
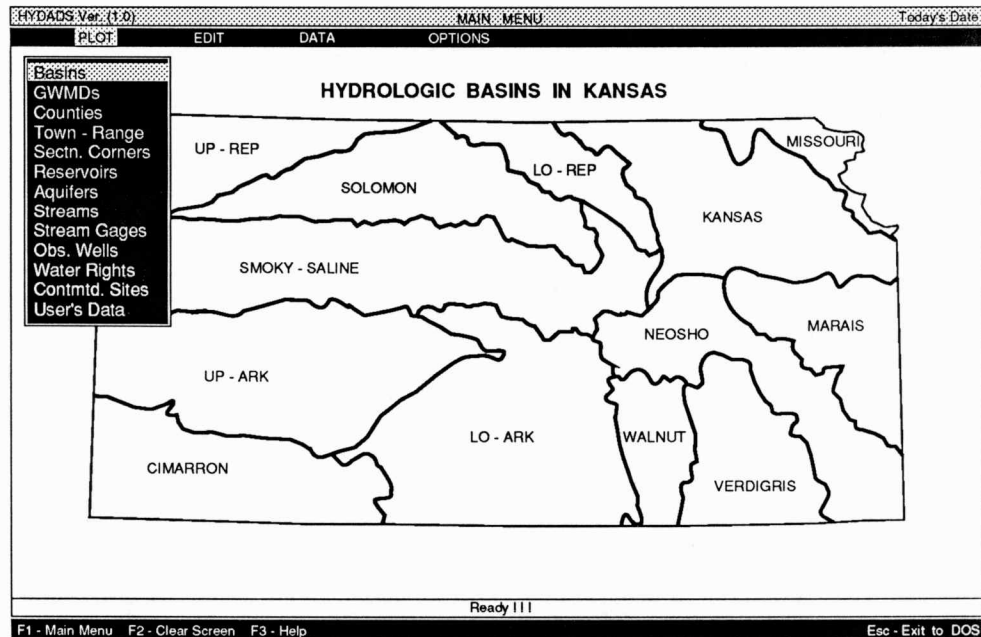


KANSAS GEOLOGICAL SURVEY



KGS Shaukat, N.
OF HYDADS-Hydrologic data access and
89-43 display system for Kansas

HYDADS - Hydrologic Data Access and Display System for Kansas



User's Manual
by
Nadeem Shaukat

Open File Report # 89-43
Kansas Geological Survey
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How to Get Help

- Use the instant help by highlighting the menu item and pressing function key F3.
- Refer to Chapter I for Hardware/Software considerations.
- Refer to Chapter II, "HYDADS Installation," for instructions on preparation of the system environment for HYDADS.
- Refer to Chapter V, "Using HYDADS," for detailed step by step instructions for HYDADS use.

If answers are not available from these sources, call Nadeem Shaukat at (913) 864-3965 between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Before calling, be prepared by having the following information at hand:

- The type of computer and display adapter.
- The contents of the AUTOEXEC.BAT file from the boot disk.
- The contents of the CONFIG.SYS file from the boot disk.
- As much information as possible relative to the problem, including the steps required to recreate it.

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CHAPTER I

Introduction

What is **HYDADS**?

The management of Kansas water resources depends heavily on the availability and quality of data. Since 1905, information on different water resources has been gathered and stored for use as reference materials. However, these data have not been recorded in a form immediately accessible to water-resources planners and investigators. In 1986, a program was initiated at the Kansas Geological Survey for storing readily accessible hydrological, hydrogeological, and water-resources information and statistics for each major hydrologic basin in the state.

The **HYdrologic Data Access and Display System (HYDADS)** is a pulldown-menu-driven software system developed in Turbo Pascal for IBM-AT personal computers or compatibles. This software enables water-resources planners and investigators to instantly plot basins, ground-water management districts, streams, reservoirs, stream-gage stations, active pumping wells, contaminated sites, and observation wells in Kansas and to access a variety of information about them. Any information attached to the features displayed on the monitor can be retrieved, examined, and then saved on a disk file for later use. A data base for these capabilities is part of **HYDADS**.

The system also allows the user to edit the graphic images plotted on the screen with additional features such as lines, circles, rectangles, and triangles. Any location plotted on the screen can be digitized to the state coordinate system and stored on a disk file. The screen images can be labeled with a variety of letter fonts and printed out on a plotter or printer. The paint and cut/paste facilities provide the freedom to erase or modify the images produced on the screen. Multiple layers of new information can be added and then saved onto ordinary disk files for future reference.

HYDADS lets the user "zoom" images to multiple magnifications, enabling a more comprehensive view of the selected area. Variable-size circular and rectangular "windows" permit the user to mark more specific areas of interest and retrieve additional information.

HYDADS will allow the user to make certain modifications to the accompanying data base. Other data sets may be added from a user's data bases via floppy or hard disks (see Chapter VI for details).

A number of utility programs also are provided with **HYDADS**. These programs support data conversions to a coordinate system acceptable to **HYDADS** and updates or modifications of the existing **HYDADS** data base. A utility program called **DISPLAY** redisplay images captured by **HYDADS** on screen.

Basic Assumptions

HYDADS does not require extensive previous computer experience to use. However, the user should have a basic knowledge of computer systems, including:

- Familiarity with computer basics, such as using floppy and hard disk drives, and the structure and use of directory-management systems.
- Knowledge of hardware configurations.
- Knowledge of the systems environment and how to modify it.
- Knowledge of commonly used DOS commands.
- Knowledge of hydrogeology and the basics of computing terminology such as integer or real numbers and how to define a format of data sets.

Hardware/Software Considerations

The **HYDADS** program requires the following hardware and software considerations:

- Computer System : IBM-AT personal computer or compatible with MS-DOS 2.0 or later
- Hard Disk : approximately 20 MB for system files and a complete data base
- Floppy Drive : high-density drive (at least 1.2 MB) required for installation
- RAM Memory : at least 350 KB
- Graphics Card : VGA or EGA
- Monitor : color monitor with 640x480 (VGA) or 640x350 (EGA) pixels resolution
- Mouse : optional (3 button preferred)
- Math Coprocessor : optional, but preferred
- Printer : optional with any graphics screen-dump software (not included with **HYDADS**)

How to Use this Manual

The HYDADS user's manual has been designed to provide detailed information about the use of the system and is divided into the following sections:

- **Chapter II - Getting Started:** includes information on the contents of the HYDADS disks, making backup copies of the disks, and installation of HYDADS onto the hard disk. Preparation of the system environment for running HYDADS is also explained in this chapter.
- **Chapter III - HYDADS Menus:** explains each of the HYDADS menus, and how and when they should be used.
- **Chapter IV - HYDADS Data Base:** discusses the contents, source, and reliability of the HYDADS data base.
- **Chapter V - Using HYDADS:** explains the use of HYDADS. Each of the options available on the HYDADS menu is explained.
- **Chapter VI - HYDADS Utilities:** explains the utility programs that have been developed for the user to support maximum use of HYDADS.
- **Chapter VII - Frequently Asked Questions:** contains frequently asked questions and the answers.

CHAPTER II

Getting Started

In this chapter, the contents of each disk in the **HYDADS** package are listed. Making back-up copies and preparation of the system environment for **HYDADS** are discussed, and instructions for the installation of **HYDADS** onto the computer system are covered in this chapter.

Contents of **HYDADS** Disks

Before installation, check the materials enclosed with this package. There should be:

- three system disks
- 22 data disks
- HYDADS** reference manual

The 22 data disks contain hydrologic data for the entire state of Kansas. The individual user's needs will determine which portions of the data will be installed on the system. A summary of the contents of **HYDADS** disks follows:

Disk	Name	Files	Explanation
System Disk #1	HYDMOUSE.EXE		HYDADS for use with a mouse
	HYDKBD.EXE		HYDADS for use with a keyboard
	INSTALL.EXE		HYDADS installation program
	CONVERT.EXE		Coordinate conversion utility
	DISPLAY.EXE		Utility to redisplay images captured by HYDADS
	ASCI2BIN.EXE		Utility to convert HYDADS data from ASCII to binary format
System Disk #2	BIN2ASCI.EXE		Utility to convert HYDADS data from binary to ASCII format
	BASINALL.VGA		VGA image for all basins in Kansas
	BASINALL.EGA		EGA image for all basins in Kansas
	GMDS.VGA		VGA image for all ground-water management districts in Kansas
System Disk #3	GMDS.EGA		EGA image for all ground-water management districts in Kansas
	HYDADS.HLP		Help file
	LEOBASE.DAT		Geographical data base used with CONVERT utility
Data Disk #1	*****.DAT		Boundary-data files for all basins

Data Disk #2	*****.DAT	Boundary-data files for all ground-water management districts
Data Disk #3	*****.DAT	County-lines data files
Data Disk #4	*****.DAT	Township-range-lines data files
Data Disk #5	*****.DAT	Section-corners data files
Data Disk #6	*****.DAT	Water-rights data files
Data Disk #7,8	*****.DAT	Water-level data files
Data Disk #9	*****.DAT	Surface-reservoirs data files
Data Disk #10	*****.DAT	Data files for location of stream-gage stations and contaminated sites
Data Disk #11-22	*****.DAT	Stream-location data files

Note: The '*****' represents the file name corresponding to the basin or region name.

Backing Up your Disks

Due to the volume of the data base, double-sided, high-density (1.2-MB) disks have been used for storing this information in order to maintain a manageable number of disks. Before installing **HYDADS**, back-up copies should be made. Twenty-five double-sided, high-density (1.2-MB) floppy disks will be required to copy all **HYDADS** system and data files. Assuming that the disk drive is **A:** these steps should be followed:

- Make your current drive **C:**
- Type **DISKCOPY A: A:**
- Follow the DOS instructions on the screen
- Label the back-up disk as on the **HYDADS** disk using a soft-tip pen
- Repeat this process for each disk
- Store all original disks in a safe place

HYDADS Installation

The **HYDADS** installation program tailors the **HYDADS** menus and data base to the geographical regions and menu items chosen by the user. The **INSTALL** program may be run as often as desired, enabling the user to choose different menu items and geographical regions at different times depending on what information is needed.

Installing **HYDADS** more than once will not delete the data files for the regions chosen in previous installations. Instead it will add new data files for the newly selected regions. Unused files and sub-directories from the **HYDADS** data base can be

moved to a floppy disk for storage by using DOS commands. For complete information on the **HYDADS** directory structure, please refer to Appendix A.

- To begin installation, place the **HYDADS** system disk #1 into the high-density disk drive and change directory to that drive.
- Type **INSTALL**.

Pressing should bring the installation screen (Figure 2.1) up on the monitor. and can be used to change the field, and and can be used to change the options (Yes/No). The current field will always be highlighted.

Press to exit to DOS at any time. recalls the default settings, and pressing starts installation of **HYDADS** with the options selected on the screen.

Selecting Input Device

The **HYDADS** program is designed so that the user can input information with one of two devices. These two devices are the **KEYBOARD** and the **MOUSE**. If a mouse is available on the system, select the **MOUSE** option as an input device; using a mouse pointer on the screen is much faster than entering information through the keyboard. Selecting the **MOUSE** option also gives the user *freedom to choose the keyboard or the mouse* for inputting information. Selecting the **KEYBOARD** option limits the user to the keyboard only.

- Select one of the two options and move to the next field using .

Selecting Display Device

HYDADS supports two display-adaptor cards (video board), **EGA** (Enhanced Graphics Adapter) and **VGA** (Video Graphics Array). The adaptor cards have the necessary pixel resolution and color support to display graphic images. Pixel resolution and a reasonable number of colors are important when multiple layers of information are to be overlaid. **EGA** has 640H x 350V pixels resolution, while **VGA** has 640H x 480V pixels resolution. Both adaptors support simultaneous use of 16 colors from 64 palettes.

HYDADS Installation			
Input Device: Keyboard		Display Device: EGA	
HYDADS Directory: C:\HYDADS\			
Select Area(s) for Data Installation GWMDs GWMD #1: NO GWMD #2: NO GWMD #3: NO GWMD #4: NO GWMD #5: NO		Select Item(s) for Menu Installation Basins: GWMDs: Counties: Town-Range: Sectn. Corners: Reservoirs: Streams: Stream Gages: Obs. Wells: Water Rights: Contmtd. Sites: YES User's Data: NO	
Basins UP-REP: YES SOLOMON: YES LO-REP: YES KANSAS: YES MISSOURI: YES WALNUT: YES NEOSHO: YES MARAIS: YES UP-ARK: YES LO-ARK: YES CIMARRON: YES VERDIGRIS: YES SMOKY-SALINE: YES			
Use ↑ or ↓ to change the field. Use → or ← to change the option.			
ESC Escape to DOS		F1 Recall Default Settings	
		F2 Start Installation	


Figure 2.1 - HYDADS Installation Screen

- Determine the type of video card and monitor for the computer system and select the appropriate display device and move to the next field using



Selecting **HYDADS** Directory

HYDADS installation on your system's hard-disk drive requires creation of a directory so all system files, utility programs, and data files are organized and handled systematically in one place. The **HYDADS** system files and the complete data base for the state require about 20 megabytes (MB) of storage space on the hard disk. See Appendix B for disk space requirements.

The default setting for the **HYDADS** directory is **C:\HYDADS**. The drive and directory name can be changed by pressing  and typing a new drive and/or directory name. Several subdirectories will automatically be created in this directory during the installation process. The number and size of the data-base subdirectories will be determined by the number of items the user selects for menu installation.

Selecting the **Area(s)** for Data Installation

The geographical areas of the state have been categorized based on hydrologic basins and Groundwater Management Districts (GWMDs). Specific areas of interest can be selectively loaded onto the computer system depending on the user's needs. Selecting GWMDs for installation will turn the installation of all basins to 'NO'. Likewise, selecting any basin will turn the GWMDs installation to 'NO'. If no individual selections are made, all the basins will automatically be installed. *If GWMDs are selected for installation, **HYDADS** must be initiated by plotting GWMDs first and adding basin boundaries later. If basins are selected for installation, **HYDADS** must be initiated by plotting basins first, and adding GWMD boundaries later.*

- Highlight the GWMDs **OR** basins of interest and change the option to **YES** for the GWMDs/basins desired.

Selecting **Item(s)** for Menu Installation

As previously mentioned, the **HYDADS** menu can be tailored to the needs of the user. Items from the **PLOT** and **DATA** menus can also be chosen selectively for installation. If no individual selections are made, all items will automatically be

installed. **Basins** must be selected as a menu item in order to avoid system errors. Therefore, the user will not be able to change this option from YES to NO. Any other item can be selected or not, according to the user's needs and the availability of storage space on the hard disk.

The last item on the menu-selection list is **User's Data**. It is advisable to select this option for installation because it will give the user freedom to plot and retrieve information from other data sets with minor modifications via the floppy or hard drive (see CONVERT in chapter VI).

Start Installation

- Review the installation screen once again and make sure that all the selections made are correct
- Press **F2** to start installation
- Follow the series of instructions shown on the installation screen

The user will need to insert the appropriate **HYDADS** disk per the instructions on the installation screen so that system files and data files will load onto the assigned directories.

Installation time depends on the number and size of geographical regions and number of menu items selected for installation. When the installation process is completed, press any key to exit to DOS.

Preparing the System Environment

After running the **INSTALL** program the **CONFIG.SYS** file settings may need to be changed, or a **CONFIG.SYS** file created. The following steps can be performed to allow **HYDADS** and other utility programs to run:

- Access **CONFIG.SYS** file on the root directory. If none exists, use any text editor to create a file with this name.
- Enter: **Buffer = 10**
Files = 20
Device = pathname\ANSI.SYS

The pathname represents the drive and the directory name where the file ANSI.SYS is stored (example: C:\DOS\ANSI.SYS). Refer to the DOS manual for more details about the ANSI.SYS driver.

- Access AUTOEXEC.BAT file on the root directory and place the name **HYDADS** in the PATH command line. This will help you access files located in other directories while operating **HYDADS**.

If you have chosen to use MOUSE as an input device for **HYDADS**, you must load the input-driver file (MSMOUSE or MOUSE) through the AUTOEXEC.BAT file. Check the MOUSE reference manual for further instructions.

After these modifications have been made, reboot the system so that the new settings will take effect.

CHAPTER III

HYDADS MENUS

The Menu System

In order to best describe how the **HYDADS** menu system works, the user will be referred to Figure 3.1 throughout this chapter. Figure 3.1 shows how the **HYDADS** screen is split into these five regions:






- Region #1:** (**Title, Menu Status, Today's Date**) shows the **HYDADS** version number, the user's current menu status, and the current date.
- Region #2:** (**Main Menu**) lists the options available on the main menu.
- Region #3:** (**Display or Work Area**) is the display area; the selected plots will appear here along with associated data.
- Region #4:** (**Query Area**) is a communications region from **HYDADS** to the user.
- Region #5:** (**Function Keys Index**) is an index of the keyboard function keys for returning to the main menu, getting help, and returning to DOS.

HYDADS uses a multilayer menu system for selecting options. The first layer is designated as the **MAIN MENU**. The second and third layers of the menu are **sub-menus** categorized according to the subject of the main menu in which they are located. A variety of menu options can be chosen by way of "pull-down" and "pop-up" menus; the currently selected item is always highlighted. Further information about the highlighted option can be obtained by pressing the **F3** key for **HELP**. Playing with the menus will help the user understand how they work and how to move through them with ease.



Figure 3.1 - HYDADS Main Menu Screen

Selecting Menu and Menu Items

-  and  will move the user from menu to menu
-  and  will select the items from the current menu (the currently selected item will always be highlighted)
- Pressing  will execute the highlighted option





The current menu will appear on the status line (**Region #1**) of the screen.

If the **MOUSE** option is available:

- Move the mouse in a horizontal direction to move from menu to menu.
- Move the mouse in a vertical direction for selecting the item of choice.
- Pressing the left mouse button will execute the highlighted option.

Function Keys

Function keys have been programmed for use with the keyboard.

-  will return the user to the main menu from any level
-  clears the display area (**Region #3**)
-  accesses **HELP** - information on the current option
- Esc  will quit **HYDADS** and return to DOS

MAIN MENU

The **MAIN MENU** appears on the screen immediately following the **HYDADS** title screen. The main menu consists of **PLOT**, **EDIT**, **DATA** and **OPTIONS** (Figure 3.1).

PLOT Menu

The **PLOT** menu has items of geographical nature with their relationship or significance to hydrology, hydrogeology, or water resources. The geographical location of the features can be closed boundaries (basins, reservoirs), lines (counties, township-range, streams) or points (wells, contaminated sites). Items available under the **PLOT** menu (Figure 3.2) can be plotted on the screen individually or in multiple combinations using any of the 16 colors and 16 symbols available with **HYDADS**.

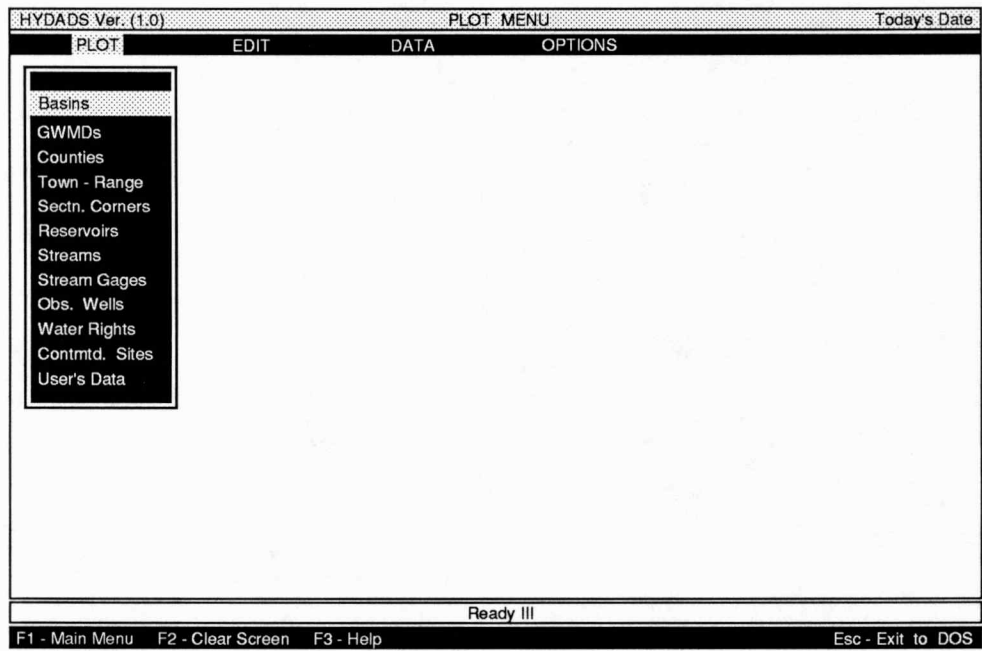


Figure 3.2 - HYDADS PLOT Menu

The names and number of items present on the **PLOT** menu are determined by the items selected during **HYDADS** installation.







EDIT Menu

The **EDIT** menu provides a variety of features for editing the images created on the screen by the **PLOT** menu. These features include

- drawing (lines, circles, rectangles, and triangles)
- labeling
- painting
- digitizing
- cutting/pasting

See Figure 3.3 to see the **HYDADS** edit menu. A number of text fonts, line patterns, and fill patterns are available on this menu.

DATA Menu

The **DATA** menu choices are the same as the **PLOT** menu choices. **DATA** retrieves the information associated with location selected in the **PLOT** menu. The data can be "clipped" to the plot with a variable-size circular, rectangular, or a 2-mile fixed-radius circular window. The clipped data can be seen page by page on the screen by using      and , and can then be saved on a disk file.

The **DATA** menu will always match the **PLOT** menu (Figures 3.2, 3.4).

OPTIONS Menu

The **OPTIONS** menu (Figure 3.5) allows the user to zoom out, save, show, and print images created on the screen. The pictures of all hydrological basins in Kansas and all Groundwater Management Districts can be displayed at any time if needed by selecting the "Show Basins" and the "Show GWMDs" options, respectively. A list of all symbols can also be displayed under this menu. The option 'Change Color' gives the user freedom to use all 64 palettes available on EGA/VGA video cards but restricts choice to only 16 colors at a time. Selecting the 'Default Colors' option brings all 16 basic colors back to your computer system. The option 'Delete Files' lets the user delete image files and user's data files in case these subdirectories become overcrowded.

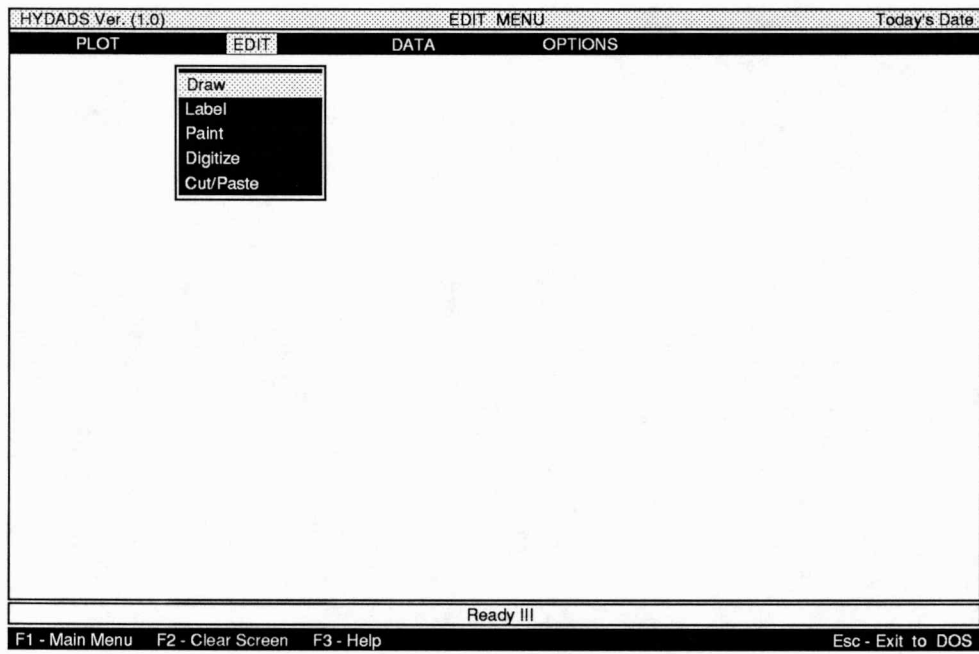


FIGURE 3.3 - HYDADS EDIT Menu

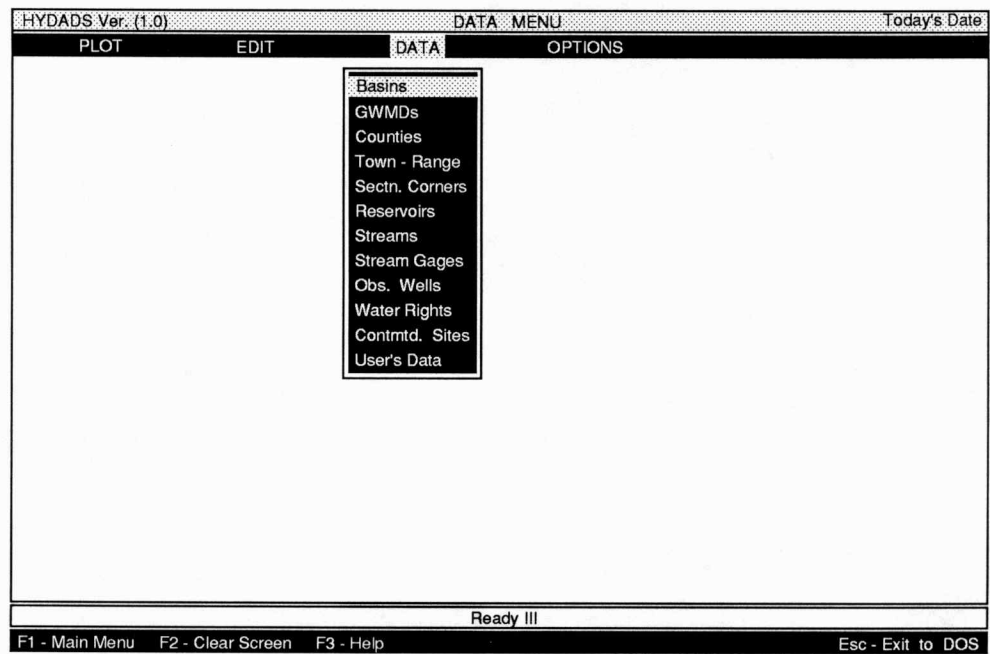


Figure 3.4 - HYDADS DATA Menu

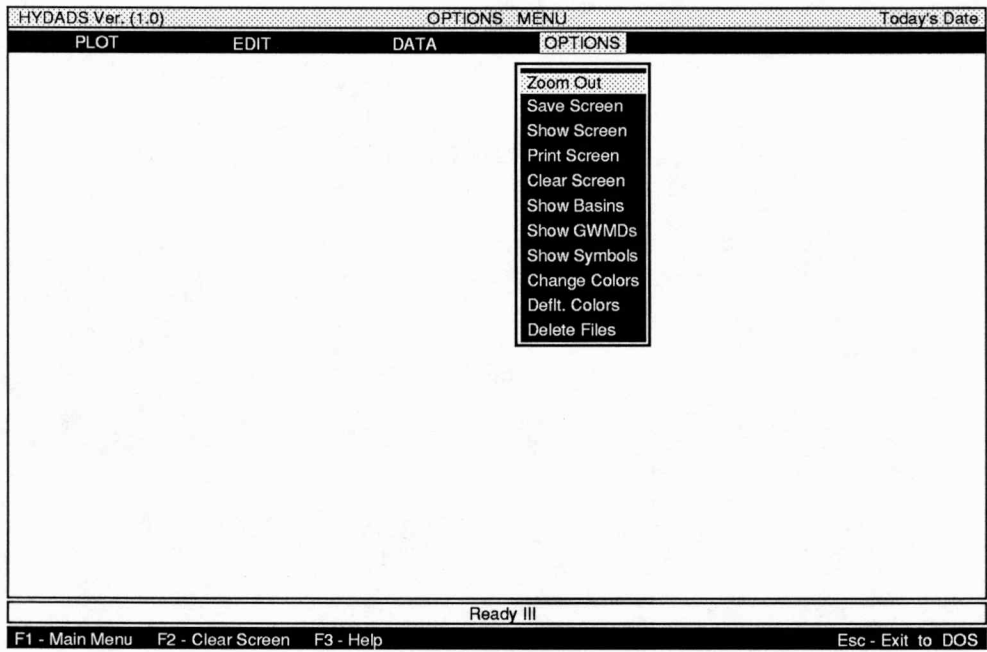


Figure 3.5 - HYDADS OPTIONS Menu

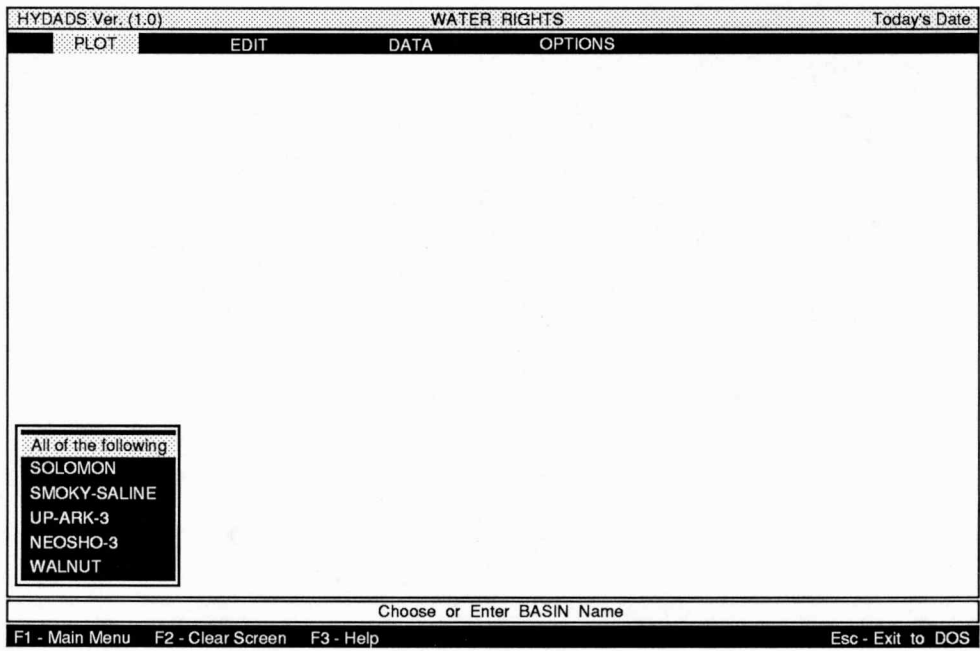


Figure 3.6 - HYDADS submenu for selecting basin for plotting water-rights

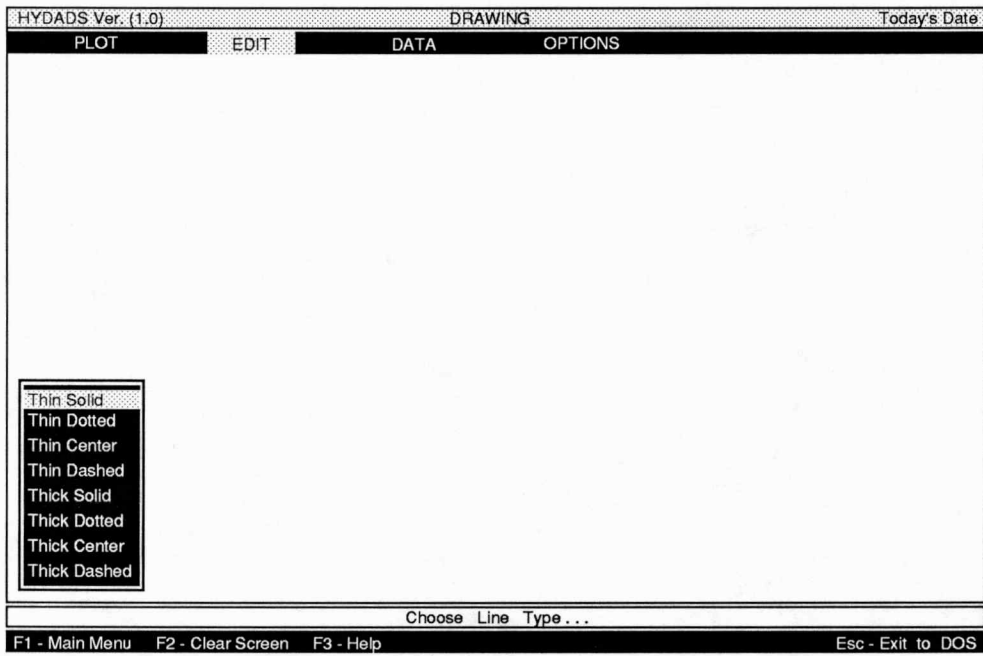


Figure 3.7 - HYDADS sub-menu for selecting line types for drawing lines

SUB-MENUS

SUB-MENUS are the second and third layers of the **HYDADS** menu system. These menus "pop up" on the screen when they are selected from one of the main menu items. The **SUB-MENUS** allow the user to select sub-regions of the geographical regions plotted on the screen and overlay different types of data onto the plotted image (Figure 3.6).

Some of the **SUB-MENUS** select windows for clipping data, while others provide options for different text fonts, line patterns, fill patterns, symbols, and colors. See Chapter V for details about using these options. Figure 3.7 shows a sub-menu used to select line type for drawing lines.

CHAPTER IV

HYDADS DATA BASE

The **HYDADS** data base consists of geographical features relevant to the hydrology, hydrogeology, and water resources of the state of Kansas. This includes hydrologic-basin boundaries, Groundwater Management Districts boundaries, county lines, township-range lines, section corners, streams, and surface reservoirs. These data have been digitized from 7.5-minute quadrangle topographic maps generated by Automated Cartography of the Technical Information Services Section at the Kansas Geological Survey (KGS). Digitization of these features has been carefully produced at high resolution to ensure excellent reliability.

Other information included in the data base include the underground water-levels measurements from observation wells, water rights, locations of stream-gage stations, and locations of contaminated sites in the state. State and Federal water-resources management agencies have provided these data sets for use in **HYDADS**.

Water levels were provided by the United States Geological Survey (USGS) under a cooperative program between KGS and USGS. The accompanying data for water levels contains the first yearly readings taken from 1930 to 1987 in all of the observation wells included in the program network. Records of this information include the year; the location by township, range, section, and quarter section; the water level in feet; and the basin name.

Water-rights information was obtained from the Division of Water Resources, Kansas State Board of Agriculture. Records in this data set consist of the application number; the location by township, range, section, and quarter section; the pumping rate (GPM) and quantity (ac-ft); the type of use; the source; and the basin name. The current data set includes information up to 1986.

The accompanying data set for stream-gage stations only includes location of the streams (courtesy of the USGS) at this time. Information about the stream levels for these stations is not yet available, but the necessary steps for adding this information to the existing data base are being developed.

The location of contaminated sites near surface- or ground-water resources is included in this package (obtained from the Kansas Department of Health and Environment). Information about the volume, extent, or hazardous nature of the contaminants is not available with this data base. If preliminary use of **HYDADS** indicates that this information would be helpful, it will be added to future versions.

Great effort has been made to make this data base as error free as possible. However, human errors must be expected and 100 percent reliability cannot be claimed.

Most of the files in this data base are formatted in a way such that the information requires minimum storage space and can be retrieved as efficiently as possible.

The user is given some ability to modify or update these data sets; the modification procedure is explained in Chapter VI.

CHAPTER V

USING HYDADS

Before running **HYDADS**, make sure the environment is properly set as explained in Chapter II.

Selecting the **HYDADS** Directory

To run **HYDADS**, log on to the **HYDADS** sub-directory from the root directory of the system. Assuming the root directory is **C:**, type

CD\HYDADS

and press to make **HYDADS** the current directory.

Running **HYDADS**

You are now ready to run the **HYDADS** program. Type:

HYDADS

and press . The **HYDADS** title page will appear on the screen (Figure 5.1). **HYDADS** will run until you quit the program by pressing .

Press any key to access the **HYDADS** main menu. Instructions to the user will appear at the bottom of the screen in **Field #4** (Figure 3.1). Any action performed successfully by **HYDADS** is confirmed with a single beep tone and is prompted on the screen by "**Ready!!!**". Any incorrect input will be blocked, and a double beep will sound to signal the user to re-enter the correct information.

The main menu appears with four options: **PLOT**, **EDIT**, **DATA**, and **OPTIONS** (Figure 5.2). Remember that if **HYDADS** is running on the system for the first time, the user **MUST** match the installation choice of either **Basin(s)** or **GWMD(s)**.

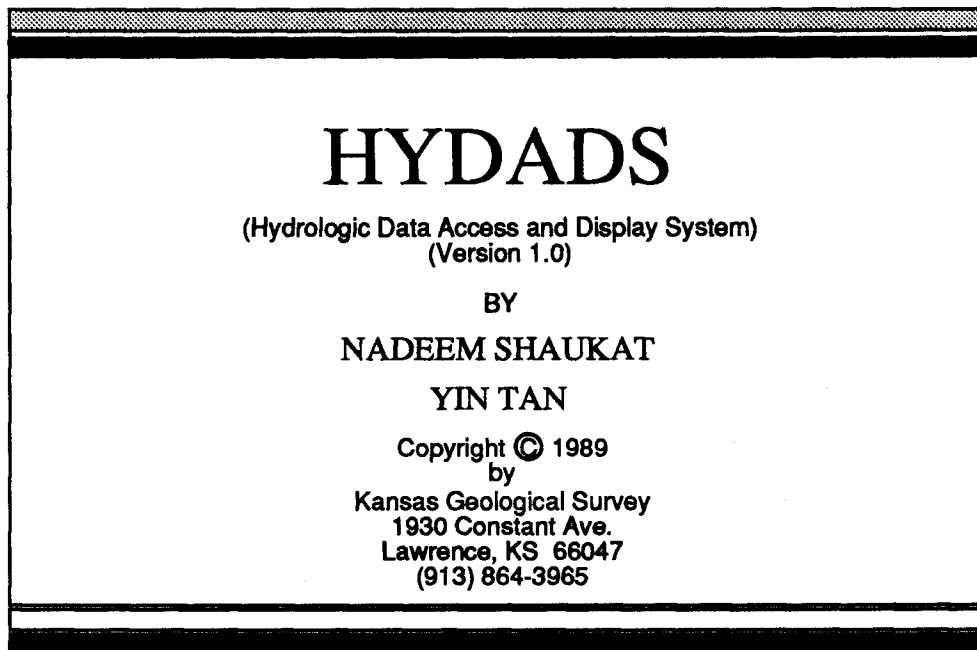


Figure 5.1 HYDADS Title Screen

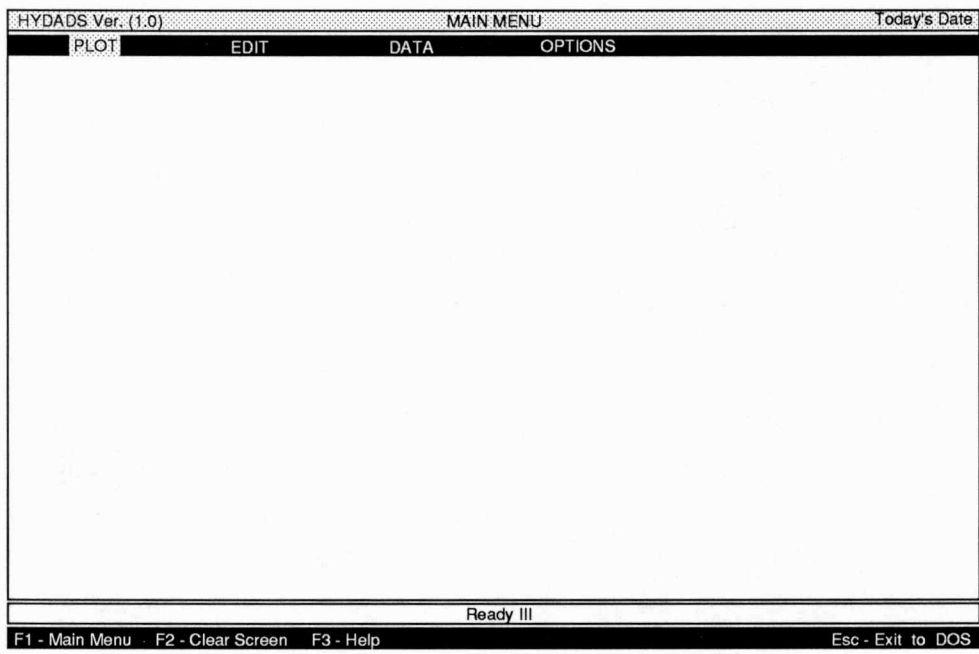


Figure 5.2 - HYDADS Main Menu

Creating the Primary Plot

As stated previously, input is made by using either a MOUSE or the KEYBOARD. The method for using each of these devices is basically the same for BASIN(s) as it is for GWMD(s):

Input by MOUSE

- Highlight the desired option from the PLOT menu and press the mouse left button
- A picture of all the basins or GWMDs with their names and a pointing arrow will appear on the screen
- Move the pointing arrow into the box on the screen with the basin/GWMD name or number you want to plot and press the mouse left button
- Select a color for the currently chosen option by pointing the arrow tip into one of the color boxes at the bottom of the screen and pressing the mouse left button
- Repeat this process for any number of basins/GWMDs you want to plot and press the mouse right button. Doing so will plot the selected option with respectively chosen colors

Input by KEYBOARD

- Highlight the desired option from the PLOT menu and press the key
- A picture of all basins or GWMDs in the state and their names will appear on the screen
- Enter the name of the main basin* or the number of the GWMD as it is written on the screen
 - *For sub-basins, add the number of the sub-basin next to the name of the main basin separated by a dash "-", (e.g., Up-Rep-1, Solomon-4, or NEOSHO-2). Typing in upper case or lower case does not have any effect on the basin names, but any misspelled basin name will cause a warning and you will be asked to re-type the correct name*
- After entering the properly spelled basin name, press to highlight the box of the selected basin/GWMD name
- Select a color by entering the color number from the colors index
- Repeat this process for the desired number of basins/GWMDs to be plotted and press twice to plot the selected item(s) on the screen

Plotting BASINS

Hydrologic-basin boundaries serve as the basic area for plotting additional information. There are 13 main hydrologic basins in Kansas which are further

subdivided into 91 sub-basins. Main basins are referred to by the Kansas Water Office with some abbreviation. Numbers are assigned to sub-basins arbitrarily for the purpose of data management.

NOTE: If basins are installed and GWMDs are not, you **MUST** begin by plotting basins first. GWMDs boundaries can be overlaid later but may not be filled with solid colors.

Plotting GWMDs

The Groundwater Management Districts (GWMDs) boundaries are also included in **HYDADS** because these districts manage the ground-water resources of the state within their own administrative territories. The districts' boundaries also serve as a base unit for plotting any information related to the districts. One or several districts in Kansas can be plotted at a time if the data for those GWMDs have been installed.

NOTE: If basins are installed and GWMDs are not, you **MUST** begin by plotting basins first. GWMDs boundaries can be overlaid later but may not be filled with solid colors.

Adding Information to the Primary Plot

The following options must be selected for addition to a plotted basin or GWMD. The use of the **MOUSE** and **KEYBOARD** may vary slightly according to the type of information selected for addition to the base plot.

Input by MOUSE

- Highlight the desired option from the **PLOT** menu and press the mouse left button
- Select a color for the desired outlines by pointing the arrow tip into one of the color boxes at the bottom of the screen and pressing the mouse left button

Input by KEYBOARD

- Highlight the desired option from the **PLOT** menu and press **Enter**
- Select a color by entering the color number from the colors index
- Press **Enter**

NOTE: Outlines for these options will be clipped automatically to the rectangular extremes of the region plotted on the screen.

Plotting **COUNTIES**

Counties are political and administrative territories divided by county lines which are available on **HYDADS**. Once basins or GWMDs are plotted on the screen, the county lines can be overlaid onto them.

Plotting **TOWNSHIP-RANGE**

The counties are further divided into townships and ranges for legal management of land use. The digitized data for these boundaries are also available on **HYDADS**. Once basins or GWMDs are plotted on the screen, the township-range lines can be overlaid on them.

Plotting **SECTION CORNERS**

Each township is further subdivided into 36 sections, each approximately one mile square. These sections are referred to by section numbers. Section 1 is in the northeast corner of the township. Sections 2 to 6 proceed to the west, with section 6 in the northwest corner. Section 7 is immediately below section 6, and sections 8 to 12 lie consecutively to the east from section 7. This snakelike pattern terminates with section 36 in the southeastern corner of the township. The digitized data for these section corners are also available on **HYDADS**; the numbering of these sections is not available at present. Once basins or GWMDs are plotted on the screen, the section corners can be overlaid with a '+' sign on them.

The reservoirs, streams, and stream-gages options employ the same MOUSE and KEYBOARD methods.

*Input by **MOUSE***

- Highlight the desired option from the **PLOT** menu and press the mouse left button. A sub-menu will pop up in lower left corner of the screen showing names of all of the selected options within boundaries of the region plotted on the screen
- Choose one or all of the desired options by highlighting and pressing the mouse left button
- Select a color for the option by pointing the arrow tip into one of the color boxes at the bottom of the screen and pressing the mouse left button. Doing so will show the selected option in the chosen color

Input by KEYBOARD

- Highlight the desired option from the **PLOT** menu and press **Enter**. A sub-menu will pop up in the lower left corner of the screen showing names of all of the selected options within boundaries of the region plotted on screen
- Choose one or all of the desired options by highlighting the option and pressing **Enter**
- Select a color by entering the color number from the colors index
- Press **Enter**. Doing so will show the selected option in the chosen color

Plotting RESERVOIRS

The accompanying data base for **HYDADS** contains the location of all major surface-water reservoirs in the state. The boundaries of these reservoirs can be overlaid and filled with one of the 16 colors available with **HYDADS** if basins or GWMDs are already plotted on the screen.

Plotting STREAMS

Streams play a major role in the interaction between surface and ground water and in feeding surface reservoirs with water. Digitized data for the location of all major streams in the state are available with the accompanying **HYDADS** data base. Once any basin or GWMD boundary is plotted on the screen, the location of streams can be overlaid with any one of the 16 colors available with **HYDADS**. The stream names are not presently available with this release.

Plotting STREAM GAGES

Stream-gage stations are the locations where the level and flow rate of water in the streams are measured. The **HYDADS** data base contains the location of these stations, which can be plotted if basin(s) or GWMD(s) are already plotted on the screen.

Due to differences in the type of information given for observation wells, water rights, and contaminated sites, slightly different MOUSE and KEYBOARD methods are used for each option.

Plotting **OBSERVATION WELLS**

Observation wells are wells included in the network of a cooperative program between the KGS and USGS for measuring and recording underground water levels. The locations and water-level data from 1930 to 1987 are available in this version of **HYDADS**.

*Input by **MOUSE***

- Highlight "Obs. Wells" from the **PLOT** menu and press the mouse left button
- Choose one or all basins and press the mouse left button
- Enter the year 'from' and 'to' for the time period you are interested in accessing (e.g., 75 or 1975 for 'from' and 80 or 1980 for 'to' for information from 1975 to 1980)
- Press
- Select a symbol for the observation well locations by pointing the arrow tip into one of the symbol boxes at the bottom of the screen and pressing the mouse left button
- Select a color

*Input by **KEYBOARD***

- Highlight "Obs. Wells" from the **PLOT** menu and press
- Choose one or all basins and press
- Enter the year 'from' and 'to' for the time period you are interested in accessing
- Select a symbol and press
- Select a color

NOTE: Due to the abundance of observation wells, selection of smaller size symbols is recommended.

Plotting **WATER RIGHTS**

For improved long-term management of water resources, surface- and ground-water rights are appropriated by the State government to users in order to maintain a balance between supply and demand. Any information about the current status of this balance is useful to water-resources planners for better resource planning and management. The locations of water-rights appropriations and associated information (quantity, rate, use, etc.) are included in this version of **HYDADS**.

Input by MOUSE

- Highlight "Water Rights" from the PLOT menu and press the mouse left button
- Choose one or all basins and press the mouse left button
- Select a symbol for the locations and press the mouse left button
- Select a color

Input by KEYBOARD

- Highlight "Water Rights" from the PLOT menu and press
- Choose one or all basins
- Select a symbol and press
- Select a color

NOTE: Due to the abundance of water-rights locations, selection of smaller size symbols is recommended.

Plotting CONTAMINATED SITES

In the present age of industrialization, refuse from chemical processes is a great threat to surface- and ground-water resources because of its hazardous nature to humans, animals, and vegetation. Avoiding pollution of our natural resources with these chemicals and organics is of great concern to water-resources researchers. The location of contaminated sites in the state is available in this version of HYDADS.

Input by MOUSE

- Highlight "Contmtd.Sites" from the PLOT menu and press the mouse left button
- Choose one or all basins and press the mouse left button
- A list of all contaminants present in the basin(s) will appear on the screen and an arrow will appear in the upper left corner of the screen
- Select the contaminant to be plotted by pointing the arrow into one of the boxes containing contaminant numbers and pressing the mouse left button
- Use the arrow tip to select a symbol for this contaminant and press the mouse left button
- Select a color
- Repeat this process for any number of contaminants to be plotted and press the mouse right button; doing so will show the contaminant(s) locations in selected basin(s) with the symbols and colors of your choice

Input by KEYBOARD

- Highlight "Contmtd.Sites" from the **PLOT** menu and press **Enter**
- Choose one or all basins and press **Enter**
- A list of all contaminants (with numbers) present in the basin(s) will appear on the screen
- Select the contaminant to be plotted by entering the number from one of the boxes containing contaminant numbers and pressing **Enter**
- Enter a symbol number for this contaminant and press **Enter**
- Select a color
- Repeat this process for any number of contaminants to be plotted, and press **Enter** *twice*; doing so will show the contaminant(s) locations in selected basin(s) with the symbols and colors of your choice

Plotting USER'S DATA

User's data can be any locations represented by geographical coordinates (longitude-latitude or township, range, section, quarter section) and any information associated with these locations. This data **MUST** belong to the region plotted on the screen and be processed by the 'CONVERT' utility available with **HYDADS** before plotting (see details in chapter VI).

Input by MOUSE

- Highlight "User's Data" from the **PLOT** menu and press the mouse left button
- Choose the file name and press the mouse left button
- If the option 'New Data File' is chosen from this sub-menu, type in a file name and a complete path name
- Select a symbol for these locations and press the mouse left button
- Select a color

Input by KEYBOARD

- Highlight "User's Data" from the **PLOT** menu and press **Enter**
- Choose the file name and press **Enter**
- If the option 'New Data File' is chosen from this sub-menu, type in a file name and a complete path name
- Select a symbol and press **Enter**
- Select a color

EDITING

The **EDIT** menu provides a variety of features to edit images created on the screen in the **PLOT** menu. These features include drawing, labeling, painting, digitizing, and cutting/pasting. A variety of text fonts, line patterns, fill patterns, and colors can be used in this option.

NOTE: Functions in this menu are performed by using a cross-hair, a window, and the arrow keys. The step-size movement for these tools can be adjusted by pressing alphanumeric keys before pressing the arrow keys. To set the step size to 1 pixel, press the "1", press "2" for 2 pixels, "A" for 10 pixels, "B" for 11 pixels, and so on. The default step size is 5 pixels.

Editing with **DRAW**

Input by MOUSE

- Highlight "Draw" from the **EDIT** menu and press the mouse left button
- Choose an option and press the mouse left button (If a line is selected from the sub-menu, a line type should also be selected)
- Select a color
- If a circle, triangle, or rectangle is selected for plotting, select a fill pattern. Move the cross-hair to the desired starting point of the selected option and press the mouse left button. Move the mouse to adjust the size of the option selected and press the mouse right button to form the triangle, circle, or rectangle
- If a line is selected for plotting, move the cross-hair to the desired starting point and press the mouse left button. Move the mouse to the opposite end of the line and press the mouse left button again to form the line. Press the mouse middle button to move the cross-hair to a new location on the screen, or mouse right button to quit the mode

Input by KEYBOARD

- Highlight "Draw" from the **EDIT** menu and press **Enter**
- Move the cross-hair using **↑**, **↓**, **→**, or **←**
- Increase or decrease the size of the figure using **↑** and **↓**
- If a circle, triangle, or rectangle is selected for plotting, press **Enter**
- If the line is option selected, press **Enter** to begin the line, move to the end of the line and press **Enter** again to end the line. Press **End** to move the cross-hair to a new location on the screen, or **Home** to quit the mode

Editing with LABEL

The Label option allows the **HYDADS** user to label images plotted on the screen using a variety of fonts in different sizes and colors.

Input by MOUSE

- Highlight "Label" from the **EDIT** menu and press the mouse left button
- Enter the text to be labeled and press
- Select a color
- Select one of the fonts from the sub-menu
- Move the cross-hair to the desired location of text to be labeled and press the mouse left button
- Use the mouse to make a rectangle for the text to fit in and press the mouse right button
- The text will be written horizontally or vertically depending on the direction of the rectangle. The text in a wide rectangle will be horizontal; the text in a tall rectangle will be vertical

Input by KEYBOARD

- Highlight "Label" from the **EDIT** menu and press
- Move the cross-hair using , , , or
- Increase or decrease the size of rectangle by using and
- Press to position text and then to enter text in rectangle

Editing with PAINT

The Paint option allows the **HYDADS** user to edit images plotted on the screen by removing existing features or filling areas with different colors.

Input by MOUSE

- Highlight "Paint" from the **EDIT** menu and press the mouse left button
- Select a brush tip from the sub-menu
- Move the mouse to change the size of brush tip and press the mouse left button
- Select a color
- With the mouse left button pressed, move the brush tip anywhere on the screen to paint
- Press the mouse right button to quit the paint mode

Input by KEYBOARD

Painting is not possible by KEYBOARD.

Editing with DIGITIZE

The Digitize option allows the **HYDADS** user to locate state or screen coordinate features on plotted images. If desired, the digitized data can be saved onto a disk file.

Input by MOUSE

- Highlight "Digitize" from the **EDIT** menu and press the mouse left button
- Select type of digitizing from the sub-menu
- Answer Y or N for saving the digitized data onto a disk file
- If answered Y, type in a file name for the new data to be saved in
- Move the cross-hair to the area to be digitized
- The digitized data in (X,Y) pairs will appear at the bottom of the screen
- Press the mouse left button to save the digitized locations onto the disk file
- Press the mouse right button to quit the digitize mode

Input by KEYBOARD

- Highlight "Digitize" from the **EDIT** menu and press
- Move the cross-hair using , , , or
- Press to save the digitized locations onto the disk file and to quit the digitize mode

Editing with CUT/PASTE

The Cut/Paste option allows the **HYDADS** user to modify images plotted on the screen by cutting features from one area and pasting them onto another area.

Input by MOUSE

- Highlight "Cut/Paste" from the **EDIT** menu and press the mouse left button
- Move the cross-hair to a "corner" of the image to be cut and press the mouse left button
- Use the mouse to form a rectangle around the area to be clipped
- Select an option to "keep the original" or "clip the original" from the sub-menu
- Use the mouse to move the clipped image to the desired location and press the mouse right button; this action will paste the clipped image into the new location

Input by KEYBOARD

- Highlight "Cut/Paste" from the **EDIT** menu and press **Enter**
- Move the cross-hair using **↑**, **↓**, **→**, or **←**
- Press **Enter** to select the clipped image. After the image has been moved to the desired location, press **Enter** to paste the clipped image in the new location

DATA

The **DATA** menu gives the user the same options as the **PLOT** menu but retrieves information relative to the current plotted image. The data can be clipped to the area of interest with a variable circular, rectangular, or a 2-mile fixed-radius circular window. The clipped data can be viewed page by page on the screen and be saved onto a disk file for later use.

The current version of **HYDADS** only contains data related to water rights, water levels in observation wells, and the user's data. Selection of any other item from this menu will cause the message "NOT AVAILABLE YET" to appear on the screen.

The observation wells, water rights, and user's data options employ the same MOUSE and KEYBOARD methods:

Input by MOUSE

- Highlight the desired option from the **DATA** menu and press the mouse left button
- Select window type from the sub-menu
- Move the cross-hair to the area of the image the user wishes to retrieve further data information for and press the mouse left button
- Use the mouse to increase or decrease the size of the window, then press the mouse left button; this will make the desired information appear on the screen
- If there is more information than can be viewed on one screen, the remaining data can be viewed by using **Page up** and **Page down**
- Press **Esc** to quit
- Answer Y or N to save the data
- If answering Y, type in a file name and the complete path name to save

Input by **KEYBOARD**

- Highlight the desired option from the **DATA** menu and press **Enter**
- Select window type from the sub-menu
- Move the cross-hair using **↑**, **↓**, **→**, or **←**
- Increase or decrease the size of the window using **↑** and **↓** keys
- If there is more information than can be viewed on one screen, the remaining data can be viewed by using **Page up** and **Page down**
- Press **Esc** to quit
- Answer Y or N to save the data
- If answering Y, type in a file name and the complete path name to save

OBSERVATION WELLS Data

Water levels measured through the KGS/USGS cooperative program from 1950 to 1987 are available with the **HYDADS** data base. Only the first reading of each year for this time period is available in this release. The year, legal location description, water level in feet, and basin name can be viewed for the observation wells currently plotted on the screen.

WATER RIGHTS Data

Water-rights information is available through 1986 with the **HYDADS** data base. This information contains the application number, legal location description, rate, quantity, use, source, and the basin name. The data can be retrieved and viewed for the water-rights locations currently plotted on the screen.

USER'S Data

This option allows the user to retrieve information from the user's data files in the **PLOT** menu. The information can be any alphanumeric list, but each record *must not be more than 255 characters long*.

NOTE: If the data listing of the user's file is longer than 80 columns, the screen can be scrolled to left and right by using **→** and **←** to view the additional data.

OPTIONS

The **OPTIONS** menu provides a number of facilities to zoom out, save, show, and print images created on the screen in the **PLOT** menu. Pictures of all hydrological basins and all Groundwater Management Districts can be viewed in this menu. Color palettes can be changed and files from **USER's** and **TEMPIMG** directories can be deleted by selecting items from this menu.

NOTE: Functions in this menu are performed by using a cross-hair, a window, and the arrow keys. The step-size movement for these tools can be adjusted by pressing alphanumeric keys before pressing the arrow keys. To set the step size to 1 pixel, press the "1", press "2" for 2 pixels, "A" for 10 pixels, "B" for 11 pixels, and so on. The default step-size is 5 pixels.

ZOOM OUT Option

Images plotted on the screen can be "zoomed out" for closer examination of the specific area of interest. Zoomed images can be rezoomed multiple times.

Input by MOUSE

- Highlight "Zoom Out" from the **OPTIONS** menu and press the mouse left button
- Move the cross-hair to a "corner" to be zoomed out and press the mouse left button
- Use the mouse to form a rectangle around the area of interest
- Press the mouse right button; this will zoom-out the image with all the original plotted features intact

Input by KEYBOARD

- Highlight "Zoom Out" from the **OPTIONS** menu and press the key
- Move the cross-hair using the , , , or keys, and press
- Increase or decrease the size of the window using and keys
- Press to zoom-out the image with all the original plotted features intact

SAVE SCREEN Option

Images plotted on the screen can be saved onto disk files for future use. All images saved with file names provided by the user are stored in a sub-directory, **TEMPIMG**, in the **HYDADS** directory. These images can be retrieved later by the selecting 'Show Screen' on the **OPTIONS** menu or by the 'DISPLAY' utility without loading **HYDADS**.

Input by MOUSE

- Highlight "Save Screen" on the **OPTIONS** menu and press the mouse left button
- Type in a file name for the current image and press
- If the file name already exists in the directory, the user will be asked if the existing file should be replaced. Answer Y or N. If N is chosen, give the file a new name as per the on-screen instructions

Input by KEYBOARD

- Highlight "Save Screen" on the **OPTIONS** menu and press
- Type in a file name for the current image and press
- If the file name already exists in the directory, the user will be asked if the existing file should be replaced. Answer Y or N. If N is chosen, give the file a new name as per the on-screen instructions

SHOW SCREEN Option

Images saved onto disk files with the "Save Screen" option can be redisplayed with the "Show Screen" option for data retrieval or for plotting additional information.

Input by MOUSE

- Highlight "Show Screen" on the **OPTIONS** menu and press the mouse left button
- Select the file name for the desired image and press the mouse left button

Input by KEYBOARD

- Highlight "Show Screen" on the **OPTIONS** menu and press
- Select the file name for the desired image and press the

PRINT SCREEN Option

Images from the screen can be printed **ONLY** if one of the commercially available screen-dump programs has been loaded previous to **HYDADS** installation. Packages such as **PIAZZ PLUS** are available in a price range of \$100 to \$200 and support a variety of printers. (Use of the 'PIAZZ PLUS' name should not be considered an endorsement; it is only used as an example).

Input by MOUSE

- Highlight "Print Screen" on the **OPTIONS** menu and press the mouse left button
- Press Shift-Print Screen keys; the printing mode of your loaded package will be accessed
- Follow the instructions from your printing package manual

Input by KEYBOARD

- Highlight "Print Screen" on the **OPTIONS** menu and press
- Press Shift-Print Screen keys; the printing mode of your loaded package will be accessed
- Follow the instructions from your printing package manual

CLEAR SCREEN Option

This option allows the user to clear the working or display area and remove unwanted images or create a fresh start for **HYDADS**.

Input by MOUSE

- Highlight "Clear Screen" on the **OPTIONS** menu and press the mouse left button

Input by KEYBOARD

- Highlight "Clear Screen" on the **OPTIONS** menu and press

SHOW BASINS Option

This option allows the user to view the location of all hydrological basins in the state and their names in case they are needed for reference while working with **HYDADS**.

Input by MOUSE

- Highlight "Show Basins" on the **OPTIONS** menu and press the mouse left button
- Press the mouse left button to remove the picture from the screen

Input by KEYBOARD

- Highlight "Show Basins" on the **OPTIONS** menu and press
- Press any key *except* to remove the picture from the screen

SHOW GWMDs Option

This option allows the user to view the location of all five Groundwater Management Districts in the state with their numbers if they are needed for reference while working with **HYDADS**.

Input by MOUSE

- Highlight "Show GWMDs" on the **OPTIONS** menu and press the mouse left button
- Press the mouse left button to remove the picture from the screen

Input by KEYBOARD

- Highlight "Show GWMDs" on the **OPTIONS** menu and press **Enter**
- Press any key *except* **Esc** to remove the picture from the screen

SHOW SYMBOLS Option

This option allows the user to view the list of symbols available with **HYDADS** for representing point locations on plotted regions.

Input by MOUSE

- Highlight "Show Symbols" on the **OPTIONS** menu and press the mouse left button
- Press the mouse left button to remove these symbols from the screen






Input by KEYBOARD

- Highlight "Show Symbols" on the **OPTIONS** menu and press **Enter**
- Press any key *except* **Esc** to remove these symbols from screen







CHANGE COLORS Option

This option allows the user to select a new set of colors from 64 palettes available on the video card.

Input by MOUSE

- Highlight "Change Colors" on the **OPTIONS** menu and press the mouse left button
- Select a color band by using  or  to form a rectangle around the desired choice
- Change color by using  and 
- Repeat this process for any colors to be changed
- Press  to save the new colors and exit this mode

Input by KEYBOARD

- Highlight "Change Colors" on the **OPTIONS** menu and press 
- Select a color band by using  or  to form a rectangle around the desired choice
- Change color by using  and 
- Repeat this process for any colors to be changed
- Press  to save the new colors and exit this mode

NOTES:

1. The colors choices on the menu cannot be changed.
2. Only 16 of the 64 color choices can be used at one time.
3. New color settings will be in effect until further changes are made or HYDADS is exited.

DEFAULT COLORS Option

This option allows the user to determine default settings of the colors on the video card.

Input by MOUSE

- Highlight "Deflt. Colors" on the **OPTIONS** menu and press the mouse left button

Input by KEYBOARD

- Highlight "Deflt. Colors" on the **OPTIONS** menu and press 

DELETE FILES Option

This option lets the **HYDADS** user delete unwanted files from the **USER FILES** and **TEMPIMG** directories at the user's discretion.

Input by MOUSE

- Highlight "Delete Files" on the **OPTIONS** menu and press the mouse left button
- Select directory
- Select file from the sub-menu in lower left of screen
- Press the mouse left button to delete file
- Answer Y or N for confirmation to delete file
- Repeat for all files to be deleted
- Press **Home** to quit

Input by KEYBOARD

- Highlight "Delete Files" on the **OPTIONS** menu and press **Enter**
- Select directory
- Press to **Enter** delete file
- Answer Y or N for confirmation to delete file
- Repeat for all files to be deleted or press **Home** to quit

CHAPTER VI

HYDADS UTILITIES

A number of utilities are provided with **HYDADS** for plotting the data created by the user or obtained from another source, modifying the existing data base, and redisplaying images captured by **HYDADS**. These utilities available are **DISPLAY**, **CONVERT**, **ASCII2BIN**, and **BIN2ASCII**.

DISPLAY

The **DISPLAY** utility allows the user to redisplay screen images captured by **HYDADS** without loading the **HYDADS** program. The image remains displayed on the screen until **Esc** is pressed.

All images captured by **HYDADS** are saved in a sub-directory called **TEMPIMG**. The file names are assigned by the user and an extension ".IMG" is automatically added to the file name.

The files **DISPLAY.EXE** and **HYDADS.CFG** must be present in the current directory in order to run the **DISPLAY** utility. The utility accepts the name of the image file from the command line following the **DISPLAY** command. It is not necessary to type .IMG as a file extension. For example,

DISPLAY IMAGE

will display an image saved in the file named **IMAGE.IMG** located in the **C:\HYDADS\TEMPIMG** directory.

If the file name is not typed following the command **DISPLAY**, the following prompt will appear

Enter the File Name:

Typing the file name of the desired image will bring that image onto the screen. Pressing **Esc** will remove the image from the screen.

NOTES:

1. If the message '**File "HYDADS.CFG" not Found!**' appears on the screen, the current directory does not contain the HYDADS.CFG file. Move to the directory containing "HYDADS.CFG" and try again.
2. Images captured by EGA (640 x 350 pixels resolution) cannot be displayed in the VGA (640 x 480 pixels resolution) mode. The following warning will appear on the screen: '**Cannot show EGA image with VGA mode!**' Images captured by VGA cannot be displayed in the EGA mode. The following warning will appear on the screen: '**Cannot show VGA image with EGA mode!**' Check the system's graphics mode and try again.
3. If the image file does not exist in the directory, the following error will appear on the screen: '**File "Filename" not found, Check C:\HYDADSTEMPIMG directory and Try Again!**'

CONVERT

Geographic and geologic data exist in three different reference systems; longitude-latitude, (X,Y), and township-range-section. It will be necessary to convert the user's data in order to plot it with **HYDADS**. The existing **HYDADS** data base uses an X,Y reference system on a 1:500,000 scale with Lambert Conformal Conic Projection for plotting on-screen. Any user data to be plotted with **HYDADS** must be consistent with this reference system. The **CONVERT** utility included in this package enables the user to convert files for use with **HYDADS**.

The **CONVERT** utility performs conversion for all three systems of coordinates. The program basically consists of FORTRAN 77 subroutines and an associated spatial data base "LEOBASE.DAT" for the state of Kansas. The subroutines and the LEOBASE were generated by Charles Ross of Automated Cartography of the Technical Information Services section of the Kansas Geological Survey and have been converted into Microsoft Fortran for the PC environment for use with **HYDADS**. **CONVERT.EXE** and **LEOBASE.DAT** must be present in the current directory in order to run this utility.

Preparing User's Data Files for HYDADS with CONVERT

Before running the **CONVERT** utility, delete the header/title of the data file so that the body of the data begins with the first line of the data. The data record should not exceed 255 characters. There are eight options available for coordinate conversion of the data. Either option 2 or option 4 (depending upon the nature of the data to be converted) is necessary before the data can be used by **HYDADS**. The other options may be selected according to the user's needs.

Proceed as follows to prepare your data file for use with **HYDADS**:

1. Access the directory containing the files: **CONVERT.EXE** and **LEOBASE.DAT**
2. Type **CONVERT** to run the utility.
3. (a) Option 2 converts longitude-latitude to (X,Y) coordinates.
(b) Option 4 converts legal descriptions (township, range, section, quarter section) to (X,Y) coordinates.
Enter the option according to the type of coordinate system of the data file.
4. (a) If option 2 is entered, the user will be asked if the longitude-latitude is in fraction form or degree-minute-second form. Enter 1 or 2 accordingly.
(b) If option 4 is entered, the user will be asked if the section quarters are in "bigger to smaller" or "smaller to bigger" order. Enter 1 or 2 accordingly.
5. After option 2 or 4 is completed, the user will be asked to enter the scale of the (X,Y) coordinates. Enter option 2 for 1:500,000, which is compatible with **HYDADS**.
6. Enter the input file name (user's data file name). Type in a complete path name if the data are in a different directory.
7. Type in the format of your data file. (Typing "L" will allow the user to view the first few lines of the user data file up to the 78th column of data.) Format entry is shown in the following examples:

Legal description:

For "T10 R35W 35ADB" enter: (1X,I2,2X,I2,A1,1X,I2,3A1)

For "7 33E 20NW NE SW" enter: (I2,1X,I2,A1,1X,I2,3A3)

Notes:

- The legal description in your data file must be ordered township, range, section, quarter section of section quadrangle.
- The range must indicate the direction, i.e. E for east or W for west.
- Using T for township and R for range does not make any difference, but these must be skipped by the X-format when entering the format.
- Leave the exact number of columns using the X-format if any data are followed by the legal location description.
- The legal description locations must be consistent, i.e. A,B,C,D cannot be mixed with NW,SW,SE,N2,NC.
- Section quarters can be expressed up to fourth level of accuracy.
- The quarter description *must not* be separated by more than one blank. For example, 'ABC', 'A D B C', or 'NW SW N2' are acceptable, but 'NW SW SE' will not be accepted.
- The quadrangle format *must always* be entered in a group format. For example, 3A1 for 'DCA', 3A3 for 'SW NW SE ' or 4A2 for 'B A C C '.
- The format entry must be typed in parentheses.

Longitude-latitude:

For -101.055 39.931, enter: (F7.3,1X,F6.3) or (2F7.3).

For 101-35-20 39-15-37, enter: (I3,1X,I2,1X,I2,1X,I2,1X,I2).

Notes:

- Longitude must be ordered first and latitude second.
- Leave the exact number of columns using the X-format if any data are followed by the legal location.
- The description of longitude-latitude must be consistent; i.e. degrees-minutes-seconds cannot be mixed with fractional expressions of longitude-latitude.
- Format entry must be typed in parentheses.

8. If you are interested in attaching any information from this data file to the location, type in the column numbers separated by a colon(:). Follow the instruction and an example on the screen. If not, just type N for No. Any information from the 1st to 255th column of your data file can be picked and attached to the location.
9. Enter the output file name for the new data to be saved in with (X,Y) coordinates.
10. Use any text editor to add a header to the output file created by the **CONVERT** utility. This header should be *exactly three lines*. Save this file for plotting the locations and retrieving the associated information with **HYDADS**.

ASCII2BIN and BIN2ASCII

These utilities allow the user to modify or update the existing data base for observation wells and water rights. All files for observation wells and water rights in the data base are in binary format. It will be necessary to convert them to ASCII format for modification and reconvert them back to binary format for further use with **HYDADS**.

The procedure for conversion follows:

- The data are organized in the files after coded basin names. Find the file name to be modified from a cross-reference list of the basin name in Appendix C.
- Copy the desired file from the appropriate data disk onto a floppy disk or the hard disk.
- Make the directory current where these utilities exist.
- Run **BIN2ASCII** by typing **BIN2ASCII**.
- Four options will appear on the screen. Option 1 is for observation wells data, option 2 is for water-rights data. Options 3 and 4 are for point data and line data, respectively. Enter the option according to the type of data.
- Enter the file name. Type in a complete path name and the file extension.
- Enter a new file name for converted ASCII-format file.
- Modify the file with any text editor.
 - (a) Each data record in the water-rights file is X-coordinate, Y-coordinate, application#, legal location, pumping rate (GPM), quantity appropriated (Ac-Ft), type of use, source.
 - (b) Each record in the observation-wells file is year, X-coordinate, Y-coordinate, legal location, number of wells at that location, water level in ft.
- Save the modified file and run the **ASCII2BIN** utility by typing **ASCII2BIN**.
- Enter the modified file name as an ASCII file name to convert it back to binary format readable by **HYDADS**.
- Rename the new binary file and copy it onto a floppy disk or hard disk for use with **HYDADS**.

CHAPTER VII

FREQUENTLY ASKED QUESTIONS

•*Can the **HYDADS** program be run from a floppy drive?*

No. The **HYDADS** image files and data base require more storage space than the space available on a floppy disk.

•*Is a high-density floppy drive required to install **HYDADS**?*

Due to the enormous volume of the digitized data base of **HYDADS**, double-sided, high-density (1.2-MB) floppy disks were used to make it available; otherwise, more than 70 disks would be required for the program and the data base. In addition, data transfer from high-density disks is simpler and much more efficient for shipping and handling. If a high-density drive is not available, special arrangements can be made.

•*Is an EGA or VGA color monitor required for **HYDADS** use?*

Yes. The EGA card and monitor are the minimum requirements. It is important to have a variety of colors and high resolution when multiple layers of information are to be overlaid. EGA is acceptable, however, VGA resolution produces a much sharper image.

•*Is a mouse necessary for running **HYDADS**?*

No, but providing information for **HYDADS** is much faster with a mouse than entering information through the keyboard. Therefore, a mouse is highly recommended. Only the **PAINT** option *requires* the use of a mouse.

•*Do I need a math coprocessor to run **HYDADS**?*

A math coprocessor is not necessary for running **HYDADS**, but it is recommended to improve the speed of data processing and image production.

•*How much storage space is needed to install **HYDADS** on a hard disk?*

It depends on the number and size of geographical regions and number of items chosen for installation. Please refer to Appendix B for complete information on storage-space requirements.

•*How much RAM memory is needed for loading **HYDADS**?*

HYDADS requires 250KB RAM for program execution, but an additional 100KB is required for image and data processing. If you have other memory-resident

programs loaded on your computer which do not leave this much RAM for **HYDADS**, they will need to be temporarily removed before running **HYDADS**.

•*Can the user's data be plotted with **HYDADS**?*

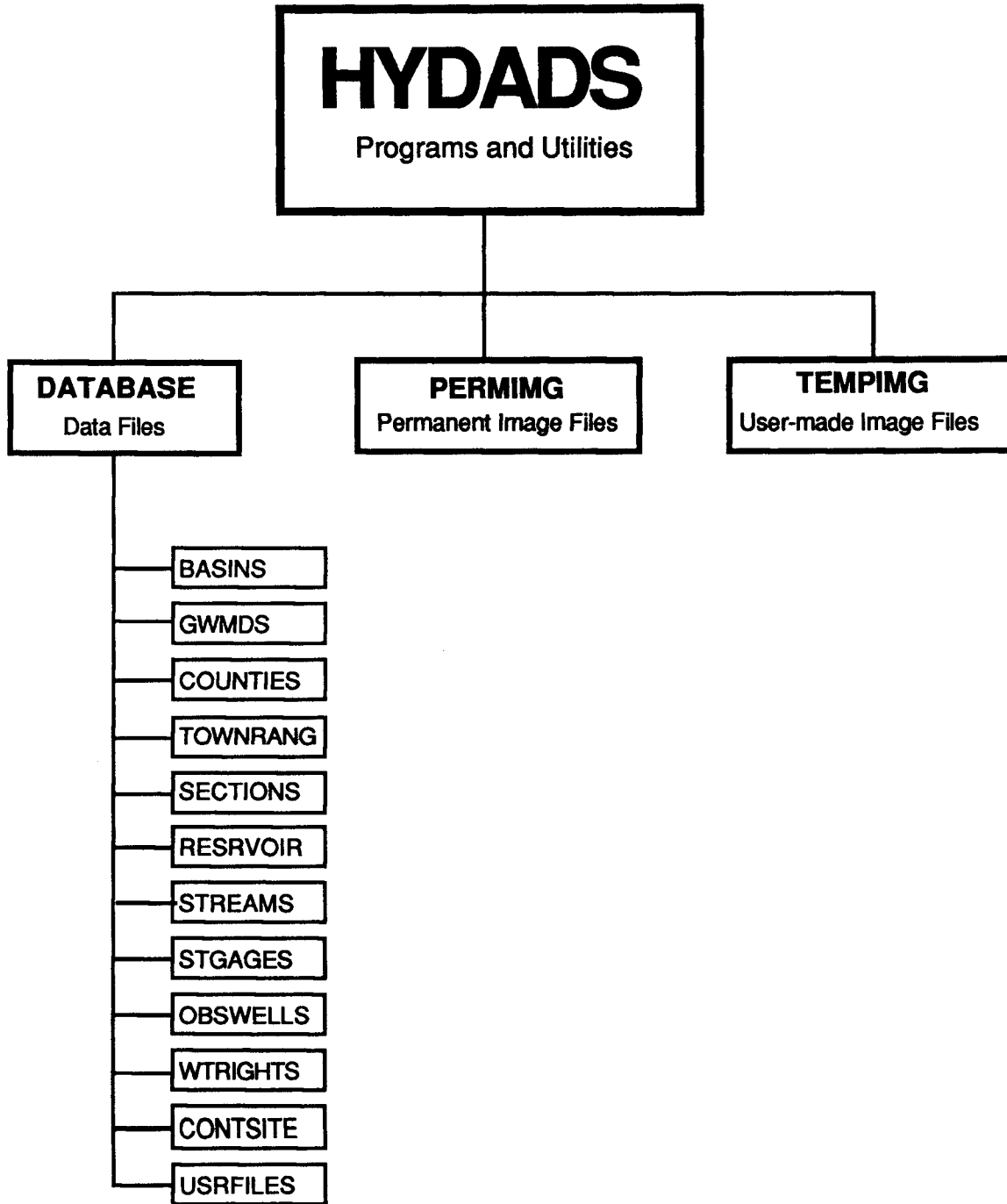
Yes. If the data locations fall within the boundaries of the geographical region plotted on the screen, the data can be plotted and information associated to those locations can be retrieved. See chapter V "Plot User's Data" and chapter VI "CONVERT" for details.

•*Can I print the screen images produced by **HYDADS**?*

Yes. However, one of the commercial printing packages currently available will be required. The **PIAZZ PLUS** packages supports more than 150 printers. These packages usually cost between \$100 and \$200.

Appendix A

HYDADS directory structure



Appendix B

(a) Hard-disk space (KBytes) required to install GWMDs data.

GWMD #	Basins	GWMDs	Counties	Town-Range	Sect.Corners	Reservoirs	Streams	Stream Gages	Obs. Wells	Wt. Rights	Cont. Sites	Total
1	39	6	24	69	86	-	721	19	268	114	30	1371
2	40	8	12	32	50	-	861	19	382	92	30	1522
3	88	14	37	111	159	-	1293	19	517	499	30	2762
4	109	16	26	101	120	32	1507	19	163	163	30	2461
5	84	10	29	79	113	10	1506	19	248	248	30	2354
total	300	53	127	391	526	42	4807	19	1392	922	30	8602

Program and Utilities - 1.5 megabytes

(b) Hard-disk space (KBytes) required to install BASINS data.

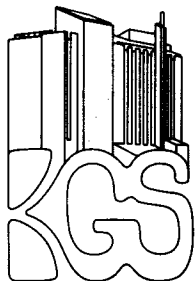
Basin Names	Basins	GWMDs	Counties	Town-Range	Sect.Corners	Reservoirs	Streams	Stream Gages	Obs. Wells	Wt. Rights	Cont. Sites	Total
UP-REP	70	16	54	176	236	7	534	19	181	85	30	1403
SOLOMON	96	16	92	242	348	33	1209	19	116	72	30	2268
LO-REP	41	-	66	141	229	27	563	19	139	37	30	1288
KANSAS	87	-	80	131	223	50	1458	19	63	52	30	2186
MISSOURI	68	-	80	131	223	-	205	19	2	3	30	804
WALNUT	27	-	45	141	200	7	401	19	16	9	30	888
NEOSHO	50	-	139	305	472	32	887	19	9	17	30	1955
MARAIS	44	-	89	207	309	32	687	19	2	14	30	1427
UP-ARK	78	30	89	259	357	-	1058	19	371	317	30	2602
LO-ARK	103	32	138	405	587	10	1445	19	440	184	30	3388
CIMARRON	52	14	77	233	328	-	457	19	220	186	30	1612
VERDIGRIS	46	-	48	143	200	22	629	19	1	11	30	1141
SMOKY-SALINE	134	29	177	487	689	41	1909	19	185	129	30	3824
total	890	53	292	782	1120	257	11435	19	1728	1111	30	17721

Program and Utilities - 1.5 megabytes

APPENDIX C

Cross-reference list between file names and basin names
for the water-rights and observation-wells data.

Basin Name	File Name	Basin Name	File Name	Basin Name	File Name
CIMARRON-1	A1.DAT	MARAIS-1	E1.DAT	UP-ARK-1	J1.DAT
CIMARRON-2	A2.DAT	MARAIS-2	E2.DAT	UP-ARK-2	J2.DAT
CIMARRON-3	A3.DAT	MARAIS-3	E3.DAT	UP-ARK-3	J3.DAT
CIMARRON-4	A4.DAT	MARAIS-4	E4.DAT	UP-ARK-4	J4.DAT
CIMARRON-5	A5.DAT	MARAIS-5	E5.DAT	UP-ARK-5	J5.DAT
CIMARRON-6	A6.DAT			UP-ARK-6	J6.DAT
CIMARRON-7	A7.DAT	MISSOURI-1	F1.DAT	UP-ARK-7	J7.DAT
CIMARRON-8	A8.DAT	MISSOURI-2	F2.DAT	UP-ARK-8	J8.DAT
CIMARRON-9	A9.DAT	MISSOURI-3	F3.DAT		
		MISSOURI-4	F4.DAT	UP-REP-1	K1.DAT
KANSAS-1	B1.DAT			UP-REP-2	K2.DAT
KANSAS-2	B2.DAT	NEOSHO-1	G1.DAT	UP-REP-3	K3.DAT
KANSAS-3	B3.DAT	NEOSHO-2	G2.DAT	UP-REP-4	K4.DAT
KANSAS-4	B4.DAT	NEOSHO-3	G3.DAT	UP-REP-5	K5.DAT
KANSAS-5	B5.DAT	NEOSHO-4	G4.DAT	UP-REP-6	K6.DAT
KANSAS-6	B6.DAT	NEOSHO-5	G5.DAT	UP-REP-7	K7.DAT
KANSAS-7	B7.DAT	NEOSHO-6	G6.DAT	UP-REP-8	K8.DAT
KANSAS-8	B8.DAT	NEOSHO-7	G7.DAT	UP-REP-9	K9.DAT
		NEOSHO-8	G8.DAT	UP-REP-10	K10.DAT
LO-ARK-1	C1.DAT			UP-REP-11	K11.DAT
LO-ARK-2	C2.DAT	SMOKY-SALINE-1	H1.DAT	UP-REP-12	K12.DAT
LO-ARK-3	C3.DAT	SMOKY-SALINE-2	H2.DAT		
LO-ARK-4	C4.DAT	SMOKY-SALINE-3	H3.DAT	VERDIGRIS-1	L1.DAT
LO-ARK-5	C5.DAT	SMOKY-SALINE-4	H4.DAT	VERDIGRIS-2	L2.DAT
LO-ARK-6	C6.DAT	SMOKY-SALINE-5	H5.DAT	VERDIGRIS-3	L3.DAT
LO-ARK-7	C7.DAT	SMOKY-SALINE-6	H6.DAT	VERDIGRIS-4	L4.DAT
LO-ARK-8	C8.DAT	SMOKY-SALINE-7	H7.DAT	VERDIGRIS-5	L5.DAT
LO-ARK-9	C9.DAT	SMOKY-SALINE-8	H8.DAT		
LO-ARK-10	C10.DAT	SMOKY-SALINE-9	H9.DAT	WALNUT-1	M1.DAT
LO-ARK-11	C11.DAT	SMOKY-SALINE-10	H10.DAT	WALNUT-2	M2.DAT
LO-ARK-12	C12.DAT			WALNUT-3	M3.DAT
		SOLOMON-1	I1.DAT		
LO-REP-1	D1.DAT	SOLOMON-2	I2.DAT		
LO-REP-2	D2.DAT	SOLOMON-3	I3.DAT		
		SOLOMON-4	I4.DAT		



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