INTERACTIVE DIGITAL PLATE

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As part of this report, an interactive digital plate is provided as a tool for readers to further investigate the environmental and dissolved-solids conditions presented in this study. The plate is an Environmental Systems Research Institute (ESRI) published map file (.pmf) and can be viewed by using ESRI's free ArcReader software, a mapping application that allows users to view, explore, query, and print published map files. The data are displayed by using the Albers Equal-Area conic projection and the North American Datum of 1983. Descriptions of the data layers, data sources, and associated viewable scale ranges are provided in table 1. Descriptions of the attributes (fields) in each of these data layers are described in table 2.

A brief description of select ArcReader tools and functionality is given below to help readers to begin by using the interactive digital plate. For further information on how to use ArcReader, see the ArcReader help menu or visit the ArcReader section of the ESRI website at: http://www.esri.com/software/arcgis/arcreader/index.html.

Download and unzip interactive digital plate data package:

1. Download the zip file that contains the map file and data for the interactive digital plate.
2. Unzip the contents of the file into a directory. The directory structure is shown below.

Download and install ArcReader:

- Download and install ArcReader.

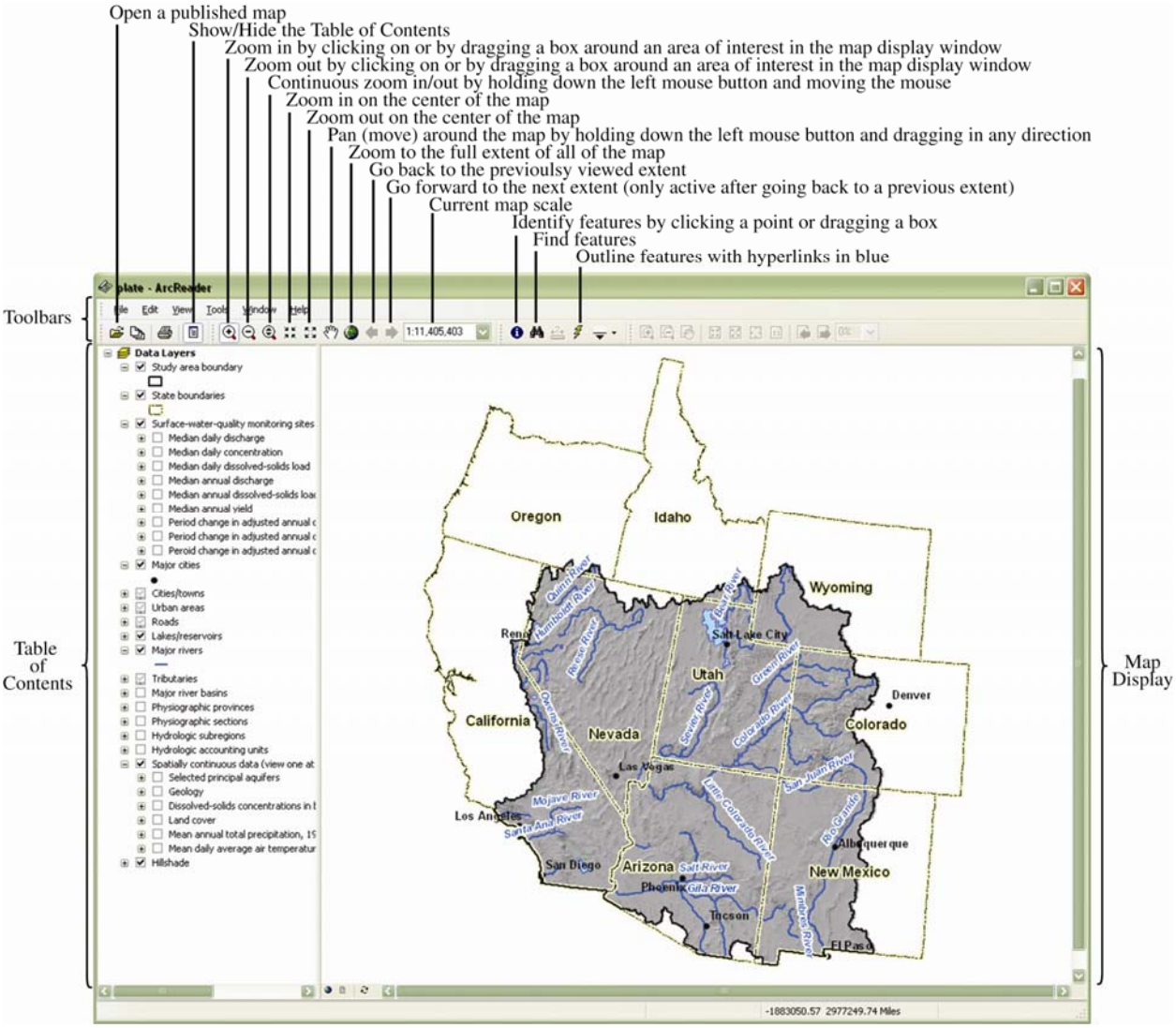
  Please note:

  - You will be required to register with ESRI in order to download ArcReader.
  - ArcReader is not compatible with Mac operating systems.

- Start ArcReader from the Start menu
  1. Click the **Start** button on the Windows taskbar.
  2. Point to **Programs**>**ArcGIS**, and click **ArcReader**.
- Open the .pmf file for the interactive digital plate
  1. Click the open button  , or click the **File** menu and click **Open**.
  2. Click the **Look In** dropdown arrow and navigate to the folder that contains the plate.pmf file.
  3. Click on plate.pmf to select it and then click **Open**.

ArcReader Window and Tools

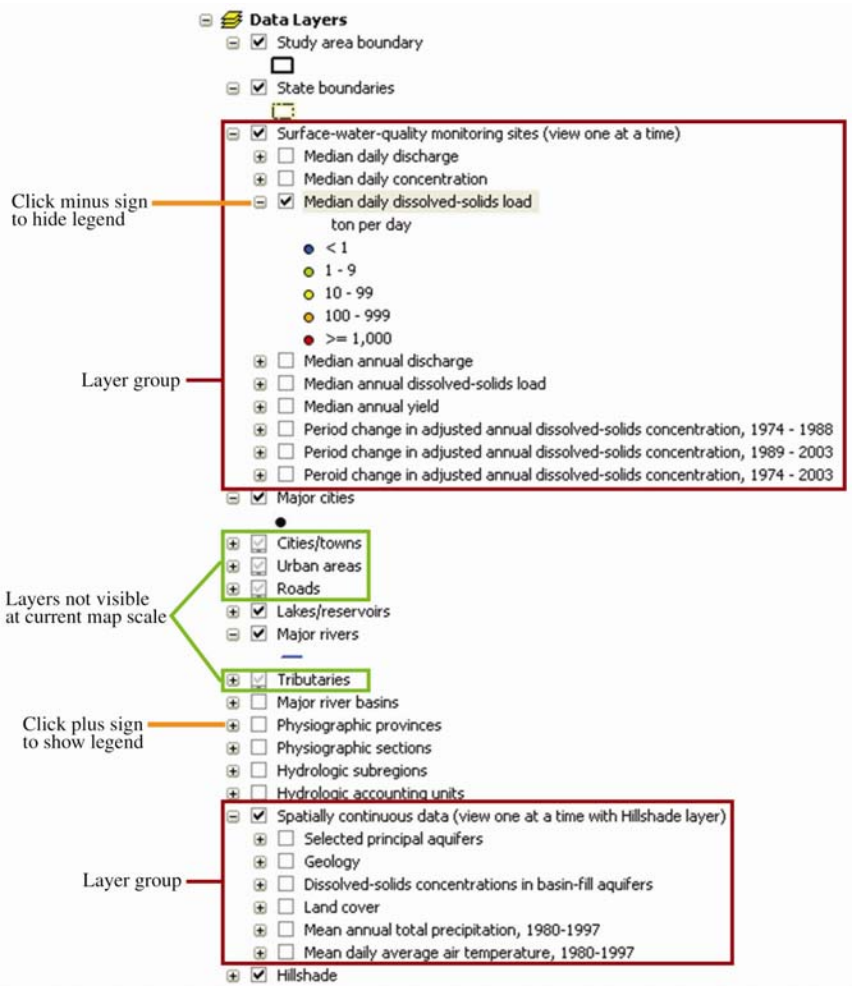
Fundamental components of the ArcReader window are shown below.



Displaying Layers

The table of contents shows what layers are available for display on the map and how the geographic features in those layers are symbolized. Layers are drawn on the map in the order in which they appear in the table of contents from bottom to top.

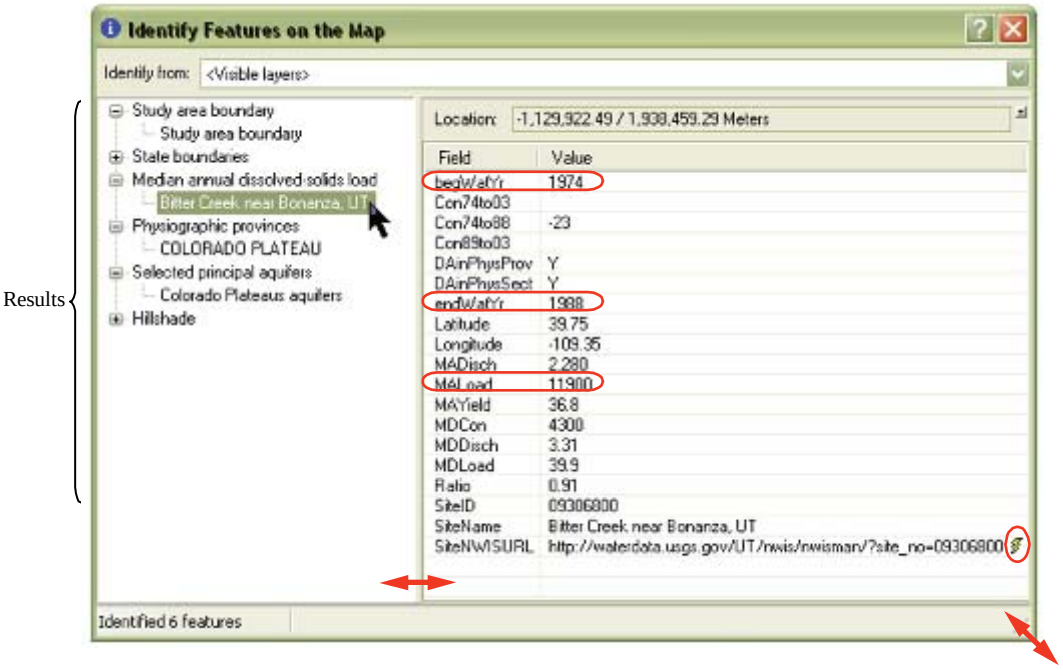
- A checkmark in the box next to a layer name in the table of contents means that the layer is currently on and thus visible in the map display. To turn a layer off, click the checkmark in the box next to the layer name.
- A layer with a grayed-out checkmark is not available for display at the current map scale. See table 1 for viewable scale ranges for individual layers.
- Some layers have labels associated with the features. See table 1 for viewable scale ranges for labels for individual layers.
- Click the plus or minus sign to the left of the layer name to show or hide the legend for that layer.
- There are two layer groups in the table of contents, the "Surface-water-quality monitoring sites" group and "Spatially continuous data" group. The "Surface-water-quality monitoring sites" group contains layers that show the same set of surface-water-quality monitoring sites color-coded by using nine different parameters. The "Spatially continuous data" group contains layers that are symbolized with a level of transparency so that the Hillshade layer is also visible. Because of the transparency, the colors in the legend for layers in this group will more closely match those drawn on the map if the Hillshade layer is also turned on. A layer that is a member of a group will only be visible if both the member layer and the group-name layer are turned on. Because of the nature of the groups in this plate, only one layer should be displayed at a time within a given group.



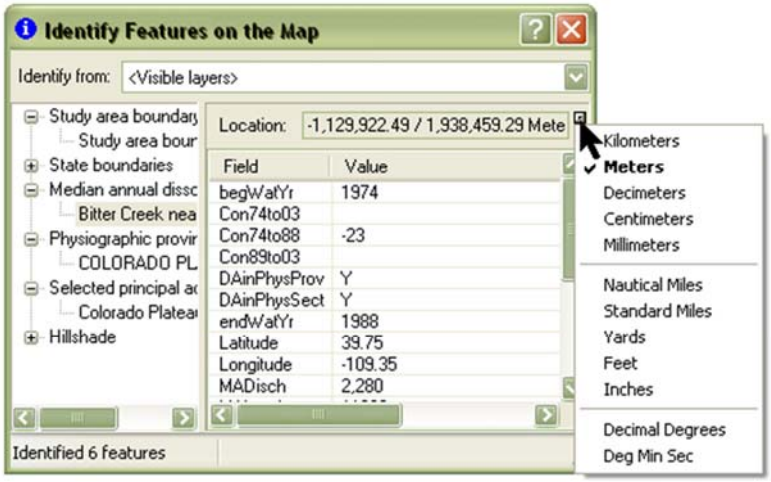
Using the Identify tool

The **Identify** tool allows the user to see which features are at a specific location and to investigate the attributes of features.

- Click on the **Identify** tool. The *Identify Features on the Map* window opens. By default, the *Identify from* dropdown list is set to <*Top-most layer*>. Other options include <*Visible layers*>, <*All layers*>, or the user can select an individual layer.
- Click on a point of interest in the map display. Results are displayed by layer name.
- Click on a layer name to view the attributes for individual features in that layer. A hyperlink field will display the hyperlink symbol (). See table 2 for a description of each field, and the units for the listed values of each field. The example to the right shows that the median annual load at Bitter Creek near Bonanza, UT was 11,900 tons/year for 1974 to 1988.
- Double-red arrows show places where the mouse can be used to expand window for easier viewing.



- The coordinates of the feature or feature part that is being queried are displayed in the *Location* box. The default coordinates are the units of the map projection. The units can be changed by clicking on the small box located above the upper right corner of the *Location* box.



Using the Find tool

The **Find** tool allows the user to search for and locate features based on a name or value. The example below shows how to locate surface-water-quality-monitoring sites on the Rio Chama.

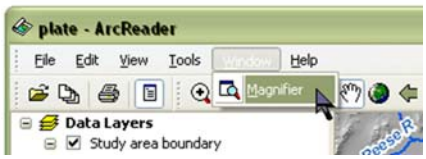
- Click on the **Find** tool.  . The *Find* dialog window opens. Type "Rio Chama" in the *Find* text box. Use the *In Layers* dropdown arrow to select one of the layers in the "Surface-water-quality-monitoring sites" group. Click the *Find* button.

- A list of sites that have fields that contain the text string "Rio Chama" is displayed in the Results section of the window. To navigate to or learn more about one of the sites, right-click on one of the rows to show the context menu.

The Magnifier Window

The magnifier window works like a magnifying glass. A magnified view of the data under the window is displayed in the magnifier window as it is moved around in the map display.

- To open a magnifier window, click the **Window** menu and click *Magnifier*. Drag the magnifier over the data to see a magnified view. Right-click inside the magnifier window to access various settings.



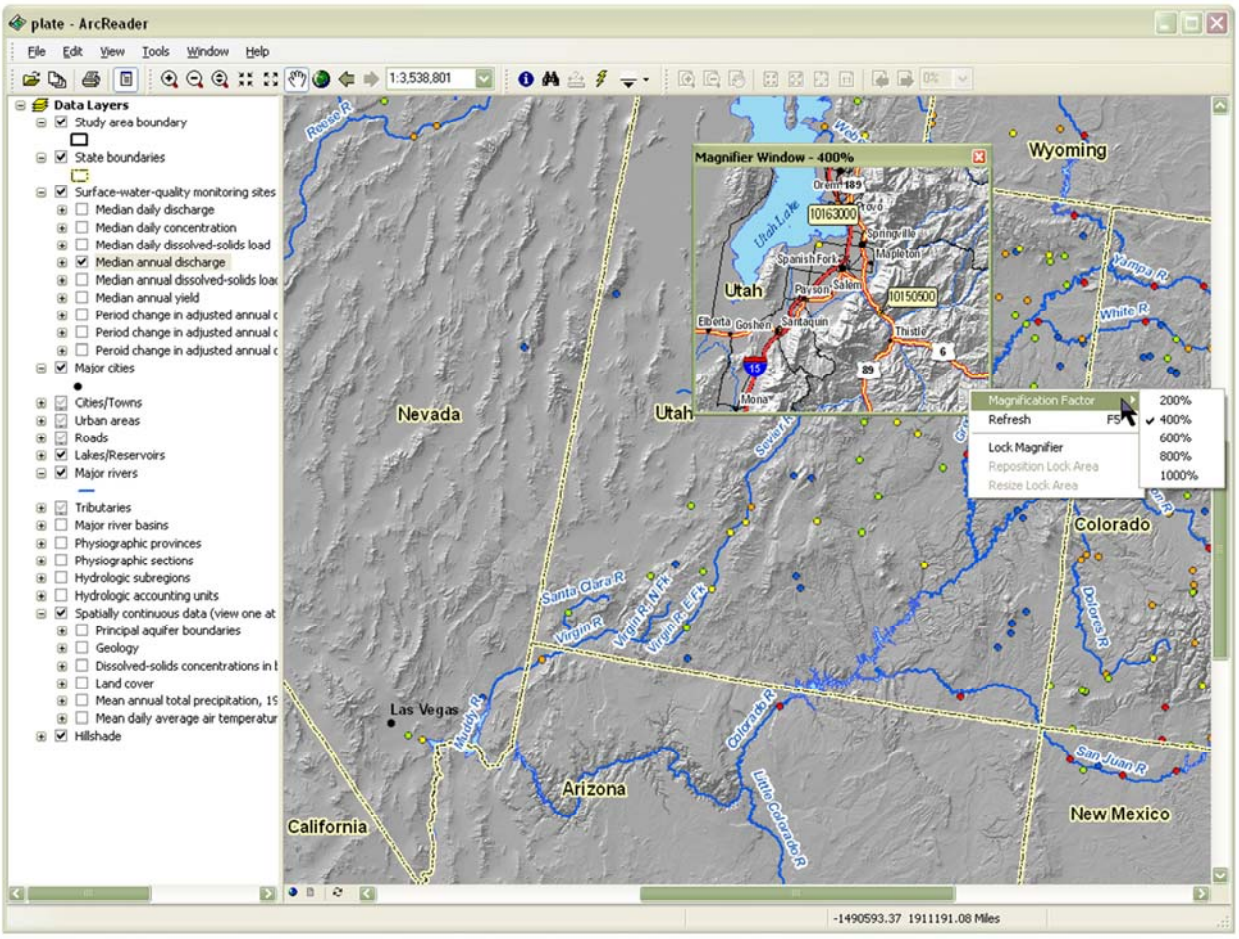


Table 1. Description of data layers in the interactive digital plate.
[--, not applicable; USGS, U.S. Geological Survey; NWIS, National Water Information System; ESRI, Environmental System Research Institute, Inc.]

				Viewable scale range	
Layer name	**General description**	**Type**	**Source**	**data**	**labels**
Study area boundary	Study area boundary.	Polygon	Determined as part of this study.	All	--
State boundaries	State boundaries.	Polygon	Digital data from USGS (2006).	All	All
Surface-water-quality monitoring sites	USGS surface-water-quality monitoring sites used in this study that have concentration, discharge, load, yield, and in some cases, trend data available for display.	Point	Data computed as part of this study on the basis of data in NWIS.	All	Minimum 1:1,500,000
Roads	Interstates, highways, and roads in the study area.	Line	ESRI Data & Maps	Minimum 1:1,200,000	Same as data
Major cities	Selected major cities in and around the study area.	Point	ESRI Data & Maps	Minimum 1:1,200,000	Same as data
Cities/towns	Cities and towns in the study area.	Point	ESRI Data & Maps	Minimum 1:1,200,000	Same as data
Urban areas	Urban areas in the study area.	Polygon	ESRI Data & Maps	Minimum 1:1,200,000	Same as data
Lakes/reservoirs	Lakes and reservoirs in the study area.	Polygon	USGS National Atlas	All	Minimum 1:1,000,000
Major rivers	The main stem rivers of the major river basins as defined in this study. Attributes for this layer include results from the SPARROW model.	Line	Enhanced original river reach network (U.S. Environmental Protection Agency, 1996, and DeWald and others, 1995). Digital data from Nolan and others (2002).	All	All
Tributaries	Tributaries to the main stem rivers of the major river basins as defined in this study. Attributes for this layer include results from the SPARROW model.	Line	Enhanced original river reach network (U.S. Environmental Protection Agency, 1996, and DeWald and others, 1995). Digital data from Nolan and others (2002).	Minimum 1:3,000,000	Minimum 1:500,000
Major river basins	Major river basins as defined in this study.	Polygon	Major river basins were defined in this study on the basis of hydrologic subregions. Digital data created in this study by using boundaries defined by Seaber and others (1987).	All	All
Physiographic provinces	Illustrates the extent of physiographic provinces.	Polygon	Defined by Fennemen (1931). Digital data from U.S. Geological Survey (2004c).	All	All
Physiographic sections	Illustrates the extent of physiographic sections.	Polygon	Defined by Fennemen (1931). Digital data from U.S. Geological Survey (2004c).	All	All
Hydrologic subregions	The hydrologic unit system subdivides the United States into nested basins at four different spatial levels: regions, which are the largest basins and contain subregions, which in turn contain accounting units, which in turn contain cataloging units. This layer illustrates the extent of hydrologic subregions.	Polygon	Defined by Seaber and others (1987). Digital data from Steeves and Nebert (1994).	All	All

Table 1. Continued.

Layer Name	General description	Type	Source	Viewable Scale Range: Data	Viewable Scale Range: Labels
Hydrologic subregions	The hydrologic unit system subdivides the United States into nested basins at four different spatial levels: regions, which are the largest basins and contain subregions, which in turn contain accounting units, which in turn contain cataloging units. This layer illustrates the extent of hydrologic subregions.	Polygon	Defined by Seaber and others (1987). Digital data from Steeves and Nebert (1994).	All	All
Hydrologic accounting units	Illustrates the extent of hydrologic accounting units.	Polygon	Defined by Seaber and others (1987). Digital data from Steeves and Nebert (1994).	All	All
Selected principal aquifer	Illustrates the extent of principal aquifers.	Polygon	Defined by Miller (2000). Digital data from U.S. Department of Interior (2006).	Maximum 1:225,000	--
Geology	Illustrates general bedrock geology. Units are lumped by rock type, and for sedimentary rocks, age, and general yield of dissolved solids.	Polygon	Original units determined by King and Beikman (1974). Digital data from Shruben and others (1997). Grouping of geologic units was determined as part of this study.	Maximum 1:225,000	--
Dissolved-solids concentrations in basin-fill aquifers	Illustrates general distribution of specific ranges of dissolved-solids concentrations in basin-fill aquifers.	Polygon	These data were compiled from numerous reports as well as the NWIS as part of this study. Details of these sources are listed in table M1.	Maximum 1:225,000	--
Land cover	Illustrates general distribution of land uses and vegetation that cover the land surface.	Image	Digital data from U.S. Geological Survey (2005a). Resampled to 1-kilometer grid as part of this study for display purposes in the plate.	Maximum 1:2,000,000	--
Mean annual total precipitation, 1980–97	Illustrates general variation of mean annual total precipitation, 1980–97.	Image	Daymet (2006). Converted units to inches as part of this study.	Maximum 1:500,000	--
Mean daily average air temperature, 1980–97	Illustrates general variation in mean daily average air temperature, 1980–97.	Image	Daymet (2006). Converted units to Fahrenheit as part of this study.	Maximum 1:500,000	--
Hillshade	Illustrates general topography and physiography of the land and was derived from a digital elevation model.	Grid	Digital elevation model from U.S. Geological Survey (2003).	Maximum 1:225,000	--

Table 2. Description of data-layer attributes in the interactive digital plate
[--, not applicable; NWIS, National Water Information System; USGS, U.S. Geological Survey]

Layer name	Attribute field name	Attribute description	Units
Study area boundary	--	Study area boundary.	--
State boundaries	NAME	Name of state.	--
Surface-water-quality monitoring sites	begWatYr	Indicates the beginning water year for which stream discharge, concentration, load, and yield information were determined.	Year
	Con74to03	Indicates the change in dissolved-solids concentration, after adjusting for variation in concentration due to variation in discharge that occurred from 1974 to 2003. The amount of change is expressed as a percentage of the concentration for the base year (usually 1974).	Percent
	Con89to03	Indicates the change in dissolved-solids concentration, after adjusting for variation in concentration due to variation in discharge that occurred from 1989 to 2003. The amount of change is expressed as a percentage of the concentration for the base year (usually 1989).	Percent
	DAinPhysProv	Indicates whether or not the site drainage basin is almost entirely within physiographic province of site location.	--
	DAinPhysSect	Indicates whether or not the site drainage basin is almost entirely within physiographic section of site location.	--
	endWatYr	Indicates the ending water year for which stream discharge, concentration, load, and yield information were determined.	Year
	Latitude	Latitude of site.	decimal degrees
	Longitude	Longitude of site.	decimal degrees
	MADisch	Indicates median annual discharge at site. Time period for data varies by site.	Acre-feet per year
	MALoad	Indicates median annual dissolved-solids load at site. Time period for data varies by site.	Tons per year
	MAYield	Indicates median annual dissolved-solids yield at site. Time period for data varies by site.	(Tons per year) per square mile
	MDCon	Indicates median daily dissolved-solids concentration at site. Time period for data varies by site.	Milligrams per liter
	MDDisch	Indicates median daily discharge at site. Time period for data varies by site.	Cubic feet per second
	MDLoad	Indicates median daily dissolved-solids load at site. Time period for data varies by site.	Tons per day
	Ratio	Indicates relation of dissolved-solids concentration to specific conductance for each site. This ratio was used to compute a dissolved-solids concentration from specific conductance data if concentration data were unavailable for a given sample.	Milligrams per liter per microsiemen per centimeter
	SiteID	The USGS site identifier for site. The site identifier is hyper-linked to the NWIS home page for the site.	--
	SiteName	The USGS name for the site.	--
	SiteNWISURL	The URL address for the NWIS home page for the site.	--
Major cities	NAME	The name of the city.	--
Cities/towns	NAME	The name of the city or town.	--
Urban areas	NAME	The name of the urban area.	--
Roads	NAME	The name of the road.	--
Lakes/reservoirs	NAME	The name of the lake or reservoir.	
Major rivers, Tributaries	DAREA	Drainage area for reach catchment of interest and all upstream reach catchments.	Square miles
	NAME	The name of the stream reach.	--
	PLOAD	Indicates predicted annual load for stream reach. Replaced with observed load for reaches with a stream-water-quality monitoring site.	Tons per year
	PLOADRC	Indicates predicted annual deliveries to stream reach from reach-catchment sources.	Tons per year
	RC_DAREA	Drainage area for reach catchment, which includes only the area that contributes runoff received by the reach of interest and excludes the drainage area for upstream reaches.	Square miles
	RVR_RCH	U.S. Environmental Protection Agency stream reach number.	--
	SE_PLOAD	Indicates standard error for predicted annual load, which is a measure of the data uncertainty.	Tons per year

Table 2. Continued.

Layer Name	Attribute Name	Attribute Description	Units
	SE_PLOADC	Indicates standard error for predicted annual deliveries from reach-catchment sources, which is a measure of the data uncertainty.	Percent
	SHARE_CPL	Indicates the share of the predicted annual load for the stream reach that originates from cultivated and pasture land sources.	Percent
	SHARE_CR	Indicates the share of the predicted annual load for the stream reach that originates from crystalline rock sources.	Percent
	SHARE_IW	Indicates the share of the predicted annual load for the stream reach that originates from imported water transported into the reach of interest and upstream reaches.	Percent
	SHARE_VR	Indicates the share of the predicted annual load for the stream reach that originates from volcanic rock sources.	Percent
	SHARERC_CPL	Indicates share of predicted annual reach-catchment deliveries from cultivated and pasture lands.	Percent
	SHARERC_IW	Indicates share of predicted annual reach-catchment deliveries from water imported to reach catchment.	Percent
	SHARERC_SED	Indicates share of predicted annual reach-catchment deliveries from sedimentary and eugeosynclinal rocks.	Percent
	SHARERC_VR	Indicates share of predicted annual reach-catchment deliveries from volcanic rocks.	Percent
	SHARERE_CR	Indicates share of predicted annual reach-catchment deliveries from crystalline rocks.	Percent
	WATERID	Unique identifier for stream reach.	--
Major river basins	NAME	The name of the major river basin.	--
Physiographic provinces	NAME	The name of the physiographic province.	--
Physiographic sections	PNAME	Province name for the given physiographic section.	--
	SNAME	The name of the physiographic section.	--
Hydrologic subregions	NAME	The name of the hydrologic subregion.	--
Hydrologic accounting units	NAME	The name of the hydrologic accounting unit.	--
Principal aquifer boundaries	NAME	The name of the principal aquifer.	--
Geology	UNIT	Bedrock geology unit name. Units are lumped by rock type, and for sedimentary rocks, age and general yield of dissolved solids.	--
Dissolved-solids concentrations in basin-fill aquifers	VALUE		Milligrams per liter
Land cover	ObjectID, Value, Count	Required fields for raster data.	--
	Grp	Numeric value indicating type of land cover: 1 - Urban Land 2 - Cultivated Land 3 - Pasture 4 - Barren Land 5 - Forested Land 6 - Grassland 7 - Shrubland 8 - Water bodies and other land	--
Mean Annual Total Precipitation, 1980-1997	Class value, Pixel value, ObjectID, Count	Required fields for raster data.	--
	Value	Mean annual total precipitation, 1980–97.	Inches
Mean Daily Average Air Temperature, 1980-1997	Class value, Pixel value, ObjectID, Count	Required fields for raster data.	--
	Value	Mean daily average air temperature, 1980–97.	degrees Fahrenheit
Hillshade	Stretched value, Pixel value	Required fields for raster data.	--