGAHELA R	24301.096	116.933	295.565	
05020005003	MINGO CR	15449.703	2.888	5406.744	1
05020005004	MONONGAHELA R	4667.098	104.867	219.544	
05020005005	PIGEON CR	24622.963	4.602	5406.721	1
05020005006	MONONGAHELA R	33313.422	95.976	390.604	
05020005007	PIKE RUN	16576.244	2.629	6370.874	1
05020005008	MONONGAHELA R	6276.442	86.526	183.427	
05020005009	MONONGAHELA R	17863.719	82.492	308.701	
05020005010	TENMILE CR	5310.835	28.728	187.428	
05020005011	TENMILE CR	9173.261	10.977	844.521	
05020005012	DANIELS RUN	12874.752	2.042	6370.888	1
05020005013	TENMILE CR	17702.783	7.479	2391.797	

Screen 5.6.2.6

can save the output under any name by selecting *Save Output* under the File menu. You can view the output by selecting *Visualize* under the *Models* menu in BASINS View. Refer to Section 5.6.4 for further details.

5.6.3 QUAL2E

Geographic selection in QUAL2E simulation is different from that in the NPSM model and TOXIROUTE simulations because individual reaches in a cataloging unit are selected instead of a whole cataloging unit. BASINS first checks the data pertaining to the selected reaches to find out whether the selected reach network is acceptable for simulation with QUAL2E. In general, remember the following three points when you select reaches:

(1) Select connected reaches so that they build only one network.
(2) Do not select too many reaches.
(3) Reach lengths should not be significantly different.

Nonpoint source flow and loads can be included by selecting an NPSM output file. A QUAL2E simulation includes point source and reach data from BASINS View, as well as nonpoint source data from the output of a previous NPSM run. Some of the BASINS data are tailored, with as few changes as possible, to allow the input file to fulfill QUAL2E requirements. For example, to run QUAL2E all the reaches in a selected network must be divided into smaller computational elements of equal length such that each reach has an integer number of computational elements. In natural systems it is not always possible to find streams that will meet this requirement without adjustment. Therefore, reach lengths in QUAL2E might appear slightly different from what you will find in BASINS View.

Another modification can be found when a discharger is located at the most upstream or most downstream computational element of the reach. In these cases, the discharger location is shifted one computational element inside the reach because QUAL2E does not allow these two elements to receive point source discharges. In addition, only one discharger can be specified per computational element, forcing BASINS to total all the dischargers in a computational element while preparing a QUAL2E input file. Therefore, you might see "5 disch" (i.e., five dischargers together) or "3 disch" instead of a discharger name in the *Point Loads and Withdrawals* screen in QUAL2E. When some of the necessary information is not available in BASINS View, a reasonable value is assigned to fill the blank. (For example, the temperature of point source discharges is assumed to be 25 °C.) Some additional information is stored in DEFAULT.Q2E, which can be viewed and modified using any text editor. These data are also used to prepare an input file. In a QUAL2E simulation, if you select a reach that has an upstream reach not included in the current simulation, BASINS assumes that the selected reach is a headwater reach while preparing the input file for QUAL2E. If you want to carry over the effect of upstream discharges, you might have to model upstream reaches separately, record the output flow and concentrations, and type these numbers in the *Headwater Source Data* screen in QUAL2E. Refer to *QUAL2E Windows Interface User's*

Manual (USEPA, 1995) and *The Enhanced Stream Water Quality Models QUAL2E and QUAL2E-UNCAS: Documentation and User Manual* (Brown and Barnwell, 1987) for further details. Hydraulic structures/dams are not retrieved by the GIS to support the configuration of the stream system selected for simulation.

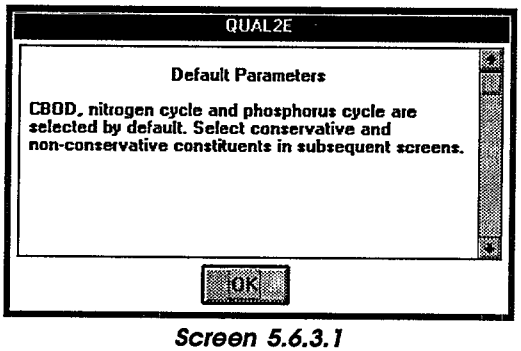
QUAL2E Steps

1. In BASINS View click on the check box next to the *Reach File* theme and make it active by clicking on the theme legend text.

2. Pull down the Models menu and select *QUAL2E.*

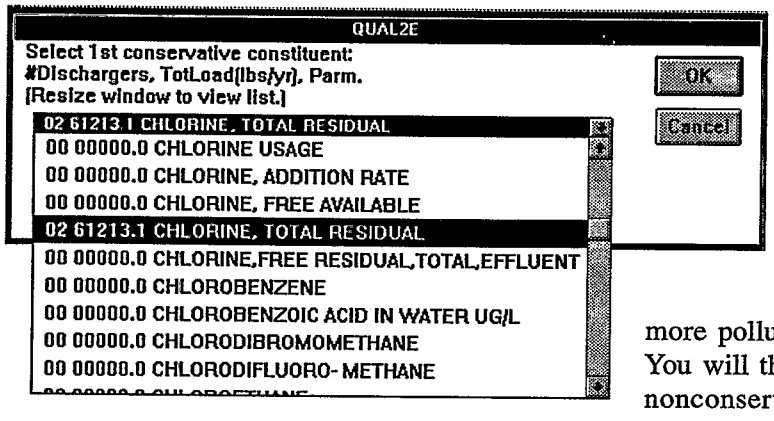
3. Select the year of point source data you want to model.

4. You will be informed that BASINS generates default input data for CBOD, dissolved oxygen, fecal coliform, nitrogenous species, and organic and dissolved phosphorus (Screen 5.6.3.1). All of these substances are automatically selected so that any point source or nonpoint source (if you choose to include NPS) data are automatically processed and included in the QUAL2E simulation.



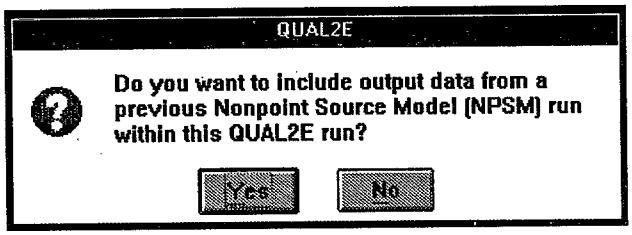
Screen 5.6.3.1

5. You will be prompted to select up to three conservative substances and one nonconservative substance. The numbers in front of the substance name indicate the number of discharges in the selected reaches, and the total number of pounds discharged per year. After you select one conservative substance in Screen 5.6.3.2, click on *OK.* You will then be prompted to select a second conservative pollutant. If you do not want to select any more pollutants, click on *Cancel.* You will then be asked to select a nonconservative substance.



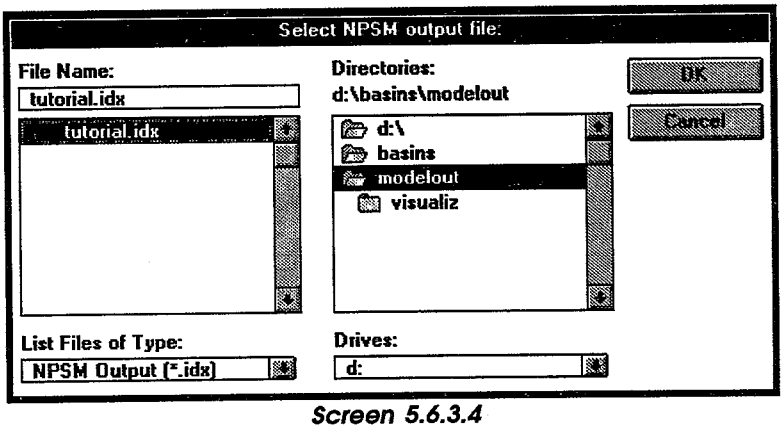
Screen 5.6.3.2

6. The next screen will ask whether you want to include nonpoint source data (Screen 5.6.3.3). In QUAL2E nonpoint source flow and loads are handled as incremental flow and loads. You must have run NPSM for the cataloging unit to be able to include nonpoint source data in your current QUAL2E simulation. If you choose *Yes,* BASINS will prompt you to select a file, as shown in Screen 5.6.3.4. Select a file that has the same name as the project name of the NPSM simulation for this watershed, but with an IDX extension. From the drop-down list in Screen 5.6.3.5, select how you want the NPS output to be processed for QUAL2E input. If you choose *Mean Flow*, the mean flow, mean dissolved oxygen concentration, and mean concentrations of all the pollutants (common to both NSPM and QUAL2E simulations) will be calculated for the entire simulation period. If you choose any monthly mean, which you can do only if the selected month lies within the NPSM simulation period, the program will calculate and use the mean flow and concentrations for the particular month as nonpoint source flow and concentrations.

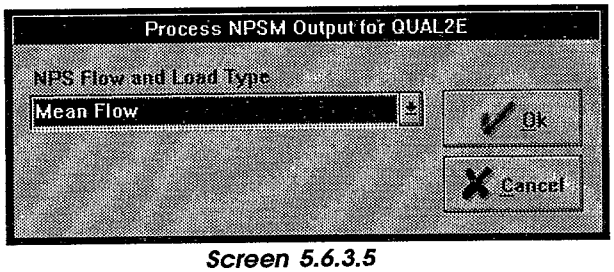


Screen 5.6.3.3

NOTE: The point source data in BASINS are currently available only for 1991, 1992, and 1993, whereas the weather data used in the NPSM simulation usually range from 1963 to 1983. When combining point source and nonpoint source flow and load data, therefore, you are implicitly assuming that weather conditions from 1991 to 1993 were similar to those from 1963 to 1983.

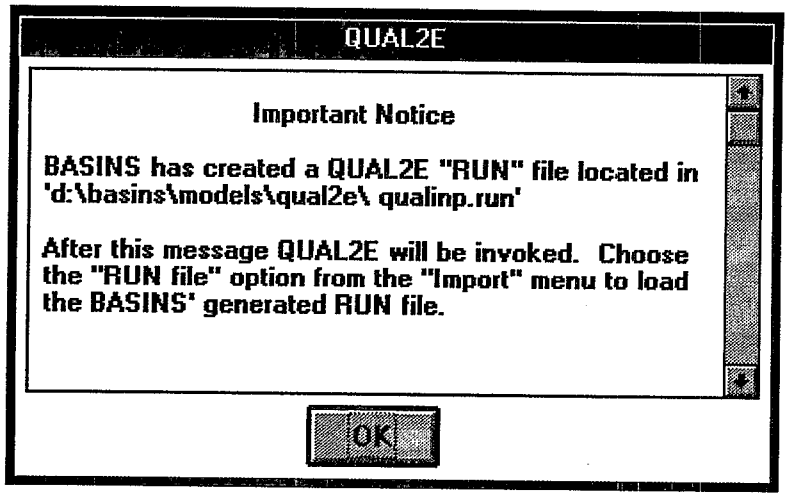


Screen 5.6.3.4



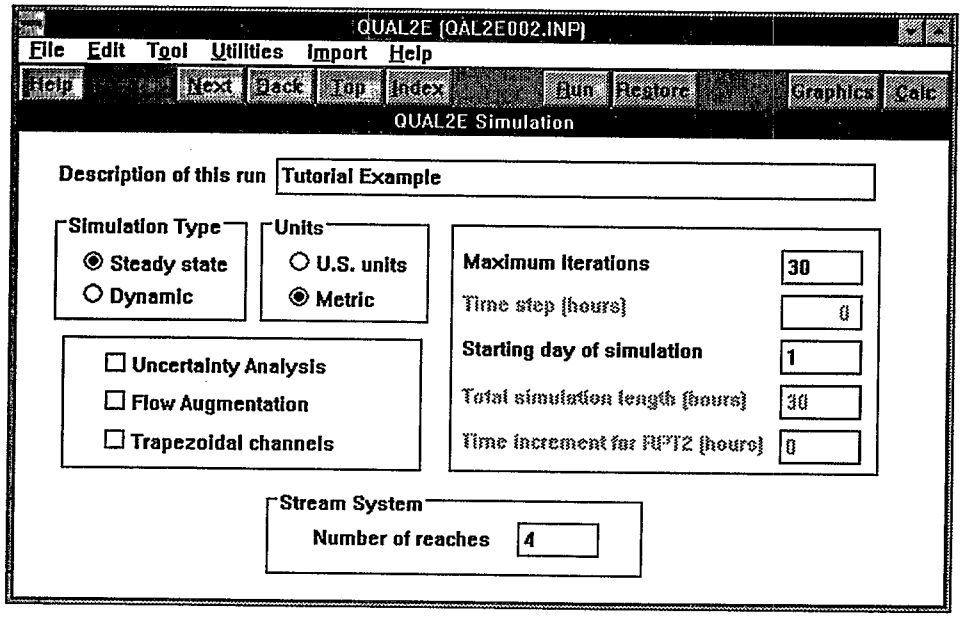
Screen 5.6.3.5

7. Finally, you will be notified how to load the input file (QUALINP.RUN) in QUAL2E (Screen 5.6.3.6).



Screen 5.6.3.6

You are now in the QUAL2E graphical user interface (Screen 5.6.3.7). Choose *RUN file* from the Import menu and select *QUALINP.RUN* to load the input you have just created. You can use the *Next* and *Back* buttons to move from screen to screen. You can modify the data on any of these screens. Click on *Run* to run the model.



Screen 5.6.3.7

9. You can view the output file after the model has run or you can view the output in BASINS View by selecting *Visualize* from the Models menu. Refer to Section 5.6.4 for more information on the Visualize feature. For more information on using QUAL2E and the Windows interface to QUAL2E, see the references (Brown and Barnwell, 1987; USEPA, 1995). In addition, the QUAL2E Windows Interface user's manual is included, in Word Perfect 5.1 format, in your BASINS installation under \BASINS\MODELS\QUAL2E\USERMANL.

5.6.4 Visualization

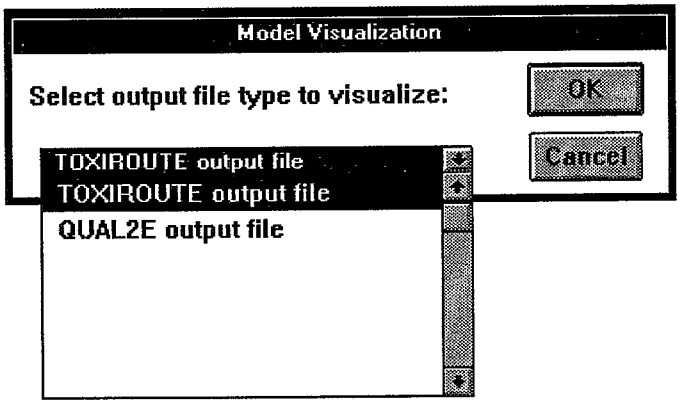
Visualization is a tool included in BASINS to allow you to view the model results in the BASINS View environment. In this way the model results can be interpreted spatially. Using this approach, you can concurrently view other relevant data, such as land use, point source locations, and gaging stations. Currently, BASINS supports visualization of the TOXIROUTE and QUAL2E simulation results. NPSM output cannot be viewed in BASINS.

5.6.4.1 Visualize TOXIROUTE Output

TOXIROUTE simulates one pollutant for all reaches in a cataloging unit during each application. The model output contains four elements: average concentration, final concentration, child concentration, and stream flow. In BASINS View, you can choose one of the four elements to visualize.

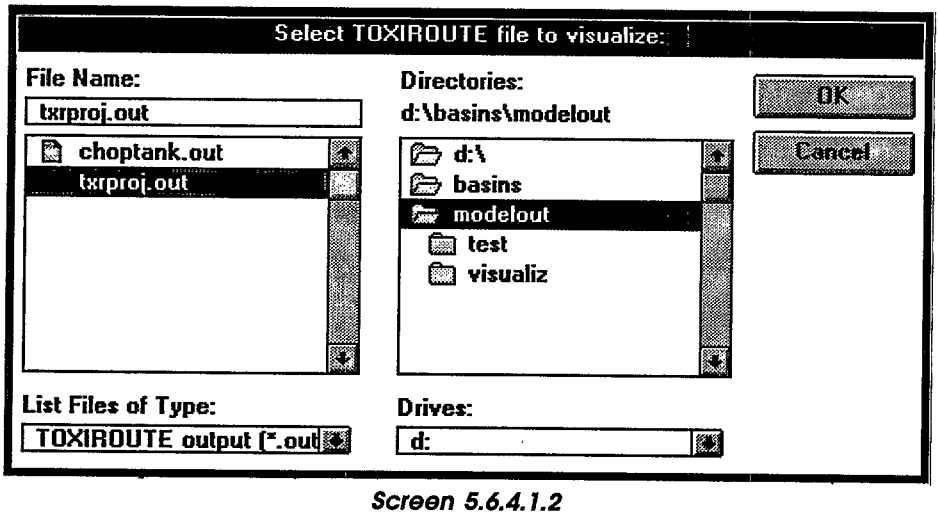
Steps

1. In BASINS View pull down the Models menu and select *Visualize*.
2. Choose *TOXIROUTE output file* in the output file type selection dialog box (Screen 5.6.4.1.1).



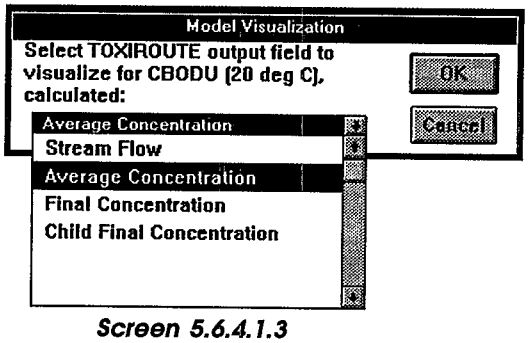
Screen 5.6.4.1.1

3. Specify the TOXIROUTE output file name in the file selection dialog box (Screen 5.6.4.1.2). The TOXIROUTE output files are located in the \BASINS\ MODELOUT directory. An output file has the same name as the TOXIROUTE project name, but it has an OUT extension. When a file is created in the TOXIROUTE output screen, you have the option to choose any name for an output file by selecting the *Save Output* option under the File menu. The default project name is TXRPROJ, and therefore the default output file name is TXRPROJ.OUT. After you have selected the output file name, click on *OK*.



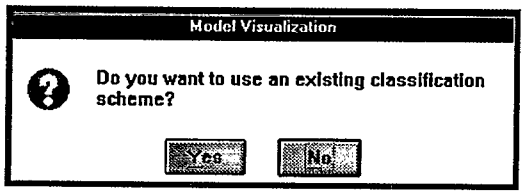
Screen 5.6.4.1.2

4. Select the output element you want to visualize in the dialog box, as shown in Screen 5.6.4.1.3. Note that the name of the pollutant (e.g., CBODU (20 deg C), calculated) appears in the text in the dialog box.



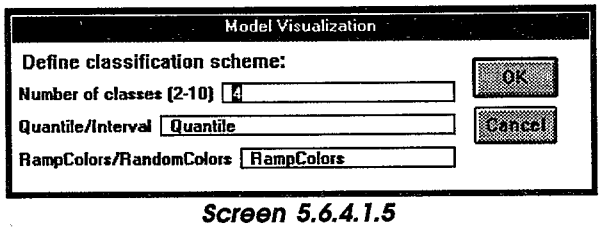
Screen 5.6.4.1.3

5. The next dialog box (Screen 5.6.4.1.4) asks you whether you want to use previously saved ranges to group results for visual display. If you want to use an existing scheme, click on *Yes*. You will be prompted to specify the name of the scheme. If you have not previously selected a scheme or you want to develop a new scheme, click on *No*.



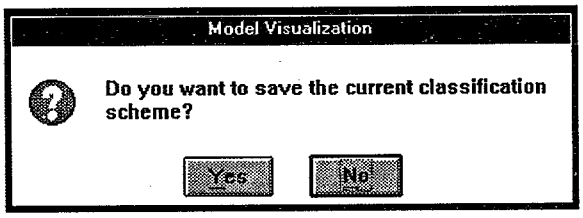
Screen 5.6.4.1.4.

6. From the classification scheme definition box (Screen 5.6.4.1.5), you can select default settings of classes, modify default classes, or edit previous settings of the saved schemes.



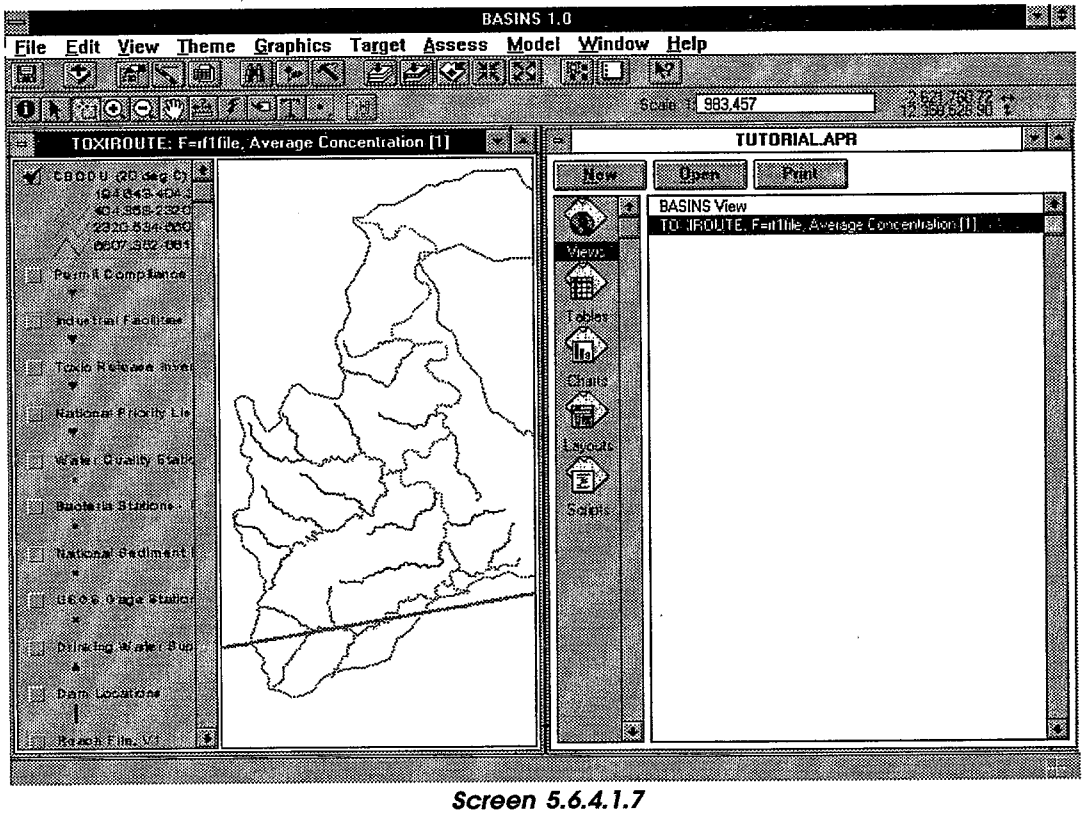
Screen 5.6.4.1.5

7. The next dialog box (Screen 5.6.4.1.6) gives you the option to save the current settings of the classification scheme for future use. If you do not want to save them, click on *No*. Otherwise, click on *Yes* and you will be prompted to provide a name for the scheme.



Screen 5.6.4.1.6

8. Screen 5.6.4.1.7 displays the results. One of the two windows has the banner *TOXIROUTE: F=filename*, output element name (e.g., *Average Concentration*). Notice that the new active theme includes the pollutant name and the legends for the classification scheme. You can double-click with the left mouse button on the window banner for a full screen view.



Screen 5.6.4.1.7

5.6.4.2 Visualize QUAL2E Output

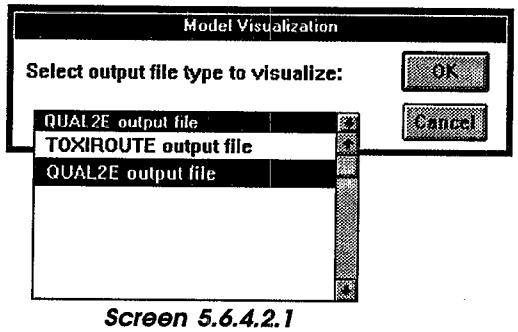
QUAL2E output can include temperature, dissolved oxygen, BOD, algae, nutrients, fecal coliform, and up to three conservative substances and one nonconservative substance. The output file also includes the values of a large number of intermediate variables (or components), which are calculated during the simulation. You might often find it very useful to visualize these variables (e.g., the components of dissolved oxygen balance). Therefore, the pollutant selection dialog box shows a long list of items from which you can choose. QUAL2E output visualization displays only the reaches that were included in the simulation.

NOTE: The Windows interface to QUAL2E can graph model results, but cannot map them.

Steps

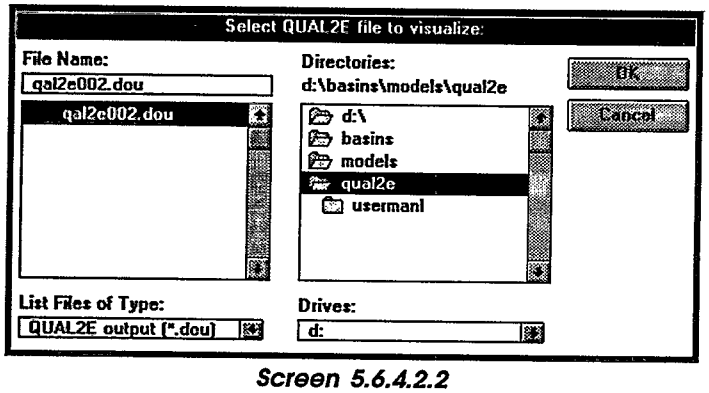
1. In BASINS View pull down the Models menu and select *Visualize*.

2. Choose *QUAL2E output file* in the output file type selection dialog box (Screen 5.6.4.2.1).



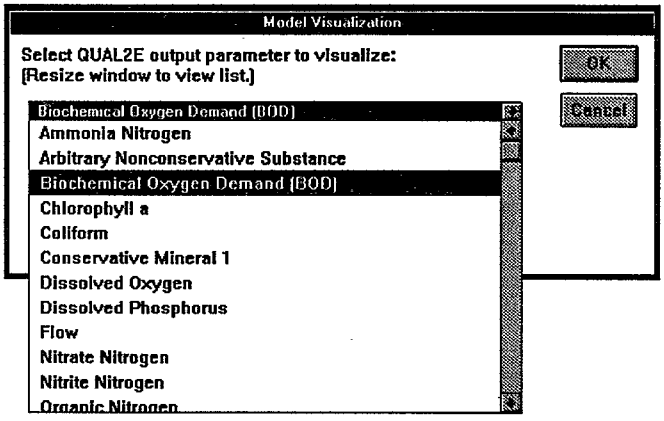
Screen 5.6.4.2.1

3. Specify the QUAL2E output file name in the file selection dialog box (Screen 5.6.4.2.2). The QUAL2E output files are located in the \BASINS\MODELS\QUAL2E directory. There are two QUAL2E output files. Both have the same name as the QUAL2E input file (e.g., QAL2E002.INP), but each has a different extension. The summary output file has an OUTextension, which is displayed after each simulation run within the QUAL2E interface. The other output file has a DOU extension (e.g., QAL2E002.DOU), and it is used in the QUAL2E output visualization process. Therefore, in the file selection dialog box you will prompted to choose only the DOU file. Click on *OK* after you have selected the output file name.



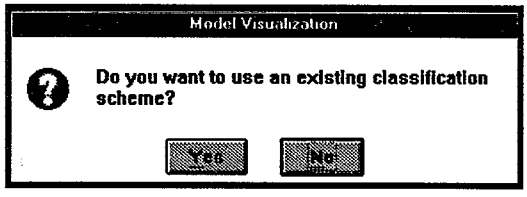
Screen 5.6.4.2.2

4. Select the output element you want to visualize in the dialog box, as shown in Screen 5.6.4.2.3.



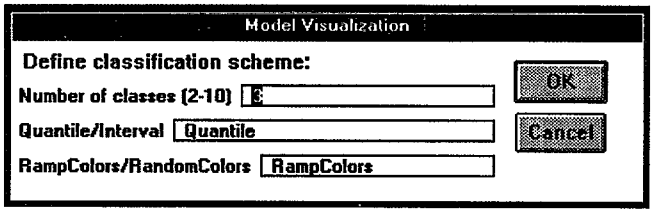
Screen 5.6.4.2.3

5. The next dialog box (Screen 5.6.4.2.4) asks whether you want to use previously saved ranges to group results for visual display. If you want to use an existing scheme, click on *Yes* and you will be asked to specify the name of the scheme. Click on *No* if you do not have any.



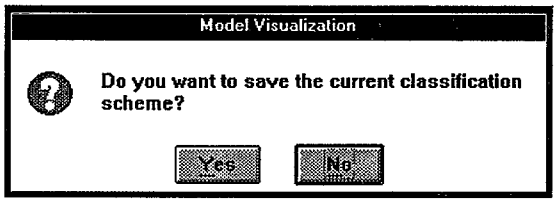
Screen 5.6.4.2.4

6. From the classification scheme definition box (Screen 5.6.4.2.5), you can select default settings of classes, modify default classes, or edit previous settings of the saved schemes.



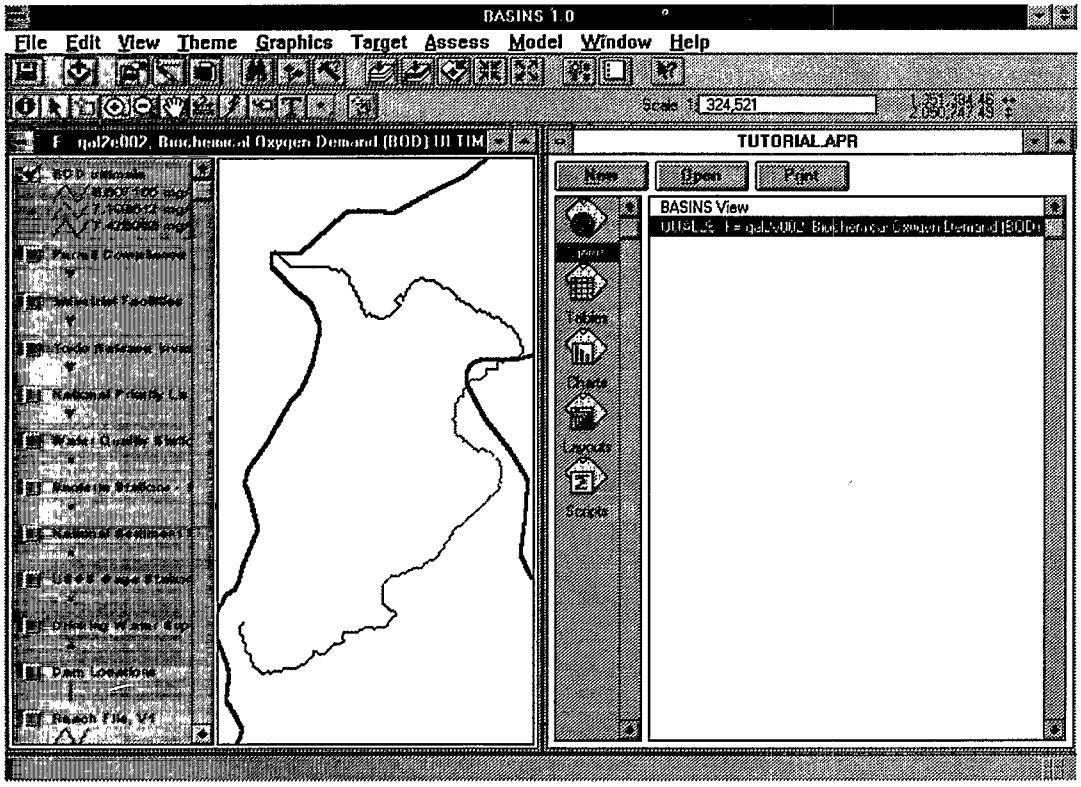
Screen 5.6.4.2.5

7. The next dialog box (Screen 5.6.4.2.6) gives you the option to save the current settings of the classification scheme for future use. If you do not want to save then, click on *No*. Otherwise, click on *Yes* and you will be prompted to provide a name for the scheme.



Screen 5.6.4.2.6

8. Screen 5.6.4.2.7 displays the color-coded reaches that were included in the QUAL2E simulation. One of the two windows has the banner *QUAL2E: F=filename*, output element name (e.g., *Biochemical Oxygen Demand*). Notice that the new active theme includes the selected output element name and the legends for the classification scheme. You can double-click the left mouse button on the window banner for a full screen view. You might want to check the *Reach File, V1* theme to view other reaches in the cataloging unit. Other themes can be viewed to examine related information with the model visualization.



Screen 5.6.4.2.7

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USEPA. 1985. *Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling.* 2nd ed. EPA 600/3-85/040. U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, GA.

USEPA. 1995. *QUAL2E Windows Interface User's Guide.* EPA/823/B/95/003. U.S. Environmental Protection Agency, Office of Science and Technology, Washington, DC.

6 Updating and Adding New Data

BASINS combines a comprehensive set of environmental data products developed based on nationally available information. These databases are suited for large-scale assessments. However, when dealing with localized small-basin analysis, higher resolution data may be necessary to effectively capture the site-specific feature variability. The BASINS system is designed to provide a flexible GIS framework that allows users to easily customize additional applications as well as integrate local environmental data to supplement or supersede the national data products supplied with the program.

The data dictionary provided with the BASINS system is a key starting point for understanding data elements and associated attribute table for each layer. Three data enhancement and update options are briefly described below.

Adding Data Layers

Users can add new layers into BASINS as long as the data meet the following requirements:

Data Projection: Albers Equal-Area
Data Format: Single precision ArcInfo export coverage

The data can be imported using ArcView's import function and then can be built in as a BASINS or ArcView layer using the Add Theme function. Once the coverage is added, ArcView functions can be used to set the theme properties of color and legend as appropriate.

Replacing Existing Data Layers

Geographically referenced data and corresponding attribute tables can be substituted for an existing data set. The minimum requirements specified for adding data apply to all data substitution as well. Furthermore, substitutions of data layers or attributes that will function with existing analytical tools require full consistency with the original structure and content of all data elements. However, modification of the BASINS system scripts can be performed to accommodate coverages with a different data structure.

The data dictionary included on the BASINS CD can be used to define the data elements and the structure of existing databases. A detailed description of the BASINS system scripts and a program flow chart are under development and will be available with the next release.

Editing and Updating Existing Data

Geographically referenced data and corresponding attribute data can be edited through the use of ArcView's built-in theme editing functions. These standard point-and-click editing functions allow the user to update selected locational features as well as revise incorrectly georeferenced data. Attribute tables can be modified using

the ArcView data editing capabilities. Additional records can also be added to update either the coverages or the tables (e.g., monitoring stations, industrial facilities, stream reaches, new water quality data summaries). The ArcView on-line help utilities contain detailed descriptions of editing procedures. Knowledge of the structure and content of BASINS data layers and attribute tables is necessary to manipulate the data records when editing or updating a given database.

7 User Assistance and Technical Support

BASINS was developed to promote better assessment and integration of point and nonpoint sources in watershed and water quality management. It integrates several key environmental data sets with improved analysis techniques. Several types of environmental programs can benefit from the use and application of such as integrated system in various stages of environmental management planning and decision making.

EPA's Office of Science and Technology (OST) is providing assistance and technical support to users of the BASINS system to facilitate its effective application. Technical support can be obtained as described below:

1. *OST's Internet Home Page:* BASINS users are encouraged to access OST's home page for information on new updates, answers to the most frequently asked questions, user tips, and additional documentation. As more real-world applications become available, references to case studies will also be posted.

   EPA OST's Internet home page address: http://www.epa.gov/ow/ost

2. *Telephone assistance*: Personnel in EPA's Office of Science and Technology are available to assist potential users with technical questions regarding system installation, applications, and data products. Inquiries on the BASINS system can be directed to:

   Jerry LaVeck, tel. (202) 260-7771, email laveck.jerry@epamail.epa.gov
   Facsimile (202) 260-9830

   Marge Coombs, tel. (202) 260-9821, email coombs.marge@epamail.epa.gov
   Facsimile (202) 260-9830

Appendix A - Metadata

Appendix A presents lineage and data quality information for each BASINS data product. The following categories were used to organize this information.

- Source Data - General Information
- Source Data - Development Procedures
- Enhancements to Source Data (for the Development of a BASINS Data Product)
- Accuracy and Quality Assurance of Source Data
- Accuracy and Quality Assurance of Enhanced Data (the BASINS Data Product)

The BASINS data are stored in a PC ARC/INFO coverage format within the DATA directory on the BASINS CD(s). All coverages are projected into National Albers.

BACTERIA MONITORING STATIONS & DATA SUMMARIES
Data Category: Environmental Monitoring

BASINS Product Description

Statistical summaries of water quality monitoring for 10 bacteria-related parameters. Parameter-specific statistics computed by station for 5 year intervals from 1970-1994.

Source Data– General Information

1. Originating Agency/Organization: United States Environmental Protection Agency

2. Data Product: Storage and Retrieval of U.S. Waters Parametric Data (STORET)

3. References: U.S. Environmental Protection Agency (1992). "Office of Water Environmental and Program Information Systems Compendium", Office of Water, U.S. EPA, Washington D.C.

4. Description: STORET is a repository of waterway parametric data, including information on ambient, intensive survey, effluent, and biological water quality

5. Geographic Extent: U.S. States and Territories

6. Scale: Not applicable

Source Data– Development Procedures

1. Data Source And Media: Station and monitoring data in STORET is contributed by a number of organizations, including federal, state, interstate agencies, universities, contractors, individuals, and water laboratories. Data updates are performed weekly. Each provider of data is responsible for the data it submits to STORET; STORET is a user-owned system. Geographic coordinates for monitoring stations obtained using USGS 1:24,000 - 1:100,000-scale topographic map (depending on map availability).

2. Spatial Data Acquisition Vehicle and/or Digitizing Device: Interpolated manually.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable

Enhancements to Source Data

1. Data Format Conversion History: The source data were obtained by performing a retrieval using the STORET MEAN program. Monitoring stations characterized as ambient stream, lake, reservoir, canal, estuary, or ocean were selected. Summary statistics were

computed by the STORET program. Statistics included number of observations, standard deviation, mean, 15th, 25th, 50th, 75th, and 85th percentiles.

2. Other Modifications: A BASINS bacteria station ID was assigned to each station in order to facilitate links and joins within BASINS between station data and the monitoring data summary tables.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not Applicable

2. Estimated Accuracy of Digital Data: Unknown, but most likely varies greatly due to variations in quality assurance practices of data contributors/owners.

3. Quality Assurance: Parametric data is screened for unreasonable high and low values before being accepted as a STORET update.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: Bacteria monitoring station coordinates were screened for acceptance based on whether the station was located within the USGS Hydrologic Cataloging Unit boundaries associated with it's EPA region. Bacteria stations located outside these boundaries were not included in this BASINS data product.

DAM LOCATIONS

Data Category: Landscape Characteristic

BASINS Product Description

Inventory of U.S. dams with associated impoundment information.

Source Data– General Information

1. Originating Agency/Organization: United States Environmental Protection Agency

2. Data Product Name: Dam File

3. References: U.S. Environmental Protection Agency (1992). "Office of Water Environmental and Program Information Systems Compendium", Office of Water, U.S. EPA, Washington D.C.

4. Description: The Dam File is an inventory of United States dams based on a 1980 census. The file contains information on 68,155 dams across the country.

5. Geographic Extent: U.S. States and Territories

6. Scale: Not Applicable

Source Data–Development Procedures

1. Data Source And Media: The Dam File data were obtained from a 1980 census performed by the U.S. Army Corps of Engineers' as part of the National Program of Inspection of Non-Federal Dams.

2. Spatial Data Acquisition Vehicle and/or Digitizing Device: Unknown.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Unknown.

Enhancements to Source Data

1. Data Format Conversion History: All records were retrieved from the EPA Dam File. An ARC/INFO coverage was constructed using twelve of the primary data fields. The resulting BASINS data product includes all dams which had valid coordinate data.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not Applicable.

2. Estimated Accuracy of Digital Data: Unknown.

3. Quality Assurance: Unknown.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: Dams were screened for acceptance based on whether the dam was located within the USGS Hydrologic Cataloging Unit boundaries associated with its EPA region. Dams located outside these boundaries were not included in this BASINS data product.

DRINKING WATER SUPPLY (DWS) SITES
Data Category: Landscape Characteristics

BASINS Product Description	Location of public water supplies and their sources of surface water supply.
Source Data– General Information	1. Originating Agency/Organization: United States Environmental Protection Agency. 2. Data Product Name: Drinking Water Supply (DWS) File. 3. References: U.S. Environmental Protection Agency (1992). "Office of Water–Environmental and Program Information Systems Compendium", Office of Water, U.S. EPA, Washington D.C. 4. Description: A database containing the locations of Public Water Supplies, their intakes, and sources of surface water supplies across the United states. 5. Geographic Extent: 50 U.S. States. 6. Scale: Not applicable.
Source Data– Development Procedures	1. Data Source And Media: Facility coordinates in the DWS file were interpolated from U.S.G.S. topographic maps varying in scale from 1:24,000 to 1:62,500 (depending on map availability). Location determined via phone interviews with plant officials. 2. Spatial Acquisition Vehicle and/or Digitizing Device: Interpolated manually 3. Precision and/or Resolution of Instrumentation Used to Digitize Map: N/A.
Enhancements to Source Data	1. Data Format Conversion History: The DWS data were retrieved from the DWS file. State and county FIPS codes were filled in from other fields where possible. The resulting ASCII file was converted into ARC/INFO National Albers projection coverage for the U.S.. The coverage was then overlaid with county coverages (conterminous U.S., Alaska, Hawaii) to assign accuracy codes based on the state-county FIPS codes. 2. Other Modifications: An accuracy code was assigned based on a comparison of state and county FIPS codes. A site with a code value

of 1 is within the correct county. A value of 2 is outside the county but inside the state. A value of 3 or 9 indicates coordinates outside the state. A site with value of 4 was formerly assigned a value of 3 or 9 but was reassigned based on visual inspection to be on the border of the correct county. Due to the amount of data, points with an accuracy code value of 2 were not visually checked.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not Applicable.

2. Estimated Accuracy of Digital Data: Unknown.

3. Quality Assurance: Unknown

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The sites with accuracy codes of 3 or 9 (outside correct state) were visually inspected to determine if they were on the border of the county within which they were associated. The facilities found to be on the border were given an accuracy code of 4.

EPA REGIONS

Data Category: Base Geography

BASINS Product Description

U.S. EPA region boundaries.

Source Data– General Information

1. Originating Agency/Organization: United States Geological Survey.

2. Data Product Name: U.S. Geological Survey Hydrography and Transportation 1:2,000,000-scale Digital Line Graph Data for the 50 U.S. states.

3. References: United States GeoData (1987). "Digital Line Graphs from 1:2,000,000-Scale Maps: Data Users Guide 3", Department of the Interior, U.S. Geological Survey, National Mapping Division, Reston, VA.

4. Description: U.S. EPA Region Boundaries in the conterminous United States.

5. Geographic Extent: 50 U.S. States and U.S. Territories.

6. Scale: 1:2,000,000

Source Data–Development Procedures

1. Data Source And Media: 1:2,000,000-scale reference maps from The National Atlas of the United States of America.

2. Spatial Acquisition Vehicle and/or Digitizing Device: The data were manually digitized.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: The manual digitizing equipment had a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches.

Enhancements to Source Data

1. Data Format Conversion History: The U.S. EPA Region coverage was dissolved from the 1:2M Scale State coverage based on the states within each U.S. EPA Region.

2. Other Modifications: An appropriate Roman numeral coverage was added to just one central polygon for each U.S. EPA Region for display purposes.

3. Data Caveats and Comments: The boundaries stop at shorelines (water extensions were not included in the coverage).

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Compiled to meet National Map Accuracy Standards where 90 percent of well-defined feature are to be within .02 inches of true mapped position.

2. Estimated Accuracy of Digital Data: Positional error of less than or equal to .003 inches or .076 mm RMSE relative to the source it was digitized from.

3. Quality Assurance: Visual comparison of proof plots with the original stable-base source material. These proof plots are generated using automated drafting machines with a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The data product was checked for placement of regions and the accuracy of the dissolve process.

GAGE SITES

Data Category: Environmental Monitoring

BASINS Product Description	Inventory of surface water gaging station data including 7-Q-10 low and monthly mean stream flow.
Source Data– General Information	1. Originating Agency/Organization: United States Environmental Protection Agency. 2. Data Product Name: Gage File. 3. References: U.S. Environmental Protection Agency (1992). "Office of Water–Environmental and Program Information Systems Compendium", Office of Water, U.S. EPA, Washington D.C. 4. Description: Inventory of surface water gaging station data used for water quality studies, waste load allocations, distribution studies, and advanced waste treatment assessments. 5. Geographic Extent: 50 U.S. States. 6. Scale: Not Applicable.
Source Data– Development Procedures	1. Data Source And Media: Gage station coordinates were interpolated from U.S.G.S. topographic maps varying in scale from 1:24,000 to 1:100,000 (depending on map availability) by USGS field personnel. 2. Spatial Acquisition Vehicle and/or Digitizing Device: Interpolated manually. 3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable.
Enhancements to Source Data	1. Data Format Conversion History: The gage data were retrieved from the Gage file database. If necessary state and county FIPS codes were filled in from other fields where possible. The resulting ASCII file was converted into ARC/INFO National Albers projection coverage for the U.S.. The coverage was then overlaid with county coverages (conterminous U.S., Alaska, Hawaii) to assign accuracy codes based on the state-county FIPS codes. 2. Other Modifications: An accuracy code was assigned based on a comparison of state and county FIPS codes. A site with a code value

of 1 is within the correct county. A value of 2 is outside the county but inside the state. A value of 3 or 9 indicates coordinates outside the state. A site with value of 4 was formerly assigned a value of 3 or 9 but was reassigned based on visual inspection to be on the border of the correct county. Due to the amount of data, points with an accuracy code value of 2 were not visually checked.

3. Data Caveats and Comments: No artificial gages have been included in the Gage Sites data. Only USGS stream gaging stations are contained in the Gage Sites data.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not Applicable.

2. Estimated Accuracy of Digital Data: Unknown.

3. Quality Assurance: Unknown.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The sites with accuracy codes of 3 or 9 outside the correct state were visually inspected to determine if they were on the border of the county within which they were associated. The facilities found to be on the border were given an accuracy code of 4.

HYDROLOGIC UNIT BOUNDARIES

Data Category: Landscape Characteristic

BASINS Product Description

Nationally consistent delineations of the hydrographic boundaries associated with major U.S. river basins.

Source Data–General Information

1. Originating Source Agency/Organization: United States Geological Survey

2. Data Product Name: Hydrologic Units.

3. References: Seaber, Paul R., Kapinos, F. Paul, and Knapp, George L., 1987, Hydrologic Unit Maps: U.S. Geological Survey Water-Supply Paper 2249, 63p.

4. Description: The Hydrologic Unit Boundaries and Codes for the conterminous United States.

5. Geographic Extent: 48 U.S. States

6. Scale: 1:100,000

Source Data–Development procedures

1. Data Source And Media: Information not available at time of User's Manual printing.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Information not available at time of User's Manual printing.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Information not available at time of User's Manual printing.

Enhancements to Source Data

1. Data Format Conversion History: The data were obtained in ARC/INFO coverage format from the USGS. The coverage for the conterminous U.S. was then visually checked for line work errors or HUC code assignment errors. The coverage was then divided into a single ARC/INFO coverage per U.S. EPA Region based on the hydrologic accounting units that overlapped each U.S. EPA Region.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Accuracy of Original Data: Information not available at the time of User Manual printing.

2. Estimated Accuracy of Digital Data: Information not available at the time of User Manual printing.

3. Quality Assurance: Information not available at the time of User Manual printing.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The U.S. hydrologic units coverage was compared to USGS State Hydrologic Unit Maps. The coverage was checked for missing polygons, bad polygon line work, and bad polygon identifiers.

INDUSTRIAL FACILITIES DISCHARGE SITES

Data Category: Environmental Stressor

BASINS Product

Facility information on industrial and municipal point source discharges to surface waters.

Source Data–Discharges

1. Originating Agency/Organization: United States Environmental

General Information

Protection Agency.

2. Data Product Name: Industrial Facilities Discharge (IFD) File.

3. References: U.S. Environmental Protection Agency (1992). "Office of Water--Environmental and Program Information Systems Compendium", Office of Water, U.S. EPA, Washington D.C.

4. Description: The Industrial Facilities Discharge (IFD) File is an automated data base of industrial point source dischargers to surface waters in the United States. The IFD was created specifically to provide the Office of Wetlands, Oceans, and Watersheds with a comprehensive data base of industrial point source dischargers.

5. Geographic Extent: 50 U.S. States, Puerto Rico, Virgin Islands, Guam, and American Samoa.

6. Scale: Not applicable.

Source Data--Development Procedures

1. Spatial Data Source And Media: Facility coordinates in the IFD file were interpolated from U.S.G.S. topographic maps varying in scale from 1:24,000 to 1:100,000 (depending on map availability) by National Permit Discharge Elimination System (NPDES) permittees.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Interpolated manually.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable.

Enhancements to Source Data

1. Data Format Conversion History: The IFD data were retrieved from the IFD file. If necessary state and county FIPS codes were filled in from other fields where possible. The resulting ASCII file was converted into an ARC/INFO coverage in national Albers projection for the U.S.. The coverage was then overlaid with county coverages (conterminous U.S., Alaska, Hawaii) to assign accuracy codes based on the state-county FIPS codes.

2. Other Modifications: An accuracy code was assigned based on a comparison of state and county FIPS codes. A site with a code value of 1 is within the correct county. A value of 2 is outside the county but inside the state. A value of 3 or 9 indicates coordinates outside the state. A site with value of 4 was formerly assigned a value of 3 or 9 but was reassigned based on visual inspection to be on the

border of the correct county. Due to the amount of data, points with an accuracy code value of 2 were not visually checked.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Unknown.

2. Estimated Accuracy of Digital Data: Unknown.

3. Quality Assurance: Unknown.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The sites with accuracy codes of 3 or 9 (outside correct state) were visually inspected to determine if they were on the border of the county within which they were associated. The facilities found to be on the border were given an accuracy code of 4.

LAND USE AND LAND COVER

Data Category: Landscape Characteristic

BASINS Product Description

Boundaries attributed with land use classifications (Anderson level II) such as residential, deciduous forest land, and forested wetland, etc.

Source Data– General Information

1. Originating Agency/Organization: United States Geological Survey.

2. Data Product Name: Geographic Information Retrieval and Analysis System (GIRAS).

3. References: United States GeoData (1986). "Land Use and Land Cover Digital Data from 1:250,000-and 1:100,000-Scale Maps: Data Users Guide 4", Department of the Interior, U.S. Geological Survey, National Mapping Program, Reston, VA.

4. Description: The Land Use/Land Cover data portrays polygons attributed with Anderson Level II codes and descriptions such as residential, deciduous forest land, and forested wetland.

5. Geographic Extent: 49 U.S. States (No data for Alaska).

6. Scale: 1:250,000 and 1:100,000.

Source Data–Development Procedures

1. Data Source And Media: NASA high-altitude aerial photographs and National High Altitude Photography at scales smaller than 1:60,000. 1:250,000 scale topographic map used as base map.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Information not yet available.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Information not yet available.

Enhancements to Source Data

1. Data Format Conversion History: About two thirds of the data were obtained as raw GIRAS files from the U.S. EPA's IBM Mainframe through the U.S. EPA GRIDS program. One fourth of the data were obtained as already converted ARC/INFO coverages from the EPA Office of Information Resources Management. The rest of the data were obtained directly from the USGS as raw GIRAS files. The raw GIRAS files were processed into ARC/INFO polygon coverages with a USGS provided GIRAS2ARC.aml program. The coverages were converted to a national Albers projection and made to fit the corresponding 1:250K or 1:100K quadrangle boundary by the AML program. Source data that existed as 1:100K quadrangles were merged together in ARC/INFO to create a 1:250K quadrangle coverage where possible.

Once the data were converted into 1:250K quadrangle coverages, a land use/land cover description field was added and populated based on the Anderson Level II code associated with each polygon. Each coverage was then visually checked by an analyst for general completeness of the line work, coding, geographic extent and position relative to surrounding quadrangles.

2. Other Modifications: None.

3. Data Caveats and Comments: A few quadrangles are missing completely and a few others have missing portions. These quadrangles include the following: Albuquerque is missing the NW corner of the quad, Cedar City is missing the SE corner of the quad, Palestine is completely missing, Russelville exists as a quarter quad, Tampa is missing southern half of quad, Wolf Point is missing the SW corner of the quad. Also the Newark, Scranton, and Pensacola quadrangles contain each contain data from 2 different states were merged to create both whole quadrangle coverages.

1:250K quadrangles are generally 1 degree high by 2 degrees wide, and 1:100K quadrangles are 30 minutes high by 1 degree wide.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Information not yet available.

2. Estimated Accuracy of Digital Data: Information not yet available.

3. Quality Assurance: Information not yet available.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The quality assurance consisted of checking for quadrangle placement, quadrangle name, and general line work as compared to the USGS "Index to Land Use and Land Cover Information (October 1992)" Map.

MAJOR ROADS

Data Category: Landscape Characteristic

BASINS Product Description

Interstate and state highway network.

Source Data– General Information

1. Originating Agency/Organization: United States Geological Survey

2. Data Product Name: U.S. Geological Survey Hydrography and Transportation 1:2,000,000-scale Digital Line Graph Data for the 50 U.S. states.

3. References: United States GeoData (1987). "Digital Line Graphs from 1:2,000,000-Scale Maps: Data Users Guide 3", Department of the Interior, U.S. Geological Survey, National Mapping Division, Reston, VA

4. Description: The transportation group from the Digital Line Graphs includes major transportation systems collected in three separate subcategories: (1) Roads and Trails, (2) Railroads, and (3) Cultural Features (airports and Alaska pipeline).

5. Geographic Extent: 50 U.S. States

6. Scale: 1:2,000,000

Source Data– Development Procedures

1. Data Source And Media: 1:2,000,000-scale reference maps from The National Atlas of the United States of America.

2. Spatial Acquisition Vehicle and/or Digitizing Device: The data were manually digitized.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: The manual digitizing equipment had a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches.

Enhancements to Source Data

1. Data Format Conversion History: The original data were obtained in optional DLG format (20 or so files) from a 1:2M USGS DLG CD-ROM. The DLG files were converted into ARC/INFO coverages and then merged into conterminous U.S., Alaska and Hawaii coverages. The Roads coverage includes only data from the Roads and Trails subcategory. These coverages were then attributed with road names and types based on USGS major/minor codes. The original USGS minor codes were also retained in the coverages to aid in manipulation of the coverage.

2. Other Modifications: The conterminous U.S. coverage was split into U.S. EPA Regional coverages.

3. Data Caveats and Comments: Road names consist of Interstate, US, or State Route Numbers. A few Roads have multiple roads types and names.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Compiled to meet National Map Accuracy Standards where 90 percent of well-defined feature are to be within .02 inches of true mapped position.

2. Estimated Accuracy of Digital Data: Positional error of less than or equal to .003 inches or .076 mm RMSE relative to the source it was digitized from.

3. Quality Assurance: Visual comparison of proof plots with the original stable-base source material. These proof plots are generated using automated drafting machines with a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: Due to the size and complexity of the coverages a random sampling of roads, by state, were compared to the 1993 edition Road Atlas produced by Rand McNally. The sampling included the following 14 states: MD, NM, AZ, ND, SC, OH, DE, CO, LA, CT, ME, RI, WV, OK. Only Interstates, U.S. Routes, and State Routes were checked.

NATIONAL SEDIMENT INVENTORY STATIONS
Data Category: Environmental Monitoring

BASINS Product Description

Sediment chemistry, tissue residue, and toxicity monitoring data for freshwater and coastal sediments.

Source Data– General Information

1. Originating Agency/Organization: United States Environmental Protection Agency

2. Data Product Name: The National Sediment Inventory, Version 1.1 (NSI)

3. References: The National Sediment Quality Survey - A Report to Congress on the Extent and Severity of Sediment Contamination in Surface Waters of the United States (Under development, publication expected FY 1996).

4. Description: The National Sediment Inventory database is a compilation of readily available data that could be used to evaluate the extent of sediment contamination throughout the United States.

5. Geographic Extent: U.S. States and Puerto Rico

6. Scale: Not Applicable.

Source Data– Development Procedures

1. Data Source And Media: The NSI data were obtained from the following sources:
- EPA's Storage and Retrieval System (STORET)
- EPA's Ocean Data Evaluation System (ODES)
- NOAA's Coastal Sediment Inventory (COSED)
- EPA Region 4's Sediment Quality Inventory
- EPA Gulf of Mexico Program's Contaminated Sediment Inventory
- EPA Region 10/COE Seattle District Sediment Inventory
- EPA's Great Lakes Data Base
- EPA's Environmental Monitoring and Assessment Program (EMAP)
- EPA Region 9 Dredged Material Tracking System (DMATS)
- USGS Massachusetts Bay Data (metals only)

Geographic coordinates for monitoring stations obtained using various techniques depending on data supplier. Station locations are typically obtained using USGS 1:24,000 - 1:100,000-scale topographic map (depending on map availability).

2. Spatial Acquisition Vehicle and/or Digitizing Device: Unknown.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Unknown.

Enhancements to Source Data

1. Data Format Conversion History: All records were retrieved from the NSI database. An ARC/INFO coverage was constructed using the NSI station table. Related NSI tables were imported into ARC/INFO in order to build numeric fields to facilitate links and joins within BASINS.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not applicable.

2. Estimated Accuracy of Digital Data: Unknown, but most likely varies greatly due to variations in quality assurance practices of data suppliers.

3. Quality Assurance: Unknown.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: NSI stations were screened for acceptance based on whether the station was located within the USGS Hydrologic Cataloging Unit boundaries associated with its EPA region. Stations located outside these boundaries were not included in this BASINS data product.

PERMIT COMPLIANCE SYSTEM (PCS) SITES AND COMPUTED LOADINGS

Data Category: Environmental Stressor

BASINS Product Description

NPDES permit-holding facility information. Contains parameter-specific loadings to surface waters computed using the EPA Effluent Decision Support System (EDSS). Computed loadings based on 1991, 1992, and !993 discharge monitoring data.

Source Data–General Information

1. Originating Agency/Organization: United States Environmental Protection Agency, Office of Enforcement, Office of Policy, Planning, and Evaluation.

2. Data Product Name: (a) Permit Compliance System (PCS) and (b) Working Data Sets of PCS Loadings (1991-1993), Loadings Over Permits (1991-1993), and PCS Point Coverage.

3. References: (a) Permit Compliance System Generalized Retrieval Manual and (b) No documentation was available at time of BASINS manual printing specifically on the Working data sets of PCS loadings.

4. Description: PCS is a national computerized management information system that automates entry, updating, and retrieval of NPDES data and tracks permit issuance, permit limits and monitoring data, and other data pertaining to facilities regulated under NPDES.

5. Geographic Extent: U.S. States and Territories

6. Scale: Not applicable.

Source Data–Development Procedures

1. Data Source And Media: The PCS data come from facility permits and from facility supplied Discharge Monitoring Reports. The PCS loadings and loading over permits were computed using the EPA Effluent Decision Support System (EDSS). The sources for the facility geographic coordinates includes the PCS latitude and longitudes, Industrial Facility Discharge File (IFD) latitude and longitudes, and ZIP Code centroids.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Unknown.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable.

Enhancements to Source Data

1. Data Format Conversion History: Facility primary identification data from the PCS database were combined with the Working Data Sets of PCS Loadings (1991-1993). In addition, pipe-specific loading data were summarized to represent total facility loadings. Furthermore, procedures were implemented to group together the variations of BOD related loads to a calculated BOD5 loading. Similar parameter groupings were implement for nitrogen and phosphorus parameters.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not applicable.

2. Estimated Accuracy of Digital Data: The accuracy of the data may vary from state to state depending upon the individual or procedures in place. The goal for accuracy of spatial data for major facilities within PCS is to be 95% confident that the position is within 25 meters of the true location. The accuracy of the existing facility coordinates varies greatly due to the variations in historical locational data collecting practices of permit writers as well as the unknown accuracy of IFD coordinates and ZIP Code centroids which are used as locational surrogates.

3. Quality Assurance: Unknown.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: PCS sites were screened for acceptance based on whether the facility was located within the USGS Hydrologic Cataloging Unit boundaries associated with its EPA region. Facilities located outside these boundaries were not included in this BASINS data product.

POPULATED PLACE LOCATIONS
Data Category: Environmental Stressor

BASINS Product Description

Location of populated places as represented on USGS topographic maps.

Source Data– General Information

1. Originating Agency/Organization: United States Geological Survey.

2. Data Product Name: USGS Geographic Names Information System II (GNIS II).

3. References: United States Geological Survey (1987). "Geographic Names Information System: Data Users Guide 6", Department of the Interior, U.S. Geological Survey, National Mapping Division, Reston, VA.

4. Description: A collection of populated place names derived from USGS Geographic Names Information System II (GNISII) Topographic Names data.

5. Geographic Extent: 50 U.S. States.

6. Scale: 1:24,000, 1:100,000

Source Data–Development Procedures

1. Data Source And Media: GNIS data were collected from USGS 1:24,00-scale topographic maps.

2. Spatial Acquisition Vehicle and/or Digitizing Device: The data were manually digitized.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: The manual digitizing equipment had a resolution of 0.001 inches and an absolute accuracy of 0.003 to 0.005 inches.

Enhancements to Source Data

1. Data Format Conversion History: The source data were obtained as State ASCII files on 9-track tape from the USGS. The ASCII files were first converted into Arc/INFO point coverages with an ARC/INFO AML program. The AML program assigned a spatial accuracy code to each point depending upon the degree of its geographical coordinate agreement with USGS 7.5" quadrangle, county, and state coverages.

2. Other Modifications: None.

3. Data Caveats and Comments: The data were checked for spatial accuracy to 7.5" USGS quad level, except for Alaska, Hawaii,(a 7.5" USGS quad boundary coverage was not available for these areas) and Colorado (GNIS II data did not contain quadrangle names).

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: The majority of the names were compiled from 1:24,000-scale, 7.5-minute topographic maps. When there were no published 7.5-minute maps or advance copies with names available, 15-minute maps were used; when there was no coverage by either series maps, 1:250,000-scale maps were used.

2. Estimated Accuracy of Digital Data: Information not available at the time of User Manual printing.

3. Quality Assurance: After Phase I data compilation, the geographic names in each State file were edited by comparing the computer files with the accumulated records of the U.S. Board on Geographic names (BGN) on a one-to-one basis. When the initial edit of the geographic names in a state file was completed, the corrections were made, and other information such as variant names and BGN data were added.

Accuracy and Quality

1. Quality Assurance Data Procedures: The Quality Assurance

Assurance of Enhanced Data

consisted of checking accuracy codes equal to 1, 3, and 9. An accuracy code with a value of '1' means that the 7.5" quadrangle boundaries that the points's geographic coordinates fell within matched the points associated 7.5" quadrangle name. An accuracy code value is equal to 9 if the point's coordinates are outside the United States borders. Anything on the border of the U.S. and touching the correct county was reassigned an accuracy of 4. An accuracy code value is equal to 3 if the point is outside the associated state border but still inside the U.S. borders. Anything on the point's associated state boundary and touching the correct county was also given an accuracy code of 4. The state coverages were also checked against each other to ensure data format consistency throughout the country.

REACH FILE, VERSION 1

Data Category: Landscape Characteristic

BASINS Product Description

Hydrographic database containing over 68,000 reaches to representing surface waters of the continental U.S.

Source Data– General Information

1. Originating Agency/Organization: United States Geological Survey and United States Environmental Protection Agency.

2. Data Product Name: Environmental Protection Agency Reach File, Version 1

3. References: United States Environmental Protection Agency Reach File Manual, June 30, 1986

4. Description: The Reach File consists of two type of reaches, the shoreline reach and the transport reach. Shoreline depicts U.S. continental coasts and the perimeters of lakes, reservoirs, and estuaries, and the shorelines of some wide rivers and islands.

Transport reaches depict segments of the hydraulic transport paths through streams and inland open waters including lakes and estuaries.

5. Geographic Extent: 48 U.S. States

6. Scale: 1:500,000

Source Data– Development Procedures

1. Data Source And Media: Information not yet available.

2. Spatial Acquisition Vehicle and/or Digitizing Device: The data were either manually digitized or scanned on an automatic device.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: The manual digitizing equipment had a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches. The scanning devices had a resolution of 30 points per millimeter or .0013 inches.

Enhancements to Source Data

1. Data Format Conversion History: The data were obtained from the U.S. EPA IBM Mainframe as a separate ARC/INFO Export coverage for each hydrologic region. The Export coverages were then imported and merged into one U.S. EPA region /hydrologic region ARC/INFO coverage. Each coverage was then merged with flow data to create an enhanced RF1 coverage.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Source graphics are initially compiled to meet national Map Accuracy standards where 90 percent of well-defined feature are to be within .02 inches of true mapped position.

2. Estimated Accuracy of Digital Data: Positional error of less than or equal to .003 inches or .076mm RMSE relative to the source it was digitized from.

3. Quality Assurance: Visual comparison of proof plots with the original stable-base source material. These proof plots are generated using automated drafting machines with a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The RF1 data were visually checked to make sure that the appropriate hydrologic regional RF1 pieces had been appended together correctly. Also the RF1 coverages were checked to make sure the flow data had been added correctly.

STATE AND COUNTY BOUNDARIES
Data Category: Base Geography

BASINS Product Description

State and county boundaries.

Source Data–General Information

1. Originating Agency/Organization: United States Geological Survey.

2. Data Product Name: U.S. Geological Survey Hydrography and Transportation 1:2,000,000-scale Digital Line Graph Data for the 50 U.S. states.

3. References: United States GeoData (1987). "Digital Line Graphs from 1:2,000,000-Scale Maps: Data Users Guide 3", Department of the Interior, U.S. Geological Survey, National Mapping Division, Reston, VA.

4. Description: County and County Equivalents Boundaries in the conterminous United States. The dataset also contains a county name and FIPS Codes for each county.

5. Geographic Extent: 50 U.S. States.

6. Scale: 1:2,000,000.

Source Data–Development Procedures

1. Data Source And Media: 1:2,000,000-scale reference maps from The National Atlas of the United States of America.

2. Spatial Acquisition Vehicle and/or Digitizing Device: The data were manually digitized.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: The manual digitizing equipment had a resolution of .001 inches and an absolute accuracy of from .003 to .005 inches.

Enhancements to Source Data

1. Data Format Conversion History: The data were obtained in ARC/INFO coverage format from the USGS. The coverage was then visually checked by an analyst for line work errors or county name and/or FIPS code errors.

2. Other Modifications: None.

3. Data Caveats and Comments: Separate data layers exist for Hawaii and Alaska County equivalents boundaries in Alaska and Hawaii centered Albers projections respectively..

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Compiled to meet USGS National Map Accuracy Standards where 90 percent of well-defined feature are to be within .02 inches of true mapped position.

2. Estimated Accuracy of Digital Data: Positional error of less than or equal to .003 inches or .076 mm RMSE relative to the source it was digitized from.

3. Quality Assurance: Visual comparison of proof plots with the original stable-base source material. These proof plots are generated using automated drafting machines with a resolution of .001 inches and an absolute accuracy of .003 to .005 inches.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: Each county's polygon(s) in the ARC/INFO coverage was visually checked against USGS maps for correct FIPS Codes, county spelling, placement within the appropriate state, presence within the coverage, and poor line work on county boundaries.

SUPERFUND NATIONAL PRIORITIES LIST SITES

Data Category: Environmental Stressor

BASINS Product Description

Location of Superfund National Priority List sites.

Source Data–General Information

1. Originating Agency/Organization: United States Environmental Protection Agency.

2. Data Product Name: NPL

3. References: Office of Emergency and Remedial Responses, National Priorities List Site Coordinate Quality Assurance and Digitizing Project Summary
EPA Contract No: 68-03-3532
March 31, 1993

4. Description: A collection of points signifying Superfund National Priority List sites in the United States.

5. Geographic Extent: 50 U.S. States.

6. Scale: Information not yet available.

Source Data–Development Procedures

1. Data Source And Media: Information not yet available.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Information not yet available.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Information not yet available.

Enhancements to Source Data

1. Data Format Conversion History: The NPL data were obtained from an U.S. EPA source in as a Dbase III+ File. The geographic coordinates were converted into U.S. EPA Regional ARC/INFO coverages as well as coverages for Alaska and Hawaii.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Information not yet available.

2. Estimated Accuracy of Digital Data: Information not yet available.

3. Quality Assurance: Information not yet available.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The sites were checked to ensure that their geographic coordinates fell within the U.S. EPA region that they were associated with.

TOXIC RELEASE INVENTORY

Data Category: Environmental Stressor

BASINS Product Description

Facility information from the 1992 TRI public data release. Contains Y/N flags for each facility indicating media-specific reported releases.

Source Data–General Information

1. Originating Agency/Organization: United States Environmental Protection Agency.

2. Data Product Name: TRI92

3. References: United States Environmental Protection Agency (1994). "1992 Toxics Release Inventory: Public Data Release", Office of Pollution and Toxics (7408), U.S. EPA, Washington D.C.

4. Description: Toxics Release Inventory Sites for 1992. These sites contain information about the facilities as well a flags for each facility indicating whether the particular facility released to a particular media during 1992.

5. Geographic Extent: 50 U.S. states and some U.S. Territories.

6. Scale: Not applicable.

Source Data–Development Procedures

1. Acquisition Vehicle and/or Digitizing Device: Not applicable.

2. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable.

Enhancements to Source Data

1. Data Format Conversion History: The data were obtained as State Arc/INFO coverages from U.S. EPA headquarter's resources. The coverages were in a geographic projection and were projected to National Albers projection. The projected state TRI coverages were then merged into ten U.S. EPA regional coverages and a separate coverages for Alaska and Hawaii.

2. Other Modifications: The coverages were merged into 10 U.S. EPA Regional.

3. Data Caveats and Limitations: The sites do not contain information about chemical release amounts. The sites' release indicator flags also do not exist for releases in other non-1992 years.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Unknown.

2. Estimated Accuracy of Digital Data: Unknown.

3. Quality Assurance: Through mass mailings, local and national seminars, training courses, and enforcement activities, EPA has endeavored to locate all facilities required to report under section 313 of EPCRA and inform them of their obligations.

Accuracy and Quality

1. Quality Assurance Data Procedures: TRI was checked

Assurance of Enhanced Data

only for general spatial accuracy to ensure that the sites all fell within the correct U.S. EPA region after being merged into regional coverages.

URBANIZED AREAS

Data Category: Environmental Stressor

BASINS Product Description

Boundaries of census defined urbanized areas.

Source Data– General Information

1. Originating Agency/Organization: United States Bureau of Census.

2. Data Product Name: TIGER/UA Limit files

3. References: U.S. Bureau of the Census. "Tiger/UA Limit Files: Technical Documentation", The Bureau, Washington D.C.

4. Description: Boundaries of Census defined urbanized areas.

5. Geographic Extent: 50 U.S. states.

6. Scale: 1:24,000

Source Data– Development Procedures

1. Data Source And Media: Information not yet available.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Information not yet available.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Information not yet available.

Enhancements to Source Data

1. Data Format Conversion History: The data were extracted originally from the U.S. Bureau of the Census' UA Limit File. The data were then processed into ARC/INFO polygon coverages. A separate ARC/INFO polygon coverage was created for each Urbanized Area. These coverages were then merged for each U.S. EPA Region and used to create a line coverage and point coverage for each region. The line coverages contains the Urbanized Area boundary line work, and the point coverages contain a point within each UA boundary. Associated with each point are the appropriate UA name and UA code.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Unknown.

2. Estimated Accuracy of Digital Data: Information not yet available.

3. Quality Assurance: Information not yet available.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The relative shape and location of each Urbanized Area boundary was compared against the Rand McNally Road Atlas. The UA name and code attributes were checked against the UA Limit File documentation for correctness. The UA points were also checked to make sure that there was only one UA name per UA boundary.

WATER QUALITY MONITORING & DATA SUMMARIES

Data Category: Environmental Monitoring

BASINS Product Description

Statistical summaries of water quality monitoring for 50 physical and chemical-related parameters. Parameter-specific statistics computed by station for 5 year intervals from 1970-1994.

Source Data– General Information

1. Originating Agency/Organization: United States Environmental Protection Agency

2. Data Product: Storage and Retrieval of U.S. Waters Parametric Data (STORET)

3. References: U.S. Environmental Protection Agency (1992). "Office of Water Environmental and Program Information Systems Compendium", Office of Water, U.S. EPA, Washington D.C.

4. Description: STORET is a repository of waterway parametric data, including information on ambient, intensive survey, effluent, and biological water quality

5. Geographic Extent: U.S. States and Territories

6. Scale: Not applicable

Source Data--Development Procedures

1. Data Source And Media: Station and monitoring data in STORET is contributed by a number of organizations, including federal, state, interstate agencies, universities, contractors, individuals, and water laboratories. Data updates are performed weekly. Each provider of data is responsible for the data it submits to STORET; STORET is a user-owned system. Geographic coordinates for monitoring stations obtained using USGS 1:24,000 - 1:100,000-scale topographic map (depending on map availability).

2. Spatial Data Acquisition Vehicle and/or Digitizing Device: Interpolated manually.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable

Enhancements to Source Data

1. Data Format Conversion History: The source data were obtained by performing a retrieval using the STORET MEAN program. Monitoring stations characterized as ambient stream, lake, reservoir, canal, estuary, or ocean were selected. Summary statistics were computed by the STORET program. Statistics included number of observations, standard deviation, mean, 15th, 25th, 50th, 75th, and 85th percentiles.

2. Other Modifications: A BASINS water quality station ID was assigned to each station in order to facilitate links and joins within BASINS between station data and the monitoring data summary tables.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Not applicable.

2. Estimated Accuracy of Digital Data: Unknown, but most likely varies greatly due to variations in quality assurance practices of data contributors/owners.

3. Quality Assurance: Parametric data is screened for unreasonable high and low values before being accepted as a STORET update.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: Bacteria monitoring station coordinates were screened for acceptance based on whether the station was located within the USGS Hydrologic Cataloging Unit boundaries associated with the EPA region. Bacteria stations located

outside these boundaries were not included in this BASINS data product.

WATERSHED DATA STATIONS & DATABASE (sample set)
Data Category: Environmental Monitoring

BASINS Product Description	Meteorological and other watershed specific environmental data necessary for the BASINS Nonpoint Source Model
Source Data– General Information	1. Originating Agency/Organization: U.S. National Oceanic and Atmospheric Administration (NOAA) OR EarthInfo, Inc. [as a reseller] and U.S. Environmental Protection Agency 2. Data Product Name(s): (a) National Climatic Data Center (NCDC) Hourly Precipitation Data OR EarthInfo Inc. NCDC Hourly Precipitation Data and (b) Center for Exposure Assessment Modeling (CEAM) Bulletin Board Service (BBS). 3. References: Database Guide for EarthInfo CD^2 NCDC Hourly and Fifteen Minute Precipitation. 4. Description: The NCDC Hourly Precipitation Data and CEAM BBS contain climatic monitoring data for NOAA 1st order meteorologic stations. 5. Geographic Extent: US States & Territories. 6. Scale: Not applicable.
Source Data– Development Procedures	1. Data Source And Media: First order climatic monitoring data is collected by various entities using defined NOAA monitoring standards. Collection technique for monitoring station coordinates was unknown at time of BASINS manual printing 2. Spatial Acquisition Vehicle and/or Digitizing Device: Unknown. 3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Not applicable.
Enhancements to Source Data	1. Data Format Conversion History: Data obtained from the NCDC hourly CDS were combined with meteorologic station data files downloaded from the CEAMS BBS. Using Hydrologic Simulation Program -- Fortran (HSPF), Watershed Data Management (WDM)

files containing time series climatic data were built for 2-6 stations in each EPA region.

2. Other Modifications: None.

3. Data Caveats and Comments: None.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Unknown.

2. Estimated Accuracy of Digital Data: Unknown.

3. Quality Assurance: Information not available.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: The monitoring station locations were assessed using county boundaries.

WEATHER STATION SITES

Data Category: Environmental Monitoring

BASINS Product Description

Location of first order NOAA weather stations used by the SWRRB model.

Source Data– General Information

1. Originating Agency/Organization: National Oceanic and Atmospheric Administration/United States Department of Commerce.

2. Data Product Name: SWRRB.

3. References: SWRRB: A Basin Scale Simulation Model for Soil and Water Resources Management/ by J.G. Arnold, J.R. Williams, A.D. Nicks, and N.B. Sammons. 1st ed.

4. Description: First Order NOAA weather stations used by the SWRRB model.

5. Geographic Extent: 50 U.S. States and U.S. Territories.

6. Scale: Not applicable.

Source Data– Development Procedures

1. Data Source And Media: Information not yet available.

2. Spatial Acquisition Vehicle and/or Digitizing Device: Information not yet available.

3. Precision and/or Resolution of Instrumentation Used to Digitize Map: Information not yet available.

Enhancements to Source Data

1. Data Format Conversion History: The weather station geographic coordinates and identification codes were written to a text file. The text file was then converted into an ARC/INFO point coverage in National Albers projection. Theissen polygons were created from the point coverage. These polygons can be overlaid other layers to show the nearest available weather station.

2. Other Modifications: None.

3. Data Caveats and Comments: The theissen polygon coverage was also projected into Alaska and Hawaii centered coverages for use in these states.

Accuracy and Quality Assurance of Source Data

1. Estimated Accuracy of Source Analog Data: Information not yet available.

2. Estimated Accuracy of Digital Data: Information not yet available.

3. Quality Assurance: Information not yet available.

Accuracy and Quality Assurance of Enhanced Data

1. Quality Assurance Data Procedures: None.

Appendix B - Data Dictionary

BASINS is distributed with approximately 300-600 megabytes of environmental and geographic data on its compact disc(s). Table B1 lists all of the BASINS data products and provides the corresponding theme name and related table names used to reference the data within the BASINS GIS environment.

Appendix Table B1 - BASINS Version 1.0 Data Products

BASINS Data Product	Page	Theme Name	Related Table Names	File Name
Bacteria Monitoring Stations & Data Summaries	B-4	Bacteria Stations - DRAFT		bc_stat.dbf bc_stat.shp bc_stat.shx
			Bacteria Data 70-74	bc_d7074.dbf
			Bacteria Data 75-79	bc_d7579.dbf
			Bacteria Data 80-84	bc_d8084.dbf
			Bacteria Data 85-89	bc_d8589.dbf
			Bacteria Data 90-94	bc_d9094.dbf
			Bacteria Parameter Table	bc_parm.dbf
			Bacteria Parameter Table 70-74	bc_p7074.dbf
			Bacteria Parameter Table 75-79	bc_p7579.dbf
			Bacteria Parameter Table 80-84	bc_p8084.dbf
			Bacteria Parameter Table 85-89	bc_p8589.dbf
			Bacteria Parameter Table 90-94	bc_p9094.dbf
Dam Locations	B-7	Dam Locations	[None]	dam.dbf dam.shp dam.shx
Drinking Water Supply (DWS) Sites	B-7	Drinking Water Supply Sites	[None]	rf1.dbf rf1.shp rf1.shx
EPA Regions	B-8	EPA Regional Boundaries	[None]	epa_reg.dbf epa_reg.shp epa_reg.shx
Gage Sites	B-8	USGS Gage Sites	[None]	gage.dbf gage.shp gage.shx
Hydrologic Unit Boundaries	B-9	Accounting Unit Boundaries	[None]	acc.dbf acc.shp acc.shx
		Cataloging Unit Boundaries	[None]	cat.dbf cat.shp cat.shx
		Cataloging Unit Codes	[None]	catpt.dbf catpt.shp catpt.shx
Industrial Facilities Discharge (IFD) Sites	B-9	Industrial Facilities Discharge Sites	[None]	ifd.dbf ifd.shp ifd.shx

BASINS Data Product	Page	Theme Name	Related Table Names	File Name
Land Use and Land Cover	B-10	Land Use Index	[None]	lulcndx.dbf lulcndx.shp lulcndx.shx
		L_(USGS Quadrangle Name)	[None]	l_(quad name) A/I coverage format
Major Roads	B-11	Major Roads	[None]	roads.dbf roads.shp roads.shx
National Sediment Inventory (NSI) Stations & Database	B-11	National Sediment Inventory Stations		nsi.dbf nsi.shp nsi.shx
			NSI Biotoxicity Data	nsibiot.dbf
			NSI Biotoxicity Phase Table	nbi_spc.dbf
			NSI Elutriate Data	nsielut.dbf
			NSI Elutriate Parameter Table	nel_prm.dbf
			NSI ODES & DMATS Remark Codes	nsirmk1.dbf
			NSI Sediment Chemistry Data	nsisedi.dbf
			NSI Sediment Chemistry Parameter Table	nsd_prm.dbf
			NSI STORET & Other Remark Codes	nsirmk1.dbf
			NSI Tissue Residue Data	nsitiss.dbf
			NSI Tissue Residue Parameter Table	nti_prm.dbf
			NSI Tissue Residue Species Table	nti_spc.dbf
Permit Compliance System (PCS) Sites and Computed Loadings	B-18	Permit Compliance System		pcs.dbf pcs.shp pcs.shx
			Permitted Discharges 1991	pcsld91.dbf
			Permitted Discharges 1992	pcsld92.dbf
			Permitted Discharges 1993	pcsld93.dbf
			Permitted Discharges Loadings Over Permits 1991	pcsop91.dbf
			Permitted Discharges Loadings Over Permits 1992	pcsop92.dbf
			Permitted Discharges Loadings Over Permits 1993	pcsop93.dbf
			Permitted Discharges Parameter Table	pcs_prm.dbf
			Permitted Discharges Parameter Table 1991	pcs_p91.dbf
			Permitted Discharges Parameter Table 1992	pcs_p92.dbf
			Permitted Discharges Parameter Table 1993	pcs_p93.dbf
Populated Place Locations	B-21	Place Names - (state postal abbreviation)	[None]	(ST)ppl.dbf (ST)ppl.shp (ST)ppl.shx
Reach File, Version 1 (RF1)	B-21	Reach File, V1	[None]	rf1.dbf rf1.shp rf1.shx
State and County Boundaries	B-23	State Boundaries	[None]	st.dbf st.shp st.shx
		County Boundaries	[None]	cnty.dbf cnty.shp cnty.shx
		County Names	[None]	cntypt.dbf cntypt.shp cntypt.shx

BASINS Data Product	Page	Theme Name	Related Table Names	File Name
Superfund National Priority List Sites	B-23	National Priority List Sites	[None]	npl.dbf npl.shp npl.shx
Toxic Release Inventory (TRI) Sites, 1992 Release	B-24	Toxic Release Inventory-1992 Sites	[None]	tri92.dbf tri92.shp tri92.shx
Urbanized Areas	B-25	Urban Area Boundaries	[None]	urban.dbf urban.shp urban.shx
		Urban Area Names	[None]	urban_nm.dbf urban_nm.shp urban_nm.shx
Water Quality Monitoring Stations & Data Summaries	B-25	Water Quality Stations		wq_stat.dbf wq_stat.shp wq_stat.shx
			Water Quality Data 70-74	wq_d7074.dbf
			Water Quality Data 75-79	wq_d7579.dbf
			Water Quality Data 80-84	wq_d8084.dbf
			Water Quality Data 85-89	wq_d8589.dbf
			Water Quality Data 90-94	wq_d9094.dbf
			Water Quality Parameter Table	wq_parm.dbf
			Water Quality Parameter Table 70-74	wq_p7074.dbf
			Water Quality Parameter Table 75-79	wq_p7579.dbf
			Water Quality Parameter Table 80-84	wq_p8084.dbf
			Water Quality Parameter Table 85-89	wq_p8589.dbf
			Water Quality Parameter Table 90-94	wq_p9094.dbf
Watershed Data Stations & Database (sample set)	B-29	Watershed Data Stations	[None]	wdm.dbf wdm.shp wdm.shx
Weather Station Sites	B-29	Weather Station Areas	[None]	met_stat.dbf met_stat.shp met_stat.shx
		Weather Station Sites	[None]	metpt.dbf metpt.shp metpt.shx

This appendix contains a brief description of the data elements included within BASINS data products. Data products are presented in alphabetical order. Appendix A contains additional information on the metadata for each data product, including references to other documentation.

Data Product: Bacteria Monitoring Stations & Data Summaries
Theme Name: Bacteria Stations - DRAFT

Field Name	*Description*
SHAPE	ArcView internal field
BACID	BASINS assigned unique station number
AGENCY	agency code
STATION	station code
LOCATION	description of location
CU	cataloging unit code
SEG	reach file v1 segment number
MILEP	reach file v1 mile point
ONOFF	on/off reach indicator
COUNTY	county name
STFIPS	state FIPS code
STATE	state postal abbreviation
TYPE	station type
STCOFIPS	state and county FIPS code
BCU	BASINS assigned cataloging unit

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Data 70-74

Field Name	*Description*
BACID	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Data 75-79

Field Name	*Description*
BACID	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Data 80-84

Field Name	*Description*
BACID	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Data 85-90

Field Name	*Description*
BACID	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit code

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria 90-94

Field Name	*Description*
BACID	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Parameter Table

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Parameter Table 70-74

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Parameter Table 75-79

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Parameter Table 80-84

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Parameter Table 85-89

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Bacteria Monitoring Stations & Data Summaries
Related Table Name: Bacteria Parameter Table 90-94

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Dam Locations
Theme Name: Dam Locations

Field Name	*Description*
SHAPE	ArcView internal field
DAMID	dam identification number
INME	impoundment name
RNME	river/stream name
CU	cataloging unit
SEG	reach file v1 segment number
DSEGL	segment length (miles)
TYPDAM	type of main dam portion
YRCDAM	year dam completed
TSPL	type of spillway
QMAX	maximum spillway discharge
X_COORD	dam location longitude (decimal degrees)
Y_COORD	dam location latitude (decimal degrees)

Data Product: Drinking Water Supply (DWS) Sites
Theme Name: Drinking Water Supply Sites

Field Name	*Description*
SHAPE	ArcView internal field
STCO	state and county FIPS code
LATDD	site latitude in decimal degrees
LONGDD	site longitude in decimal degrees

CTY	name of the city where the facility is located
CNN	name of the county where the facility is located
STA	abbreviation for the state where the facility is located
FQMINV	reach number where the facility is located
MILES	mile point on the reach where the facility is located
TYPE	facility type - "S" surface water or "G" ground water
OWN	whether facility is owned by an individual or a municipality
NAME	facility name
WUN	facility owner name
PAVGF	average facility flow in GPD
POPSV	population served by the facility
ACCURACY	accuracy code for longitude and latitude of facility
BREACH	BASINS assigned reach file v1 reach number
BFIPS	BASINS assigned state and county FIPS code

Data Product: EPA Regions
Theme Name: EPA Regional Boundaries

Field Name	*Description*
SHAPE	ArcView internal field
AREA	area of polygon
EPAREG	U.S. EPA region number
LABEL_REG	U.S. EPA region number (Roman numeral)

Data Product: Gage Sites
Theme Name: USGS Gage Sites

Field Name	*Description*
SHAPE	ArcView internal field
AGCY	identifying agency and gage number.
STCO	state and county FIPS code
LATDD	latitude of the gage in decimal degrees
LONGDD	longitude of the gage in decimal degrees
REACH	reach file v1 reach number gage location
NAME	name of reach
MNFLO	mean stream flow in CFS
SVTEN	seven / ten stream low flow
JAN	mean stream flow for month of January
FEB	mean stream flow for month of February
MAR	mean stream flow for month of March
APR	mean stream flow for month of April
MAY	mean stream flow for month of May
JUN	mean stream flow for month of June
JUL	mean stream flow for month of July
AUG	mean stream flow for month of August
SEP	mean stream flow for month of September
OCT	mean stream flow for month of October

NOV	mean stream flow for month of November
DEC	mean stream flow for month of December
ACCURACY	accuracy code for latitude and longitude of gage
BREACH	BASINS assigned reach file v1 reach number
BFIPS	BASINS assigned state and county FIPS code

Data Product: Hydrologic Unit Boundaries
Theme Name: Accounting Unit Boundaries

Field Name	*Description*
SHAPE	ArcView internal field
AREA	area of polygon
ACC_UNIT	accounting unit number

Data Product: Hydrologic Unit Boundaries
Theme Name: Cataloging Unit Boundaries

Field Name	*Description*
SHAPE	ArcView internal field
AREA	area of polygon
PLYTYPE	polygon type
HUC	cataloging unit code (numeric)
WORKB	disregard data element
ACC_UNIT	accounting unit code
CU	cataloging unit code (character)
BEXT	BASINS internal field
CRS1	BASINS internal field

Data Product: Hydrologic Unit Boundaries
Theme Name: Cataloging Unit Codes

Field Name	*Description*
SHAPE	ArcView internal field
AREA	area of polygon
PERIMETER	length of polygon perimeter
CAT_	ArcView internal field
CAT_ID	disregard data element
PLYTYPE	polygon type
HUC	cataloging unit code (numeric)
WORKB	disregard data element
ACC_UNIT	accounting unti code
CU	cataloging unit code (character)
BEXT	BASINS internal field
CRS1	BASINS internal field

Data Product: Industrial Facilities Discharge (IFD) Sites
Theme Name: Industrial Facilities Discharge Sites

Field Name	*Description*
SHAPE	ArcView internal field
NPD	NPDES number
NAM	facility name

ADR	facility address
CTY	facility city
STA	facility state abbreviation
ZIP	facility ZIP code
LAT	facility latitude in decimal degrees
LONG	facility longitude in decimal degrees
STCOFIPS	state and county FIPS code
NDC	number of discharges from the facility
FRW	receiving water name
FCU	facility cataloging unit code
FSG	facility reach file segment number
FHF	facility hit flag to indicate if facility discharges to a reach
FFL	discharge flow in thousands of gallons per day
FS1	facility SIC from PCS
FS2	SIC code 2
FS3	SIC code 3
FS4	SIC code 4
FS5	SIC code 5
MAJOR	major/minor flag (from PCS)
MILES	facility reach file mile point
XEGS	effluent guidelines subcategory index
E308SN	effluent guidelines survey number
EGF	effluent guidelines flow in thousands of gallons per day
EGS	effluent guidelines subcategory code
ACCURACY	accuracy code for facility latitude and longitude
FLOW	discharge flow in thousands of gallons per day
CU	cataloging unit code
CUSEG	reach file v1 reach number
BREACH	BASINS assigned reach file v1 reach number
BFIPS	BASINS assigned state and county FIPS code

Data Product: Land Use and Land Cover
Theme Name: Land Use Index

Field Name	*Description*
SHAPE	ArcView internal field
AREA	area of polygon (square meters)
PERIMETER	polygon perimeter (meters)
LULCNDX#_	ArcView internal field
LULCNDX#_I	disregard data element
COVERNAME	coverage name
COVNAME	alternate coverage name
QNAME	quadrangle name
EPA_REG	U.S. EPA region number
CREATE_DAT	date coverage was created
VERIFY_DAT	date coverage was verified
COMMENT1	comments concerning the coverage

Data Product: Land Use and Land Cover
Theme Name: L_(USGS Quadrangle Map Name, e.g., L_KANSKS)

Field Name	*Description*
SHAPE	ArcView internal field
AREA	area of polygon (square meters)
PERIMETER	perimeter of polygon (meters)
L_KANSKS_	ArcView assigned polygon ID
L_KANSKS_I	disregard data element
LUCODE	Anderson level 1 land use code
LEVEL2	Anderson level 2 land use code

Data Product: Major Roads
Theme Name: Major Roads

Field Name	*Description*
SHAPE	ArcView internal field
PRIMARY_NA	primary name of road
SECONDARY_	secondary name of road
ROADTYPE1	description of road type
ROADCODE1	code for road type
ROADTYPE2	first alternate description of road type
ROADCODE2	first alternate road type code
ROADTYPE3	second alternate description of road type
ROADCODE3	second alternate road type code

Data Product: NSI Stations & Database
Theme Name: National Sediment Inventory Stations

Field Name	*Description*
SHAPE	ArcView internal field
BNSIID	BASINS assigned station ID
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
AGENCY	identification of group responsible for collecting data (e.g., NS&T is NOAA's National Status and Trends Program)
STATION	monitoring station identification code.
COUNTY	county
DEPTH	water depth (m)
DEPT_MAX	maximum water depth (m)
DEPT_MIN	minimum water depth (m)
DREDGESI	dredged site
DRWATERB	dredged water body
GEOCODE	geologic code
INSTIT	institution
LAT	latitude (decimal degrees)
LAT_2	latitude #2 forming a rectangle (decimal degrees)
LNG	longitude (decimal degrees)
LNG_2	longitude #2 forming a rectangle (decimal degrees)
LOCATION	location

LOC_CODE	location code
NSIREACH	Reach File 1 reach
ORIGIN	origin
ORG_NAME	organization name
REFER	reference, literature citation
SR_SCI	senior scientist
STATE	state
WATERBOD	waterbody
EPA_REG	EPA Region
FIPS	FIPS code
FIPS_DIS	distance to nearest FIPS (mile)
HUC_DIS	distance to nearest catologic unit (mile)
RF1_DIS	distance to RF1 reach (mile)
BCU	BASINS assigned cataloging unit

Data Product: NSI Stations & Database
Related Table Name: NSI Biotoxicity Data

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
AGENCY	identification of group responsible for collecting data (e.g., NS&T is NOAA's National Status and Trends Program)
STATION	monitoring station identification code.
DATE	date of sample collection
SAMPLE	unique sample identifier code
REPLICAT	unique replicate identifier code
SEQ	computer-generated sequence number when multiple samples were taken; SOURCE, AGENCY, STATION, and DATE were identical; and no SAMPLE, SUBSAMPL, or REPLICAT codes were provided
AMMONIA	ammonia concentration (mg/L)
ABNORMAL	abnormality
BIOASS_DA	bioassay date
BIOASSAY	type of bioassay reported
BIOMASS	biomass
COMMENTS	comments
COM_NAME	common name
DIL_UNIT	concentration/Dilution units
DILUTION	concentration/Dilution
DOX	dissolved oxygen (mL/L)
ENDPOIN2	endpoint #2 of bioassay test
ENDPOINT	endpoint of bioassay test
E_QUALIF	EMERGENC qualifier
EMERGENC	emergence after 10 days
EXT_MTHO	extraction method code to indicate the method used to extract or digest the sample matrix and remove or isolate the chemical of concern
FEEDING	feeding of species tested
FLUSH	flushing rate in percent of chamber volume

	exchanged/24 hours
GENUS	organism genus
HARDNESS	hardness
HOLD_TIM	holding time of sample prior to analysis (weeks)
LFSTG_EN	life stage end–for bioassays that span more than one life stage, record predominant life stage at the end of the bioassay
LFSTG_ST	life stage start–for bioassays that span more than one life stage, record predominant life stage at the start of the bioassay
MEASURED	measured (Y/N)
NAME	genus and species name (linked to PHASE)
NUM_ORGA	number of organisms
P	result associated with ENDPOINT
P_CC	control-corrected analytical result associated with P
P2	result associated with ENDPOIN2
PH	pH
PHASE	phase code to indicate the phase (i.e., medium) in which the bioassay organisms are housed
PHOTO_PE	Photoperiod: Number of light hours vs. number of dark hours (e.g., 1608 = 16 hours light, 8 hours dark)
QASAMP1	control sample no. 1
QASAMP2	control sample no. 2
QASAMP3	control sample no. 3
RENEWAL	renewal (Y/N)
R	remark code associated with ENDPOINT and P
REBURIAL	ET50 (mean reburial time)
RESPO_TY	type of bioassay response
SALINITY	salinity of water in test chamber (ppt)
SAMP_DTL	depth to bottom of sample interval (m)
SAMP_DTU	depth to top of sample interval (m)
SERIES	bioassay series number
SIGNIF	significant difference from control
SMP_EQP	sampling equipment code
SPECCODE	species code
SPECIES	organism species
SPHERE	sphere (i.e., environment) code from which the sample came
STD_TOX	standard Toxicant Result code to indicate whether the results of the standard toxicant bioassay were acceptable
TEMP	water temperature (deg C)
TESTDUR	test duration (days)
TESTTYPE	test used
TESTEXP	test exposure periods
UNITS	units associated with ENDPOINT and P

UNITS2	units associated with ENDPOIN2 and P2
WATERTYP	water type
YOUNG	number of young produced per adult female over 4 weeks
BNSIID	BASINS assigned station ID
BCU	BASINS assigned catalogin unit
BTSNPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI Biotoxicity Phase Table

Field Name	*Description*
NAME	genus and species name
PHASE	toxicity phase listed in source of data (when available)
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
NSIPHASE	toxicity phase used by NSI
BTSNPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI Elutriate Data

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
AGENCY	identification of group responsible for collecting data (e.g., NS&T is NOAA's National Status and Trends Program)
STATION	monitoring station identification code.
DATE	date of sample collection
SAMPLE	unique sample identifier code
SEQ	computer-generated sequence number when multiple samples were taken; SOURCE, AGENCY, STATION, and DATE were identical; and no SAMPLE, SUBSAMPL, or REPLICAT codes were provided.
SUBSAMPL	unique subsample identifier code
REPLICAT	unique replicate identifier code
CAS	CAS number for analyte
EXT_MTHO	extraction method code to indicate the method used to extract or digest the sample matrix and remove or isolate the chemical of concern
INSTRUME	instrument code to identify the final chemical analysis method(s) used for analyzing the sample
P	result associated with PARM (μg/L)
PARM	analyte measured (see also P and R)
R	remark code associated with PARM and P
SAMP_DTL	depth to bottom of sample interval (m)
SAMP_DTU	depth to top of sample interval (m)
SAMP_EQP	sampling equipment code
BNSIID	BASINS assigned station ID
BCU	BASINS assigned cataloging unit

BESPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI Elutriate Parameter Table

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
PARM	Analyte measured (see also P and R)
CAS	CAS number for analyte
LNAME	analyte long name
BESPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI ODES & DMATS Remark Codes

Field Name	*Description*
REMARK CODE	remark code
DESCRIPTION	description

Data Product: NSI Stations & Database
Related Table Name: NSI Sediment Chemistry Data

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
AGENCY	identification of group responsible for collecting data (e.g., NS&T is NOAA's National Status and Trends Program)
STATION	monitoring station identification code.
DATE	date of sample collection
SAMPLE	unique sample identifier code
SUBSAMPL	unique subsample identifier code
REPLICAT	unique replicate identifier code
SEQ	computer-generated sequence number when multiple samples were taken; SOURCE, AGENCY, STATION, and DATE were identical; and no SAMPLE, SUBSAMPL, or REPLICAT codes were provided
CAS	CAS number for analyte
CLEANUP	sample cleanup code to indicate an additional step taken to further purify the sample extracts or digestates
COMMENTS	comments
DRY_WGT	percent of total sample remaining after drying
EXT_MTHO	extraction method code to indicate the method used to extract or digest the sample matrix and remove or isolate the chemical of concern
INSTRUME	instrument code to identify the final chemical analysis method(s) used for analyzing the sample
MEAS_BAS	result is wet or dry weight basis (see also P)
NSIREVCD	Preliminary evluation code (A=Reviewed in QA/QC of

	Preliminary Evaluation, U=Only one (1) observation of this chemical in source, X=Deleted based on QA/QC of Preliminary Evaluation (first run), Y=Duplicate Data, Z=Deleted based on QA/QC of Preliminary Evaluation (second run))
P	result associated with PARM (µg/kg, ppb)
PARM	analyte measured (see also P and R)
R	remark code associated with PARM and P
SAMP_DTL	depth to bottom of sample interval (m)
SAMP_DTU	depth to top of sample interval (m)
SMP_EQP	sampling equipment code
SPHERE	sphere (i.e., environment) code from which the sample came
WET_WGT	total wet weight of sample (g)

Data Product: NSI Stations & Database
Related Table Name: NSI Sediment Chemistry Parameter Table

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
PARM	analyte measured (see also P and R)
CAS	CAS number for analyte
LNAME	analyte long name
BNSIID	BASINS assigned station ID
BCU	BASINS assigned cataloging unit
BSSPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI STORET & Other Remark Codes

Field Name	*Description*
REMARK CODE	remark code
DESCRIPTION	description

Data Product: NSI Stations & Database
Related Table Name: NSI Tissue Residue Data

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
AGENCY	identification of group responsible for collecting data (e.g., NS&T is NOAA's National Status and Trends Program)
STATION	monitoring station identification code.
DATE	date of sample collection
SAMPLE	unique sample identifier code
SEQ	computer-generated sequence number when multiple samples were taken; SOURCE, AGENCY, STATION, and DATE were identical; and no SAMPLE, SUBSAMPL, or REPLICAT codes were provided
REPLICAT	unique replicate identifier code
ANATOMY	organ/tissue sampled

ANAT_CD	organ/tissue sampled code
CAS	CAS number for analyte
CLEANUP	sample cleanup code to indicate an additional step taken to further purify the sample extracts or digestates
COMPOSIT	a unique identifier to indicate a sample created by compositing tissues from several individuals
DRY_WGT	percent of total sample remaining after drying
EXT_MTHO	extraction method code to indicate the method used to extract or digest the sample matrix and remove or isolate the chemical of concern
INSTRUME	instrument code to identify the final chemical analysis method(s) used for analyzing the sample
NSIREVCD	preliminary evluation code (F=Field test, L=Lab test, W=Species cannot be resolved, Y=Duplicate Data)
LENGTH	length of specimen
LIFE_STA	life stage code to identify the life stage of the sample
MEAS_BAS	result is wet or dry weight basis (see also P)
NUMB_IND	number of organisms in sample
P	result associated with PARM
PARM	analyte measured (see also P and R)
P_STD	standard deviation of P associated with repeated measurements of PARM
R	remark code associated with PARM and P
SAMPTYPE	sample type
SEX	sex code used to identify sex of sample
SMP_EQP	sampling equipment code
SPECCODE	species code
SPECIMEN	unique identifier for the individual organism being analyzed
TOT_REP	number of replicates
WEIGHT	weight of organism
WET_WGT	total weight of sample
LIPIDS	% Extractable lipids
SPEC_BIO	STORET taxonomic code
BNSIID	BASINS assigned station ID
BCU	BASINS assigned cataloging unit
BISPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI Tissue Residue Parameter Table

Field Name	*Description*
SOURCE	identification of data origin (e.g., REG4 is the Region 4 Pilot Study)
PARM	analyte measured (see also P and R)
CAS	CAS number for analyte

LNAME	analyte long name
BTSPID	BASINS internal field

Data Product: NSI Stations & Database
Related Table Name: NSI Tissue Residue Species Table

Field Name	*Description*
SPECCODE	species code
SPEC_SCI	species scientific name
SPEC_COM	species common name
RES_MIG	species resident, migratory, or either
BOT_PEL	species benthic, pelagic, or either
EDIBLE	species considered edible by humans

Data Product: PCS Sites and Computed Loadings
Theme Name: Permit Compliance System

Field Name	*Description*
SHAPE	ArcView internal field
NPDES	NPDES permit number
LAT	latitude
LONG	longitude
METHOD	latitude/longitude method code
ZIP	postal zip code
HUC	hydrologic cataloging unit
P_LAT	preferred latitude
P_LONG	preferred longitude
X_COORD	facility longitude
Y_COORD	facility latitude
MADI	major discharge identifier
SIC	standard industrial classification code
CNTY	county code
CSDN	consolidated system facility identifier
FFID	federal facility identification number
FLLC	facility latitude/longitude code of accurace
TELE	cognizant official telephone
SPC	unknown
NAME	facility name
ADDRESS	facility address
CITY	city code
IFDSIC	SIC contained in IFD database
CUSEG	cataloging unity reach file segment
MI	Reach file, v1 segment mile point
PRS1	BASINS internal field
PRS2	BASINS internal field
CU	cataloging unit
BREACH	BASINS internal field
BFIPS	BASINS county FIPS code
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges 1991

Field Name	*Description*
NPDES	NPDES permit number
PARAMETER	STORET parameter code
LBY0	estimated loading calculated with remarked data set to zero (lbs/yr)
LBYE	estimated loading calculated with remarked data set to half-detection limit (lbs/yr)
LBY1	estimated loading calculated with remarked data set to detection limit (lbs/yr)
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges 1992

Field Name	*Description*
NPDES	NPDES permit number
PARAMETER	STORET parameter code
LBY0	estimated loading calculated with remarked data set to zero (lbs/yr)
LBYE	estimated loading calculated with remarked data set to half-detection limit (lbs/yr)
LBY1	estimated loading calculated with remarked data set to detection limit (lbs/yr)
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges 1993

Field Name	*Description*
NPDES	NPDES permit number
PARAMETER	STORET parameter code
LBY0	estimated loading calculated with remarked data set to zero (lbs/yr)
LBYE	estimated loading calculated with remarked data set to half-detection limit (lbs/yr)
LBY1	estimated loading calculated with remarked data set to detection limit (lbs/yr)
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Loadings Over Permits 1991

Field Name	*Description*
NPDES	NPDES permit number
PARAMETER	STORET parameter code
LBYOVER	portion of estimated loading over permit calculated with remarked data set to half-detection limit (lbs/yr)

LBYE	estimated loading calculated with remarked data set to half-detection limit (lbs/yr)
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Loadings Over Permits 1992

Field Name	*Description*
NPDES	NPDES permit number
PARAMETER	STORET parameter code
LBYOVER	portion of estimated loading over permit calculated with remarked data set to half-detection limit (lbs/yr)
LBYE	estimated loading calculated with remarked data set to half-detection limit (lbs/yr)
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Loadings Over Permits 1993

Field Name	*Description*
NPDES	NPDES permit number
PARAMETER	STORET parameter code
LBYOVER	portion of estimated loading over permit calculated with remarked data set to half-detection limit (lbs/yr)
LBYE	estimated loading calculated with remarked data set to half-detection limit (lbs/yr)
BCU	BASINS assigned cataloging unit

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Parameter Table

Field Name	*Description*
PARAMETER	STORET parameter code
PRAM_NAME	parameter name
CHEMICAL_N	chemical name
CAS_NUMBER	chemical abstract registry number

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Parameter Table 1991

Field Name	*Description*
PARAMETER	STORET parameter code
PRAM_NAME	parameter name
CHEMICAL_N	chemical name
CAS_NUMBER	chemical abstract registry number

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Parameter Table 1992

Field Name	*Description*
PARAMETER	STORET parameter code
PRAM_NAME	parameter name
CHEMICAL_N	chemical name
CAS_NUMBER	chemical abstract registry number

Data Product: PCS Sites and Computed Loadings
Related Table Name: Permitted Discharges Parameter Table 1993

Field Name	*Description*
PARAMETER	STORET parameter code
PRAM_NAME	parameter name
CHEMICAL_N	chemical name
CAS_NUMBER	chemical abstract registry number

Data Product: Populated Place Locations
Theme Name: Place Names - (State Postal Abbreviation)

Field Name	*Description*
SHAPE	ArcView internal field
AREA	BASINS internal field
PERIMETER	BASINS internal field
ALPPL_	BASINS internal field
ALPPL_ID	BASINS internal field
NAME	place name which can be used to label the place on a map display
DESIG	designation that this is a populated place
COUNTY	county name
FIPS1	state and county FIPS code
LAT_IN	place latitude in DDMMSS
LONG_IN	place longitude in DDDMMSS
ELEV	elevation of the place in meters(character)
QCODE	code for the accuracy of the latitude and longitude of place
ELEVNUM	elevation of the place in meters integers)

Data Product: Reach File, Version 1 (RF1)
Theme Name: Reach File, V1

Field Name	*Description*
SHAPE	ArcView internal field
HUC	cataloging unit code
SEG	reach segment number
MILEPT	indicates the beginning of the reach
SEQNO	reach sequence number
RFLAG	reach flag "1" is a stream reach
OWFLAG	open water flag "1" is a open water reach
TFLAG	terminal reach flag "1" is a terminal reach
SFLAG	start reach flag "1" is a start reach
TYPE	reach segment type

SEGL	length of the reach
LEV	reach level order
J	reach junction number
K	reach divergence number
PMILE	path mile
ARBSUM	milage distance upstream from the stream discharge
USDIR	upstream reach direction
TERMID	terminal stream system ID
TRMBLV	terminal base level
PNAME	primary reach name
PNMCD	primary name code
OWNAME	open water name
OWNMCD	open water name code
DSHUC	downstream cataloging unit number
DSSEG	downstream reach segment number
DSMLPT	downstream mile point
MNFLOW	mean flow in the reach in cfs
SVTNFLOW	stream velocity in the reach at seven/ten low flow
MNVELO	stream velocity in the reach at mean flow
SVTNVELO	stream velocity in the reach at seven/ten low flow
RIVRCH	reach number
CU	cataloging unit
DESSEQ	downstream segment number
USSEQ	upstream segment number
USDIR	upstream reach direction (L or R)
DSCSM	downstream CU, segment, mile point
CCSM	complement CU, segment, mile point
CDIR	complement bank direction
ULCSM	upstream left CU, segment, mile point
URCSM	upstream right CU, segment, mile point
MDLAT	midpoint latitude
MDLONG	midpoint longitude
PSNPDAT	date of snapshot (yymm); zero if current
PLOWFL	stream-only low flow
PMEANFL	stream-only mean flow
PTOPELE	top of reach elevation
PBOTELE	bottom of reach elevation
PSLOPE	slope: NOT DERIVED from elevations
PDEPTH	mean depth (feet)
PWIDTH	mean width (feet)
PTEMP	mean temperature
PPH	mean pH
PLOWVEL	total low-flow velocity
PK1	CBOD decay rate constant (if known)
PK2	reaeration rate constant (if known)
PK3	NH3 decay rate constant (if known)
PMANN	"Roughness" coefficient (if known)
PSOD	sediment oxygen demand
PBGDO	background DO
PBGNH3	background NH3

PBGBOD5	background CBOD
PBGNBOD	background NBOD

Data Product: State and County Boundaries
Theme Name: State Boundaries

Field Name	*Description*
SHAPE	ArcView internal field
AREA	BASINS internal field
ST	state name abbreviation
EPAREG	state region

Data Product: State and County Boundaries
Theme Name: County Boundaries

Field Name	*Description*
SHAPE	ArcView internal field
FIPS	county FIPS code
ST	state postal abbreviations
CNTYNAME	county name
PLYTYPE	polygon type
WORKB	BASINS internal field
STCOFIPS	state and county FIPS code
BEXT	BASINS internal field

Data Product: State and County Boundaries
Theme Name: County Names

Field Name	*Description*
SHAPE	ArcView internal field
AREA	ArcView internal field
PERIMETER	ArcView internal field
CNTY	ArcView internal field
CNTY_ID	ArcView internal field
FIPS	county FIPS code
ST	state postal abbreviations
CNTYNAME	county name
PLYTYPE	polygon type
WORKB	BASINS internal field
STCOFIPS	state and county FIPS code
BEXT	BASINS internal field

Data Product: Superfund National Priority List Sites
Theme Name: National Priority List Sites

Field Name	*Description*
SHAPE	ArcView internal field
CERCLIS_ID	CERCLIS ID number
SITE_NAME	name of the NPL site
STATE	site state abbreviation
REGION	site region
LATDD	site latitude in DDMMSS

LONGDD	site longitude in DDMMSS
UPDATE	coordinate source

Data Product: Toxic Release Inventory (TRI) Sites, 1992 Release
Theme Name: Toxic Release Inventory Sites, 1992 Sites

Field Name	*Description*
SHAPE	ArcView internal field
NAME	facility name
ADDRESS	facility address
CITY	facility city
CNTY	facility county
ST	facility state abbreviation
ZIP	facility zip code
ZIP_PLUS4	extended facility zip code
MAIL_ZIP	zip code of the mailing address
STCOFIPS	state and county FIPS code for the facility location
REGION	EPA region where the facility is located
HIST_REC	flag for existing data from previous years
FAC_CLOSED	whether or not the facility is in operation
SUBMIT_LAT	submitted facility latitude in decimal degrees
SUBMIT_LON	submitted facility longitude in decimal degrees
SUBMIT_MET	not used
PREFER_LAT	preferred facility latitude in decimal degrees
PREFER_LON	preferred facility longitude in decimal degrees
PREFER_MET	not used
PREFER_AC	accuracy of preferred latitude and longitude in meters
PREFER_ACU	accuracy unit in meters
S_DMS_LAT	facility latitude in DDMMSS
S_DMS_LONG	facility longitude in DDDMMSS
LAT_LON_FL	not used
TRIS_X_DT	TRIS version date for this data
REP_IN_87	facility data reported in TRIS 1987
REP_IN_88	facility data reported in TRIS 1988
REP_IN_89	facility data reported in TRIS 1989
REP_IN_90	facility data reported in TRIS 1990
REP_IN_91	facility data reported in TRIS 1991
REP_IN_92	facility data reported in TRIS 1992
PAR_DUNS	parent corporations DUNS number
ASSGN_DUNS	assigned DUNS number
U_DUNS	DUNS number used for TRI
PAR_NAME	parent corporation name
PARB_NAME	parent corporations business name
CITYB	city of the parent corporation
STB	abbreviation for the state of the parent corporation
CEOB	name of the chief executive officer
REACH_NUMB	reach number to which the facility discharges

ALT2_AT	unknown
TRI	TRI identification number
UGI92RLSD	facilities discharge occurs underground
AIR92RLSD	facilities discharge occurs in the air
LND92RLSD	facilities discharge occurs on land
TRNFRD92	facilities use off-site transfer
BFIPS	BASINS assigned state and county FIPS code

Data Product: Urbanized Areas
Theme Name: Urban Area Boundaries

Field Name	*Description*
SHAPE	ArcView internal field
AREA	ArcView internal field
PERIMETER	ArcView internal field
URBAN_	ArcView internal field
URBAN_ID	ArcView internal field
CITYNAME	urbanized area name

Data Product: Urbanized Areas
Theme Name: Urban Area Names

Field Name	*Description*
SHAPE	ArcView internal field
AREA	ArcView internal field
PERIMETER	ArcView internal field
UANAME_	ArcView internal field
UANAME_ID	ArcView internal field
UA_CODE	a unique code for the urbanized area
CITYNAME	urbanized area name

Data Product: Water Quality Monitoring Stations & Data Summaries
Theme Name: Water Quality Stations

Field Name	*Description*
SHAPE	ArcView internal field
BWCID	BASINS assigned unique station number
AGENCY	agency code
STATION	station code
LOCATION	description of location
CU	cataloging unit code
SEG	reach file v1 segment number
MILEP	reach file v1 mile point
ONOFF	on/off reach indicator
COUNTY	county name
STFIPS	state FIPS code
STATE	state postal abbreviation
STCOFIPS	state and county FIPS code
WRS1	BASINS internal field
WRS2	BASINS internal field
BREACH	BASINS internal field

BFIPS	BASINS internal field
BCU	BASINS assigned cataloging unit
TYPE	station type

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Data 70-74

Field Name	*Description*
BWQRD	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit code

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Data 75-79

Field Name	*Description*
BWQRD	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit code

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Data 80-84

Field Name	*Description*
BWQRD	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit code

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Data 85-89

Field Name	*Description*
BWQRD	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit code

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Data 90-94

Field Name	*Description*
BWQRD	BASINS assigned unique station number
PARAMETER	EPA STORET parameter code
NO OBS	number of observations
MEAN	mean value
15TH %	15th percentile value
25TH %	25th percentile value
50TH %	50th percentile value
75TH %	75th percentile value
85TH %	85th percentile value
STD	standard deviation
BCU	BASINS assigned cataloging unit code

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Parameter Table

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	type of standard
REF_LVLSRC	reference level source

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Parameter Table 70-74

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type

UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	unknown
REF_LVLSRC	reference level source

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Parameter Table 75-79

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	unknown
REF_LVLSRC	reference level source

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Parameter Table 80-84

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	unknown
REF_LVLSRC	reference level source

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Parameter Table 85-89

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level
LW_REF_LVL	lower reference level
UNKNOWN	unknown
REF_LVLSRC	reference level source

Data Product: Water Quality Monitoring Stations & Data Summaries
Related Table Name: Water Quality Parameter Table 90-94

Field Name	*Description*
PARM_CODE	EPA STORET parameter code
PARM_NAME	parameter name
SAMPLE_TYP	sample type
UNITS	units
UP_REF_LVL	upper reference level

LW_REF_LVL	lower reference level
UNKNOWN	unknown
REF_LVLSRC	reference level source

Data Product: Watershed Data Stations & Database (sample set)
Theme Name: Watershed Data Stations

Field Name	*Description*
SHAPE	ArcView internal field
LONGITUDE	longitude
LATITUDE	latitude
ELEVATION	elevation
STAT_NAME	station name
COUNTY	county
PPT_PERIOD	duration of precipitation
COV_PCT	percent of sampling period covered
REGION	EPA region

Data Product: Weather Station Sites
Theme Name: Weather Station Areas

Field Name	*Description*
SHAPE	ArcView internal field
AREA	ArcView internal field
ID	weather station identification code
LATDD	latitude of the weather station in decimal degrees
LONGDD	longitude of the weather station in decimal degrees
ELEVFT	elevation of the weather station in meters
STATNAME	weather station name
VIG_ID	BASINS internal field

Data Product: Weather Station Sites
Theme Name: Weather Station Sites

Field Name	*Description*
SHAPE	ArcView internal field
ID	weather station identification code
LATDD	latitude of the weather station in decimal degrees
LONGDD	longitude of the weather station in decimal degrees
ELEVFT	elevation of the weather station in meters
STATNAME	weather station name
VIG_ID	BASINS internal field

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