Water Information Management and Analysis System, Version 4, for ArcView

User's Manual

Kansas Department of Agriculture
Division of Water Resources

Table of Contents

Disclaimer

The Kansas Department of Agriculture, Division of Water Resources (DWR) exercises great care in the creation of its Water Information Management and Analysis System (WIMAS) program. However, the DWR offers no warranty or guarantee of the accuracy or completeness of the WIMAS program and the data contained therein, the DWR assumes no liability for errors in, interpretation of, or use of these data.

Water rights are dynamic and often complex entities. The water rights data used in WIMAS represents the water rights files as of certain date and should not be viewed as current. A new water rights data set for the WIMAS program will be made available from the Data Access and Support Center (DASC) on a semi-annual basis. DASC can be contacted at http://gisdasc.kgs.ukans.edu or at (785) 864-3965, ext 410.

Reported water use information used in WIMAS at this time represents only a single calender year. Information provided in WIMAS can not be used to determine whether a water right has been lawfully used in accordance with the terms, conditions and limitations specified in the vested right, certificate or permit. To obtain current standing information on a particular water right file, please contact the DWR.

The term "status", as used in the WIMAS program, denotes one of the following phases of a water right's development: (1) The application is pending initial review by the DWR; (2) A permit has been issued; (3) The DWR has received a notice and proof of completion of the diversion works; (4) The time to perfect the water right has expired; (5) A Certificate of Appropriation has been issued; or (6) The water right has been dismissed for some reason.

Information contained in the WIMAS program is a public record; however, by accessing the WIMAS program, associated data, and any products generated by WIMAS (i.e. maps, graphs, tables, and reports) the user agrees that they will not use them for selling, or offering the sale, of any property or services in violation of K.S.A 45-220(c)(2).

For more information contact the DWR at (785) 296-3717.

Water Information Management and Analysis System (WIMAS), version 4, for ArcView- User's Manual

By Blake Brownie Wilson

Introduction

Water rights in the State of Kansas are complex and dynamic entities that permit their owners the privilege of appropriating water for beneficial use. As the number of water rights in the state increase over time, the ability to access and analyze water right activity in terms of their location, authorized quantity allocations and pumping rates, yearly reported water use and their relationship to other spatial features becomes a daunting task. In 1991, the Kansas Department of Agriculture's Division of Water Resources (KDA-DWR) and the U.S. Geological Survey (USGS) developed a GIS application, known as the Water Information Management and Analysis System (WIMAS), to assist in the analysis and management of the State's water resources.

WIMAS was first written as an AML based, ARC/INFO application that ran in a UNIX, X-Windows environment. By integrating data sets from both the KDA-DWR and the USGS, WIMAS allowed users the ability to analyze the availability and use made of water in a spatial context. WIMAS was the first GIS application to both map and simplify the intricacies of queries to the KDA-DWR water rights data, however, its use outside of the cooperating agencies was minimal. Users were required to have access to a UNIX workstation running a licensed copy of ARC/INFO.

In 1994, the KDA-DWR decided to migrate its water rights information from a mainframe based, SUPRA database, to a client-server ORACLE RDBMS. The water rights database was re-structured to represent a true, relational database model. As such, the water rights database was no longer in a format compatible with the WIMAS GIS application. With the combination of the KDA-DWR database migration, advancements in ArcView and its programming language of AVENUE, and the increase in the numbers of ArcView users in the State, the Kansas GIS Policy Board provided funds to rewrite and enhance the functionality of the WIMAS to run as an ArcView application. The goal of the WIMAS program is to provide a GIS-based application to query and map water rights in the State of Kansas to the general public.

System Requirements

The WIMAS program is a customized project file that runs under the Environmental Systems Research Institute's **ArcView 3.0a** GIS software. ArcView 3.0a requires a industry-standard personal computer with at least an 80486 or higher intel-based micro processor, at least 16 MB of RAM (24 recommended), and Windows 95, or Windows NT version 3.1 and higher operating system. For the WIMAS program, a pentium 120 MHz with 32 mb of RAM and a suitable harddrive is recommended. In addition, a VGA graphics card with a video display of at least 800x600 resolution is required and a high color mode (16 bit) with small fonts is recommended. If running WIMAS from a network or local hard drive, 100 MB of space is needed for supporting GIS data layers, scripts, and other program files. When executing, the WIMAS program can require up to an additional 50 MB of drive space for temporary files, depending on the study area.

WIMAS has only been tested on Windows 95 and Windows NT 4.0 platforms. The WIMAS program has not been designed or tested for UNIX workstations, Windows 3.11, or Windows for Workgroups operating systems.

Installing WIMAS

Software

The WIMAS program is a customized project file that runs under the Environmental Systems Research Institute's **ArcView 3.0a** or **ArcView 3.1** GIS software and uses the Dialog Designer Extension for ArcView. Both ArcView and the Dialog Designer Extension have to be installed in order for WIMAS to run. To upgrade an existing licensed copy of ArcView 3.0 to ArcView 3.0a, the **av30a.exe** free update patch file can be found at http://www.esri.com under software updates and additional extensions for ArcView. WIMAS also requires the installation of the Dialog Designer Extension for ArcView 3.0a. To install this free extension, download and run the **avdlog.exe** executable file which can also be found at http://www.esri.com. Once downloaded from ESRI, both files can be executed by double-clicking on the file name in *Windows Explorer* or from a browse window opened in *My Computer*. ArcView 3.1 users do not need to install the patch and the Dialog Designer should be already loaded.

To check if your copy of ArcView has been updated or if the Dialog Designer Extension has been installed, start an ArcView session. ArcView should report the version number and list it in the upper left corner of the window. To check on the Dialog Designer installation, click on the *File* menu from the ArcView project window, and select *Extensions...* If properly installed, the Dialog Designer should be an option under the *Available Extensions* list. For more information on these files and ArcView software products, see ESRI at http://www.esri.com.

WIMAS can be run from a CDROM, a network drive, or the local hard drive and under other parent directories so long as the following WIMAS program directory and file structure is preserved:

```
\WIMAS (directory)
        |---\COVERS (directory)
        |---\HELP (directory)
        |---\METADATA (directory)
        |---\SYMBOLS (directory)
        |---\WIMAS.APR (file)
```

System Variables

In order for WIMAS to properly access the GIS data layers, two operating system variables have to be set. The ***WIMAS*** variable establishes the directory where the base program file (WIMAS.APR) is located and the ***TEMP*** variable identifies the directory where temporary files generated by the WIMAS program will be written. These system variables have to be set before WIMAS will execute properly. If the WIMAS program directory is moved or the temporary directory changed, then the system variables have to updated accordingly.

Windows 95 Installation

For computers running Windows 95, the ***WIMAS*** and ***TEMP*** variables need to be coded into the C:\AUTOEXEC.BAT file using an ASCII editor, such as Windows Notepad. After editing and saving the C:\AUTOEXEC.BAT file, the computer needs to be re-booted.

Example: *The c:\temp is the directory to be used for WIMAS temporary files and the WIMAS program directory (and its subdirectories listed above) has been copied to the C:\APPS directory. Add the followings lines to the end of the AUTOEXEC.BAT file:*

SET TEMP=C:\TEMP
SET WIMAS=C:\APPS\WIMAS

Note- the *Temp* variable may already be set.

Windows NT 4.0 Installation

For computers running Windows NT 4.0, the ***WIMAS*** and ***TEMP*** variables need to be coded into the System Properties Window. Press the Windows NT *Start* button, go to the *Settings* Menu, and select the *Control Panel*. Double click on the *System* icon to bring up the *System Properties* window and click on the *Environment* Tab. Set the variables under *User Variables*, click on *Apply* and then the OK button. The computer does not need to be re-booted.

Example: *The c:\temp is the directory to be used for WIMAS temporary files and the WIMAS program will be run from the CDROM (listed as D: drive). Set the variables in the System Properties Window (Figure 1). Note- the* ***Temp*** *variable may already be set.*

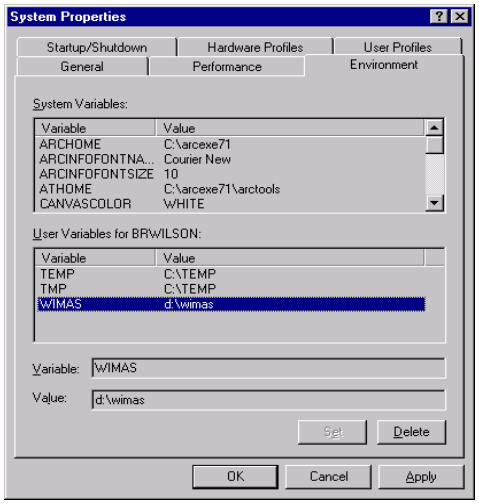

Figure 1

Loading and Running WIMAS

The WIMAS program can be launched in several ways. The project can be loaded into a running ArcView session by going to the *File* menu and selecting the *Open Project* option. Navigate to where the WIMAS program directory is stored and select the WIMAS.APR file. The Dialog Designer Extension does not have to be manually selected before WIMAS will run. A second launch option is to double-click on the WIMAS.APR file from *Windows Explorer* or from a browse window opened from *My Computer*. A shortcut on the computer's desktop can also be created with the Target or Command Line being the location of the WIMAS.APR file.

Troubleshooting

If the WIMAS program fails to load, then there are two potential problems. If a window similar to Figure 2 appears, check to see if the Dialog Designer has been installed. Hit the *Cancel* button and the program will close. Install the Dialog Designer as listed under the *Software* portion of the *Installing WIMAS* section of this manual. If a window similar to Figure 3 appears, then the ***WIMAS*** system variable has not been properly set. Hit the *Cancel All* button, followed by hitting the OK button on several system error windows that will appear. Then click on the *File* menu and select *Exit WIMAS*. Refer to the *Installing WIMAS* section above for setting system variables.

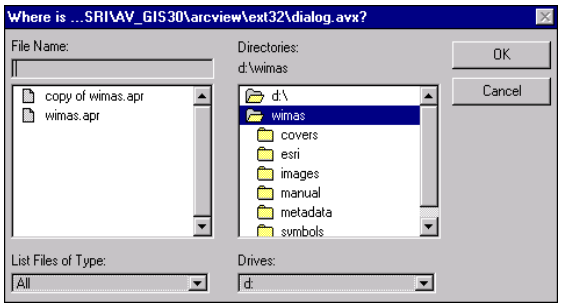

Figure 2-Dialog Designer Extension Error

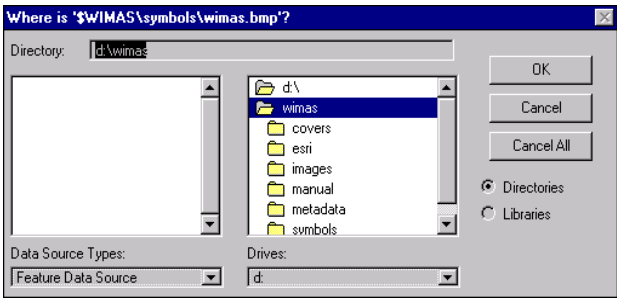

Figure 3- WIMAS System Variable Error

WIMAS Start Screen

After ArcView has been properly configured with the 3.0a patch, the installation of the Dialog Designer Extension, and the system variables have been set, the program will begin with the WIMAS Start Screen. The primary function of the WIMAS Start Screen is to establish a study area to analyze and query water rights, create a simple state-wide report, review GIS data layers used within the program, and to set specific map projection or coordinate system parameters for all map displays generated within WIMAS.

Before the program continues, the user is presented with the *WIMAS Software Agreement*. The responsibilities and use limitations associated with WIMAS listed in the Software Agreement have to be accepted or the current ArcView session will close. Contact the KDA-DWR for more information on the Software Agreement.

Exiting WIMAS

To exit and close the WIMAS program, go the *File* menu of the WIMAS Start Screen and select *Exit WIMAS*. This will close WIMAS and the ArcView session. It is not recommended that you close the WIMAS program by clicking on the **x** under the main window. This will allow you to save program links to the temporary files used by WIMAS within its original project file. Although this has no effect on the WIMAS program itself, it may impact future startup procedures of the WIMAS program. See the *Known Problems* section of this manual for more information.

Study Area Determination

The WIMAS Start Screen provides several options for establishing study areas in the State of Kansas to analyze and query water right activity. Your study area can be based on a county boundary, a KDA-DWR recognized watershed or subbasin, an area you interactively define, a specified distance around an existing water right, or a circle (generally two miles) around a proposed point of diversion (PD) for a new water application. Once a study area is established, a map display of that area and several analysis functions will be provided within the *WIMAS Analysis Screen* covered later in this manual.

 County Analysis

The *County Analysis* button allows you to base your study area on the boundaries of a Kansas county. You can interactively select a single county from the list of county names provided in the *Selection Query* window or by clicking on the geographic location with the mouse (Figure 4). As you select county names from the list, the map display will select that county. As

you click on the mapped counties with the mouse, the county name will be selected from the list. After selecting the desired county, hit the *Continue* button which will setup the WIMAS Analysis Screen for that county.

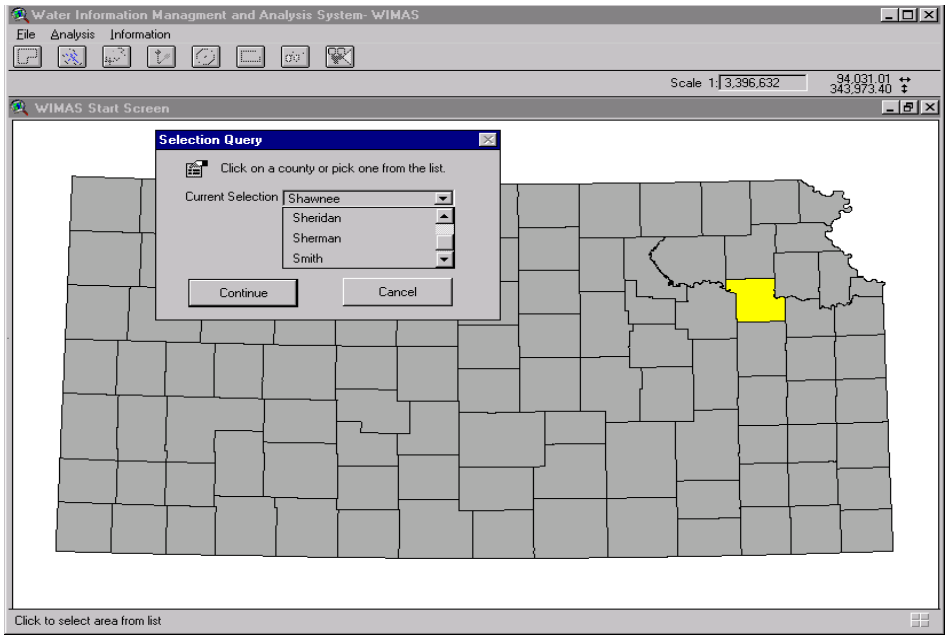

Figure 4- County Study Area Selection

Subbasin Analysis

The *Subbasin Analysis* button uses the same selection routine and form menu of the County Analysis button except it is based on the KDA-DWR recognized subbasins in the state. After interactively selecting a subbasin by name or clicking on its geographic location, the WIMAS Analysis Screen will be setup for that subbasin.

User Defined Area Analysis

WIMAS allows you to define a study area interactively or from a vector-based GIS file, such as a shape file or ARC/INFO coverage, by using the *User Defined Area Analysis* button. The routine starts with a map display of counties in the state. To further assist in delineating the defined study area, other GIS layers listed on the left side of the map display can be turned on and off as needed by clicking on the visibility box next to the GIS layer name. As shown on Figure 5, the Zooming Tools provided on the *User Defined Study Area- Setup* form allows you to zoom in, zoom out, and pan around the map display. You can either draw a polygon to represent your study area or load the boundaries from an existing GIS vector file.

Use the *Draw Study Area* tool (Figure 6) to interactively draw a polygon that represents the study area boundaries. Double click the last point to stop the delineation. After the polygon representing the study area has been drawn, the *Edit Study Area* tool (Figure 7) becomes active. This will allow additional polygon vertexes to be added or moved to further refine the study area. Once complete, click on the *Save to File* button if you wish to save the study area boundary as an ArcView shape file. Selecting the *Start Over* button will erase the current polygon and allow the study area delineation to start over.

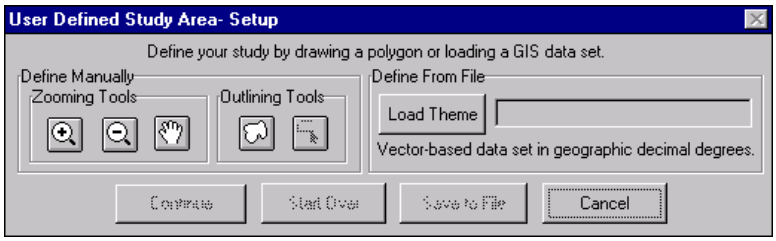


Figure 6- Draw Study Area


Figure 7- Edit Study Area

Clicking on the *Load Theme* button will allow you to load a vector-based GIS file (ArcView Shape File or ARC/INFO Coverage) to represent your study area. This study area file has be natively stored in a geographic, decimal degrees (datum NAD27) projection. If your study area data file is in a different projection, it will be added to the map display, but will not align properly with the other WIMAS files.

Once you have established the boundaries of your study area, click on the *Continue* button to bring up the WIMAS Analysis Screen. If no water rights are found in your drawn study area, a notification window will appear and the program will reset to the WIMAS Start Screen. The defined study area is identified in the WIMAS Analysis Screen map display as a red polygon.

Individual Water Right Analysis

The *Individual Water Right Analysis* button allows you to base the study area on a specified distance around an existing water right or permit to appropriate water. On the *Individual Water Right Query* form, enter the water right number, and if applicable, the county abbreviation for a vested water right and the water right qualifier (Figure 8). The *Buffer in Miles* represents the size of the circle that will be drawn around all the points of diversion associated with the individual water right. All water rights within the specified buffer distance are selected for further analysis in the WIMAS Analysis Screen. On the map display, all points of diversion that are associated with the queried water right will have a yellow star located behind them.

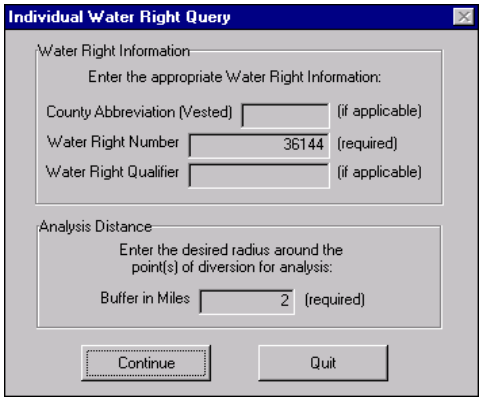

Figure 8- Individual Water Right Query

Proposed PD Circle Analysis

The *Proposed PD Circle Analysis* is a function to locate a proposed point of diversion (PD) associated with a new water right application. The study area for this analysis is a buffered distance, generally two miles, around a new PD location. Upon selecting this button, WIMAS provides two options to initially locate the proposed PD: Geographic coordinates (latitude and longitude) or Public Land Survey System legal description (township, range, and section). Once located, the proposed point will be shown by a yellow star on the map display of the WIMAS Analysis Screen.

Geographic Coordinates

Basing the location of a proposed PD by geographic coordinates is useful if the proposed point has been established by Global Position Systems (GPS) or interpolated from topographic maps. Enter the geographic decimal degrees of the proposed PD on the form (Figure 9). The point is plotted by these coordinates and all water rights within the specified buffer distance are selected for further analysis in the WIMAS Analysis Screen.

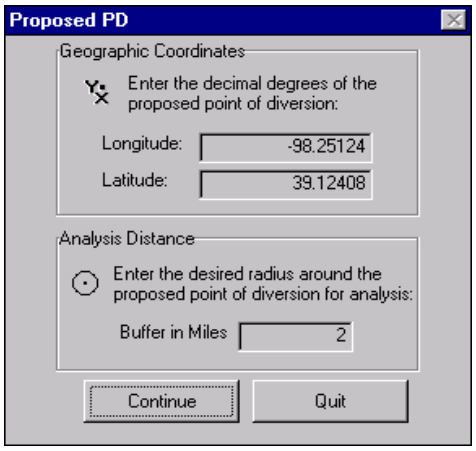

Figure 9- Geographic Coordinates

PLSS Legal Description

Currently, the most common way of describing the location of a proposed PD is by its Public Land Survey System (PLSS) legal description (township, range, section) and feet distance north and west from the southeast corner of a section. After selecting the *PLSS Legal Description* button, you will be prompted to enter the PLSS township, range, and range direction (E or W) where the proposed PD will be located. Once entered, a map display of the section corners in that township will be displayed where you will be further prompted to select the **southeast** corner of the section that the proposed PD will be located in. Select the section corner by placing the cursor over the section corner and click once. The section corner will turn yellow in color upon its selection (Figure 10).

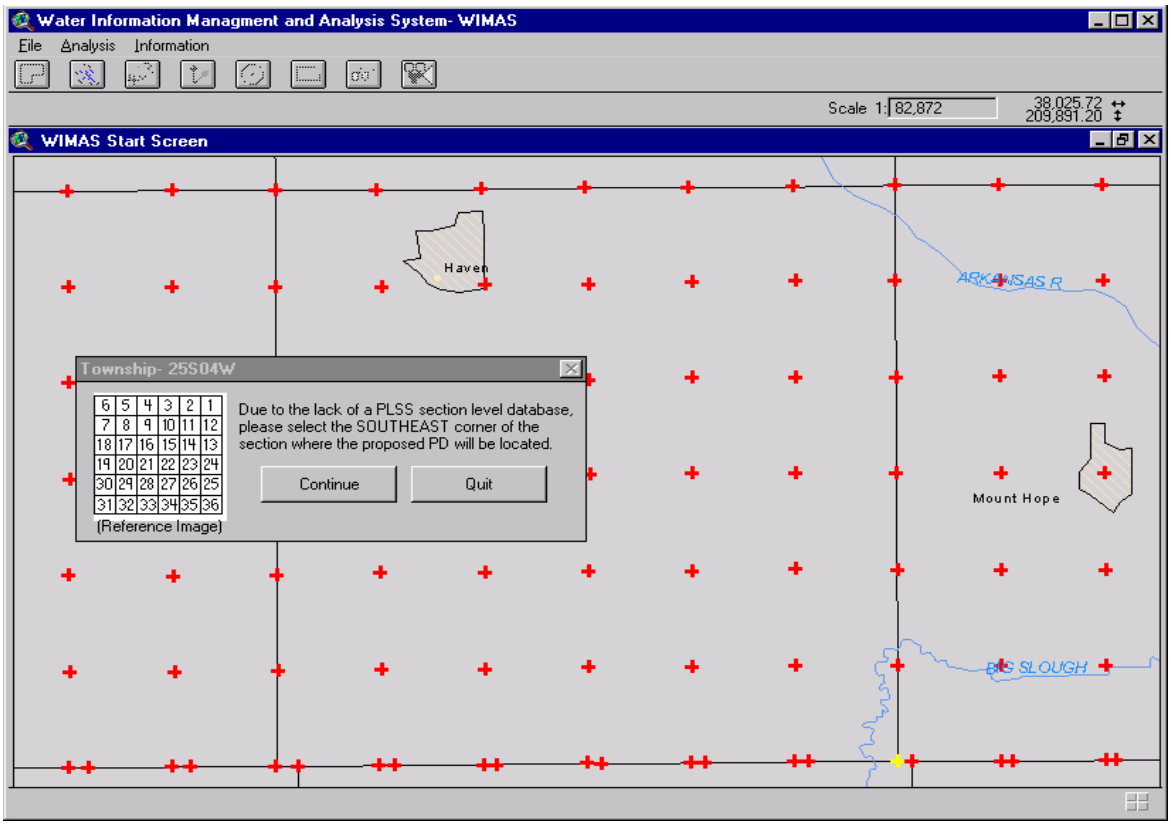

Figure 10- PLSS Section Selection for a Proposed PD

After a section corner has been selected, click on the *Continue* button. You will then need to enter the number of the section that has its southeast corner currently selected. A reference image is provided to assist in identifying the PLSS section number. You then need to enter the feet distance north and west of that southeast corner where the proposed PD will be located along with a buffer distance around the point (Figure 11). The proposed PD is then plotted based on these distance values from the section corner and all water rights within the specified buffer distance are selected for further analysis in the WIMAS Analysis Screen. The specified map projection that has been selected may have an impact on how the proposed PD is located. By default, WIMAS uses a Lambert Conformal Conic projection with parameters suitable for the State of Kansas as a whole. Please refer to the *Set Map Projection* section of this manual for more information.

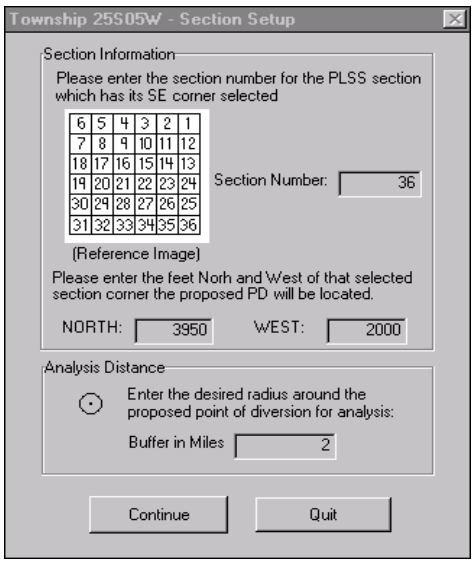

Figure 11- Distance Parameters

Although awkward, this process of selecting a section corner and then listing the section number is necessary since the KDA-DWR does not have a state-wide GIS data layer that identifies PLSS sections individually. When a data set of this nature has been accepted by the KDA-DWR, the WIMAS program will be enhanced accordingly.

Generate State Wide Report

The *Generate State Wide Report* button involves no graphics or maps and simply lists the total amount of water authorized, total amount reported used for the latest water use year, the total number of acres authorized for irrigation, and the total number of acres reported irrigated for the latest water use year. All categories are broken down by surface and ground water sources. It should be noted that since this report involves all the water rights in the state, it may take several minutes to generate the report depending on your computer's performance.

Other Functions

Metadata Reviewer

WIMAS contains a "metadata" or *Data Set Reviewer* that can be accessed by clicking on the *Theme Review* button. "Metadata" is a description about data sets and answers questions, for example, as to how the data was created, the source of the information, the time period it represents, and how often it is updated. The *Data Set Reviewer*, will display both the spatial extent and Federal Geographic Data Committee standard metadata files for each of the GIS data layers used in WIMAS (Figure 12) .

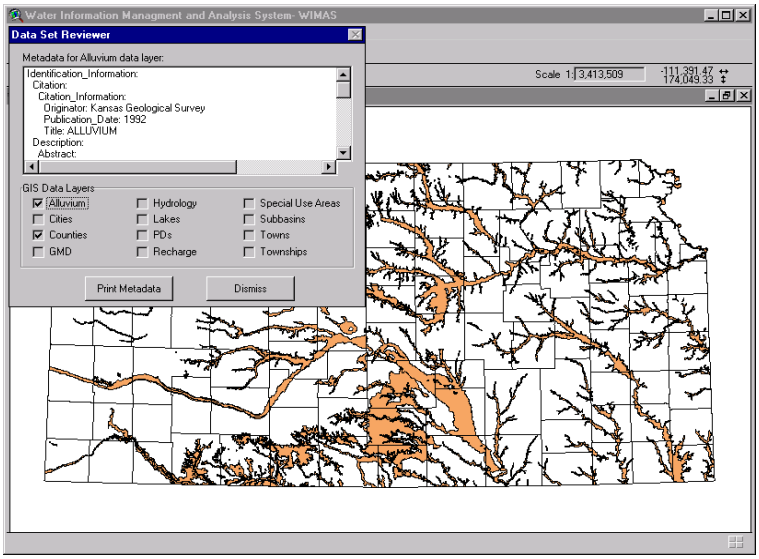

Figure 12- Data Set or "Metadata" Reviewer for WIMAS

Metadata for each GIS layer can be viewed by clicking on the check box by the name of the data set. By clicking on the *Print Metadata* button, the listed metadata file will be passed to Windows WordPad where it can be reviewed, edited, converted, or printed.

Set Map Projection

All maps are based on some type of projection that attempts to transform features on a curved, three-dimensional surface (the earth) to a flat, two-dimensional surface (a map). As such, every map contains distortions on either the shape, area, distance, or direction properties of the features portrayed on the map. The proper selection of a map projection or coordinate system can either preserve the integrity of one these properties at the expense of the others or create a compromise between each of the projection properties.

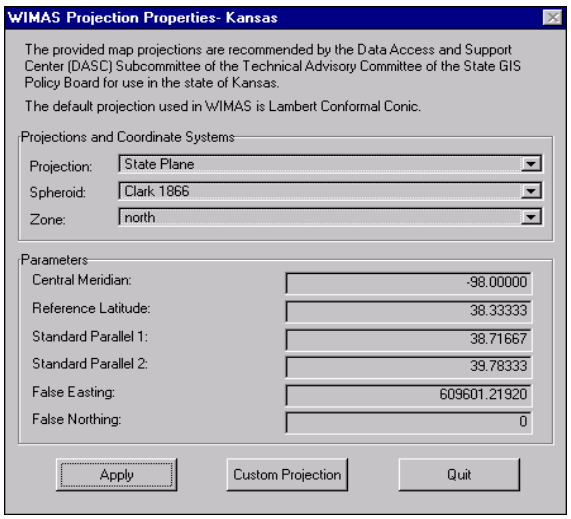

Figure 13- Define Map Projection

The *Set Projection* button allows the user to establish a base map projection or coordinate system to be used by all the map displays within the WIMAS program. Initially, a list of the five map projections and coordinate system recommended for use in the State of Kansas is provided (Figure 13). As a projection, datum and zone (if applicable) is selected, the parameters for that system are updated accordingly. If you wish to set a customized projection, click on the *Custom Projection* button. For more information on projections, see "Choosing Map Projections" in the ArcView manual.

Projection and Coordinate System Effects

If you will be adding an image file, such as a Digital Ortho-photograph, to your map displays, the map projection used in the WIMAS program will have to be set to match the parameters of the image projection. If the map projection is different from the image projection, then the GIS data sets will not align properly in the map display of the WIMAS Analysis Screen. This type of "on the fly" re-projection can not be conducted to align the native WIMAS GIS data layers to other outside GIS data sets already established in other projections. Refer to *Adding Themes* section of the this manual for more information on adding other GIS layers and proper projections.

When basing the location of a proposed PD by its PLSS description, the established map projection or coordinate system selected also has an impact. A graphic point representing the proposed PD is initially located to the known coordinates of the selected southeast corner of the section. The graphic point is then moved first in the cartesian Y coordinate direction based on the listed feet north. This is adjustment is made in geographic decimal degrees since lines of latitude on the earth maintain a constant distance. The graphic point is then moved in the cartesian X

direction based on the listed feet west. This second adjustment is based on the map units of the user's specified projection or coordinate system because lines of longitude collapse towards the north and south poles of the earth. Since every map projection introduces some sort of distortion in a map's shape, area, distance, or direction, the shift in the planar X direction becomes inexact. Although relatively small, this distortion in the X direction becomes greater with the increase in distance from the points of tangency associated with the map projection. The selection of a suitable projection or coordinate system helps to alleviate this potential offset.

WIMAS Analysis Screen

Once a study area has been established, the WIMAS Analysis Screen will be activated which provides a map display and numerous analysis, query, and display options for water rights. The map display contains all the points of diversions (PD) in the identified study area along with several supporting GIS data layers. The scale of the map, which is based on the size of study area and the display window, is shown at the upper right corner of the WIMAS Analysis Screen. The projection of the map display can be changed by selecting the *Set Projection* option under the *Display* menu.

The supporting GIS layers can be turned on or off by clicking on the visibility box located to the left of the layer name. Each GIS layer can also be set to a specified color or pattern using ArcView's native Legend Editor by double-clicking on the theme name or symbol. The order the map layers are drawn on the map display can change by clicking and dragging the layer name up or down to a new location. See your ArcView manual for more information on the Legend Editor, symbolizing data, and setting the drawing order for map displays.

At this point, you can further customize the map display or start querying and analyzing water rights. To select a new study area for analysis or return the WIMAS Start Screen, go to the *File* menu and select *Return to Main Menu*.

WIMAS Tools

The WIMAS Analysis Screen contains a "floating" *WIMAS Tools* window that can be moved about the screen or closed as needed (Figure 14). These tools allow you to manually select PDs, zoom in, out, and pan around the map display, or interactively measure area and lengths values. If closed, the tool bar can be recalled by going to the *Analysis* menu and selecting *Show WIMAS Tools*.

Figure 14

Manual Selection Tool

This tool will allow you to manually select specific areas on the map display to analyze water right conditions. PDs can be selected either individually, by double clicking on a single point, or by drawing a polygon around a set of PDs. Upon selection, the PD(s) color will change to yellow. You can unselect PDs in the same manner by double clicking a singe point or drawing a polygon around a set. For more water right selection routines, see the *Selection Routines* section listed below.

Map Display Tools

The tool bar contains three tools that allow you to zoom in, zoom out, or pan around the map display. The zoom tools will zoom in or out of the center of a particular point or to a box area dragged with the mouse. The Pan tool allows you to move around the map by moving the cursor anywhere on the map, holding down the mouse button, and dragging the display in any direction. Release the mouse button at the desired point.

Measuring Tools

The measuring tools allow you to either measure the area of a polygon or the length of line that you draw on the map display. All measurements are made in miles or square miles and are reported in the lower left corner of the WIMAS Analysis Screen.

Authorized Quantity and Reported Water Use Summaries

Two common question often asked of the KDA-DWR is how much water can be or is appropriated and how much water was used in a certain area or region of the state. To answer this type of question, WIMAS provides a water right summary form (Figure 15). The summary form establishes the total amount of water authorized annually or how much water was reported used for the most current year of publishable water use data from the KDA-DWR. The data in the form represent the water right PD(s) shown on the map display and can be based on all the water rights or a selected subset within the study area.

To activate the form, click on the button to summarize authorized quantity or the button to summarize reported water use. The summary form is composed of several parts and provides the ability to export, print, and graph the water rights used in the summary routine. The form will also list the date for which the values are valid and how many water rights and points of diversions are selected from the map display.

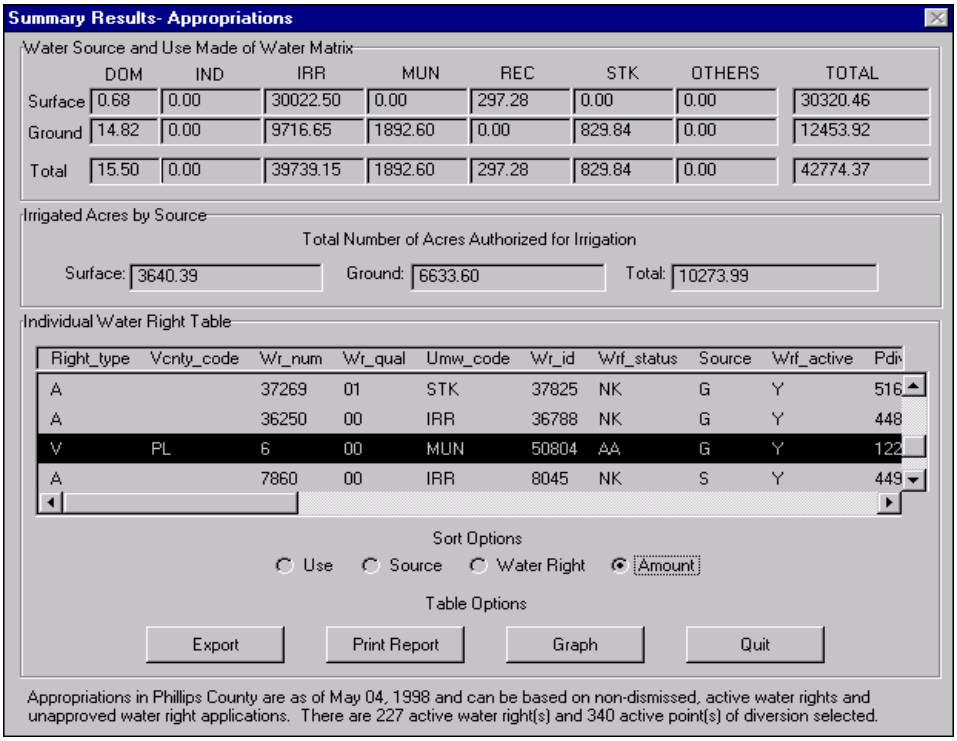

Figure 15- Summary Form (Authorized Quantity, Phillips County, KS)

Water Source and Use Made of Water Matrix

The matrix at the top of the form provides summary values by water source and use made of water, in acre-feet (AF), for the selected water rights on the map display. Using the example from Figure 15, you can see that 30,022.50 AF of water is authorized to be used for surface water irrigation water rights, 9716.65 AF of water is authorized for ground water irrigation water rights, and a total of 39,739.15 AF of water appropriated for all irrigation uses. You can also see that a total of 3032.46 AF of water is appropriated for surface water rights, 12453.92 AF of water is appropriated for ground water rights, with a total of 42,774.37 AF of water appropriated for all the water rights currently selected in the map display. For water use summaries, the form will display the same fields, only the values would represent how much water was reported used to the KDA-DWR by water right holders.

In the case of total authorized quantity appropriated, the summary values represent the total amount of water that **could** be used by each source and use made of water. For example, a single water right may be authorized to use up to 50 acre-feet of surface water annually for irrigation and/or recreation uses but can not use over 50 acre-feet in total annually. If this was the only water right selected, the summary form would list 50 acre-feet of water authorized for both irrigation and recreational surface water with a total surface water of 50 acre-feet. This is because a total of 50 acre-feet could be used for either purpose as long as the total for both purposes does not exceed 50 acre-feet.

Total Acres (Irrigation)

The next component of the summary form lists how many acres are authorized for irrigation or how many acres were reported irrigated for the latest water use year. Using Figure 15 as an example, 3640.39 acres are currently authorized to be irrigated by surface water rights, 6633.60 acres authorized to be irrigated by ground water rights, and a total of 10273.99 acres authorized for irrigation based on the water rights selected in the map display. For water use summaries, the form displays how many acres were reported irrigated by water rights.

Individual Water Right Table

The *Individual Water Right Table* provides an individual listing all the water rights currently selected on the map display and used in the summary form. The table lists information for both water rights and their associated point of diversions along with other values based on the summary type (authorized quantity or water use). For more information on the field definitions and the values they contain, use the *Data Set Reviewer* and look under the *Entity and Attribute Information* section of the metadata file for PDs.

If you select a row within the table, a magenta colored graphic star symbol will be drawn over the associated point of diversion on the map display. Using the example in Figure 15, a PD for vested water right PL 6 is currently selected. Looking at the map display (depending on your screen size and resolution, you may need to move the summary form out of the way), you can see that the water right is located just to the north of the town of Prairie View (Figure 16). This graphic star will change as you select different water rights within the table.

The water right table can be sorted on one of four criteria. *Use* will sort the table on the use made of water (e.g. Domestic, Industrial, Irrigation, etc...), *Source* is on the water source (surface or ground water), *Water Right* is by the water right number, and *Amount* is on the values listed under either ADD_QUANT or AF_USED depending on the summary type.

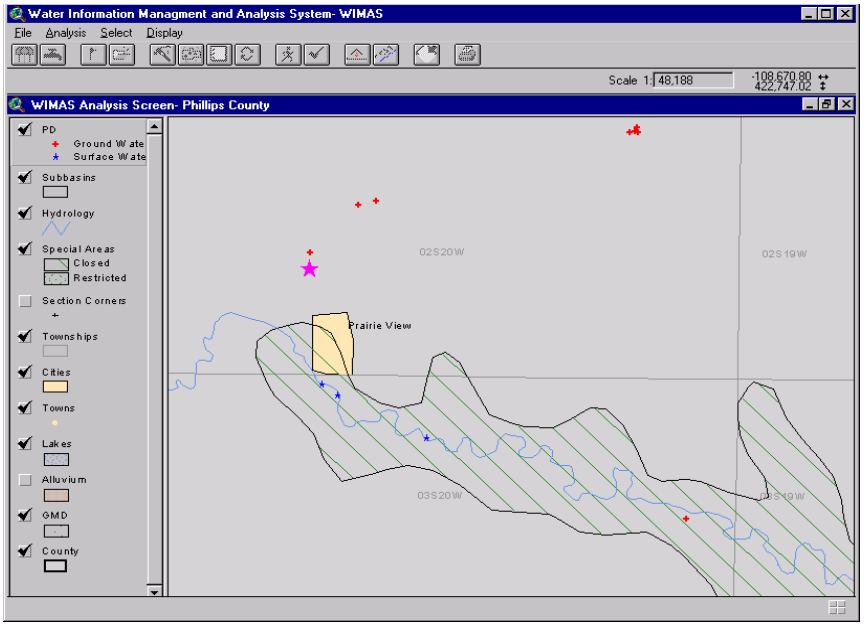

Figure 16- PD for water right PL 6

Export to File

Clicking on the *Export* button allows you to convert the data listed in the *Individual Water Right Table* to another format. You have the option to export the data to a dBase, INFO, or comma-delimited ASCII text file and can navigate to the directory where the file will be written. Any sorting order conducted on the table will not be preserved in the output file. The export file will contain every database field in the water right PD data file.

Print Report

The *Print Report* button will take the information from the *Individual Water Right Table* and generate a report sheet that is passed to Windows WordPad. The report will list the study area, the date for which the water right information is valid, document the number of water rights and points of diversion selected, provide a table listing of the water rights based on the summary type (authorized quantity or reported water use), and list some terse summary statistics (Table 1). Within the WordPad program, you can edit, save, convert, or print the report as needed. If you re-run the WIMAS Summary Form on a different water right selection set, you will need to close the current WordPad document or save the file to a new name before the new report can be generated.

Table 1- Example WIMAS Summary Report

Water Rights and Points of Diversions Report Sheet.
Proposed PD in 36-21S-21W (2950N,300W) with a 2 mile buffer.

1996 Reported Water Use values are as of May 04, 1998.

There are 26 water right(s) and 25 point(s) of diversion
currently selected that reported water use in 1996 for the study area.

File Number	Use	ST	SR	Q4	Q3	Q2	Q1	FeetN	FeetW	Sec	Twp	Rng	ID	Fo	PersId	Corr	Year	AcresIrr	Af_Used
A	578	00	IRR	NK	G		NW	NE	NW	5199	3329	35	21	21W	9	2	33968	1	1996	133	63.64
A	4352	00	IRR	NK	G		NW	SE	SW	1018	3580	26	21	21W	4	2	16125	1	1996	300	173.00
A	4353	00	IRR	NK	G					1880	3960	24	21	21W	1	2	17934	1	1996	230	215.00
A	4618	00	IRR	NK	G					3960	4600	35	21	21W	7	2	33968	1	1996	87	42.00
A	5194	00	IRR	NK	G		NE	NW	NW			1	22	21W	1	2	15124	1	1996	0	0.00
A	5194	00	IRR	NK	G		SE	SW	SW	100	4374	36	21	21W	9	2	15124	1	1996	0	0.00
A	5228	00	IRR	NK	G		NE	NE	SE	2540	85	30	21	20W	8	2	17934	1	1996	0	0.00
A	6093	00	IRR	NK	G					4129	1290	25	21	21W	5	2	17934	1	1996	115	60.91
A	6108	00	IRR	NK	G	CS	SW	NE	SE			35	21	21W	5	2	37715	1	1996	24	10.96
A	8732	00	IRR	NK	G		NW	NW	SW			19	21	20W	1	2	32834	1	1996	123	85.00
A	14453	00	IRR	NK	G		NC	SE		19	21	20W	2	2	26580	1	1996	128	123.63
A	19016	00	IRR	NK	G					1705	4650	30	21	20W	9	2	11533	1	1996	47	24.22
A	19641	00	IRR	NK	G		CW	NW		3975	5095	36	21	21W	10	2	33968	1	1996	135	151.00
A	25984	00	IRR	NK	G		CN	NW	NE	5190	1900	30	21	20W	4	2	11533	1	1996	48	37.00
A	26208	D1	IRR	NK	G					5188	3825	29	21	20W	9	2	32834	1	1996	204	142.00
A	26208	D2	IRR	NK	G					5200	5210	29	21	20W	5	2	32834	1	1996	0	0.00
A	28579	00	IRR	NK	G		CN	NW	NE	5190	1900	30	21	20W	4	2	11533	1	1996	0	0.00
A	29057	00	IRR	NK	G					1705	4650	30	21	20W	9	2	11533	1	1996	0	0.00
A	29057	00	IRR	NK	G					5172	5100	30	21	20W	10	2	11533	1	1996	0	0.00
A	29057	00	IRR	NK	G		CN	NW	NE	5190	1900	30	21	20W	4	2	11533	1	1996	0	0.00
A	31751	00	IRR	NK	G		SE	NE	NE	4435	75	30	21	20W	7	2	31439	1	1996	320	123.00
A	35302	00	IRR	NK	G					5190	2898	36	21	21W	7	2	31439	1	1996	20	26.53
V	HG	7	00	IRR	AA	G				2610	2245	25	21	21W	6	2	909	1	1996	92	70.00
V	HG	8	00	IRR	AA	G				2200	5050	25	21	21W	4	2	915	1	1996	144	141.00
V	HG	12	00	IRR	AA	G				242	5195	35	21	21W	8	2	33398	1	1996	99	117.11
V	HG	14	00	IRR	AA	G		NE	NW	SE	2204	1852	36	21	21W	2	2	25410	1	1996	20	7.50
V	HG	15	00	IRR	AA	G				4554	1620	36	21	21W	8	2	33074	1	1996	100	26.47
V	PN	31	00	IRR	AA	S		NW	SE	SW		29	21	20W	1	2	17934	1	1996	0	0.00
V	PN	44	00	IRR	AA	G				5172	5100	30	21	20W	10	2	11533	1	1996	69	55.00

Total 1996 Reported Acres Irrigated by Surface Water = 0.00
Total 1996 Reported Acres Irrigated by Ground Water = 2438.00
Total 1996 Reported Acres Irrigated = 2438.00

Total 1996 Reported Acre-Feet Used by Surface Water = 0.00
Total 1996 Reported Acre-Feet Used by Ground Water = 1694.97
Total 1996 Reported Acre-Feet Used = 1694.97

Generate Bar Graph

Selecting the *Generate Bar Graph* button allows you to generate a simple bar graph based on the summary values listed within the *Individual Water Right Table* (Figure 17). You will first be prompted on how to graph the summary results-- by County, Water Source, Subbasin, or Use Made of Water. You will then be given the opportunity to accept or change the title of the graph. The graph will then be generated based on the paper size and orientation currently selected for the printer. To change the paper size and orientation, access the printer manager for your computer through the *File* menu in the Wimas Analysis Screen and select *Printer Setup*. Once the graph has been created, you can print it or convert it to an image file so that the graph can be imported into another program, such as a word processor.

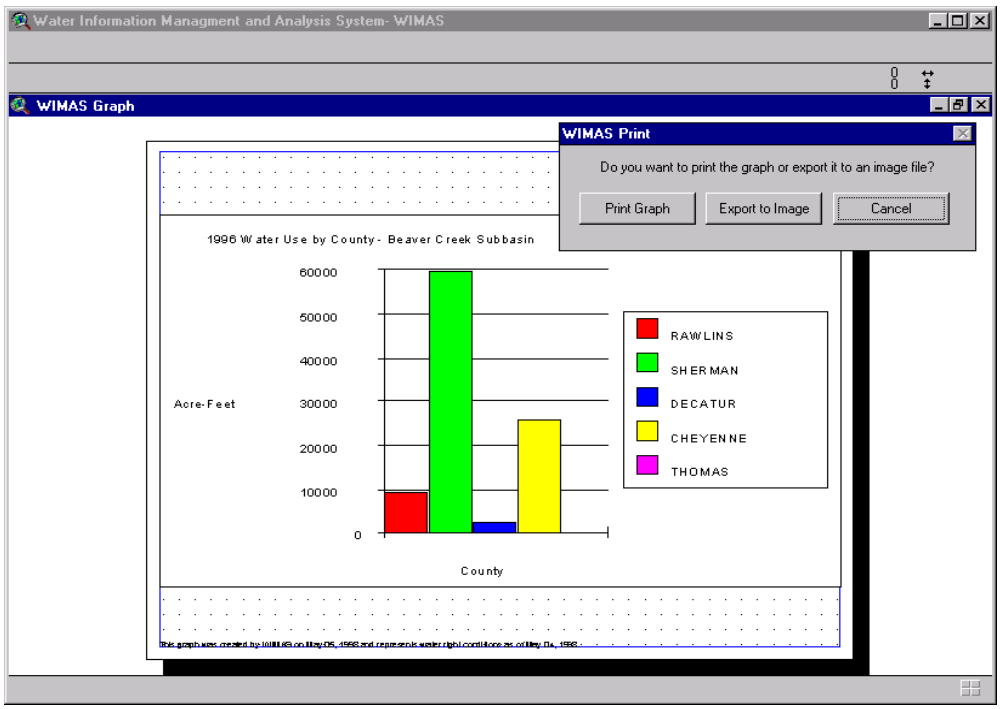

Figure 17- Wimas Graph

Point of Diversion Information

The *List Data by PD* button allows you to view water right data by individual points of water diversion which is displayed on the *Point of Diversion Information Sheet* (Figure 18). This sheet takes all the unique points of diversion that are currently selected on the map display and loads them into the PD list box located in the upper left corner of the sheet. The individual PDs are labeled by the PLSS section-township-range and DWR-ID, followed by a unique pdiv_id number listed in parentheses.

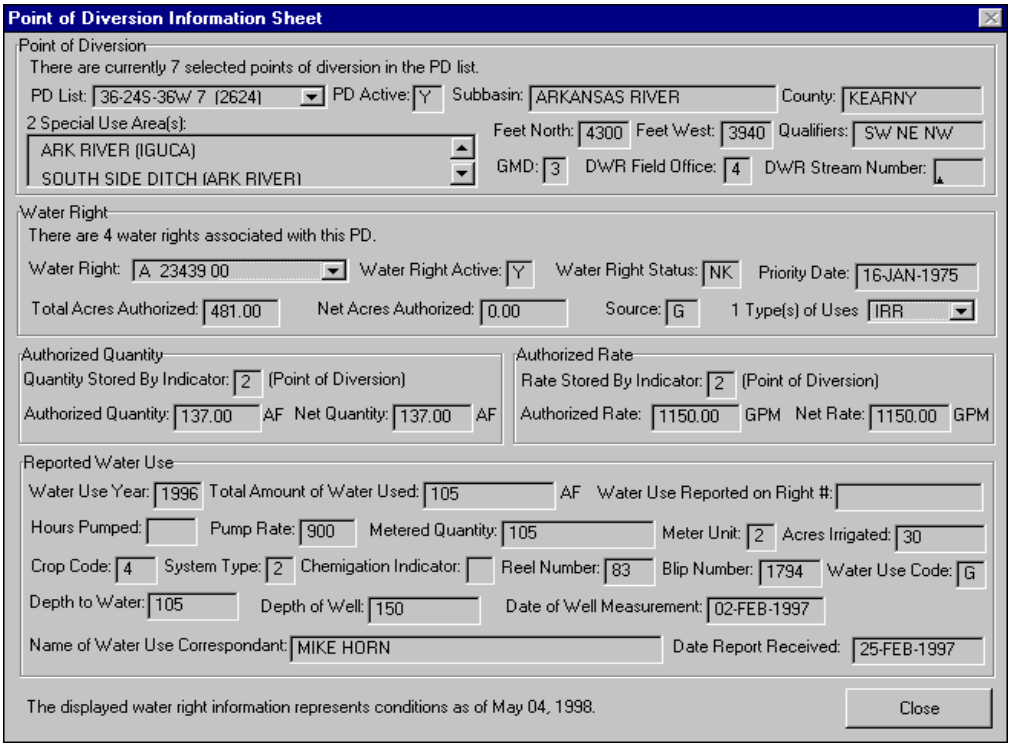

Figure 18

The corresponding water rights data provided on the sheet are based on three components that you can change. As you select a single PD from the list, all the water rights associated with that point are listed in the *Water Right* section on the sheet. A water right, in turn, may have more than one use made of water (loaded into the *Type(s) of Uses* list) also found in the *Water Right* section of the sheet. As you select single elements from each of the lists, the rest of the form will update itself with the appropriate information. In addition, as you select unique PDs from the sheet, a magenta colored graphic star symbol will be drawn over that point of diversion on the map display.

Using the hypothetical example in Figure 18, there are currently 7 PDs selected on the map display which are loaded into the *PD List* on the sheet. From this list, the selected PD located in section 36 of township 24 south, range 36 west has four separate water rights that are authorized to pump water from it. Of these four, water right 23439 has only one use made of water. Information provided on the sheet represents conditions that are based on the unique PD (36-24S-36W, DWR-ID 7), the unique water right (23439), and the unique use made of water (IRR) that are currently selected.

Water Right Information

The *List Data by Water Right* button is very similar to the *List Data by PD* button except the data are based on a unique water right on the *Water Right Information Sheet* rather than a PD (Figure 19). When executed, all water rights that have their associated PDs selected on the map display are loaded into the water rights list shown in the upper left corner of the sheet. The water rights are labeled by their right type, vested county code (if applicable), water right number, and water right qualifier (listed as "00" if not applicable).

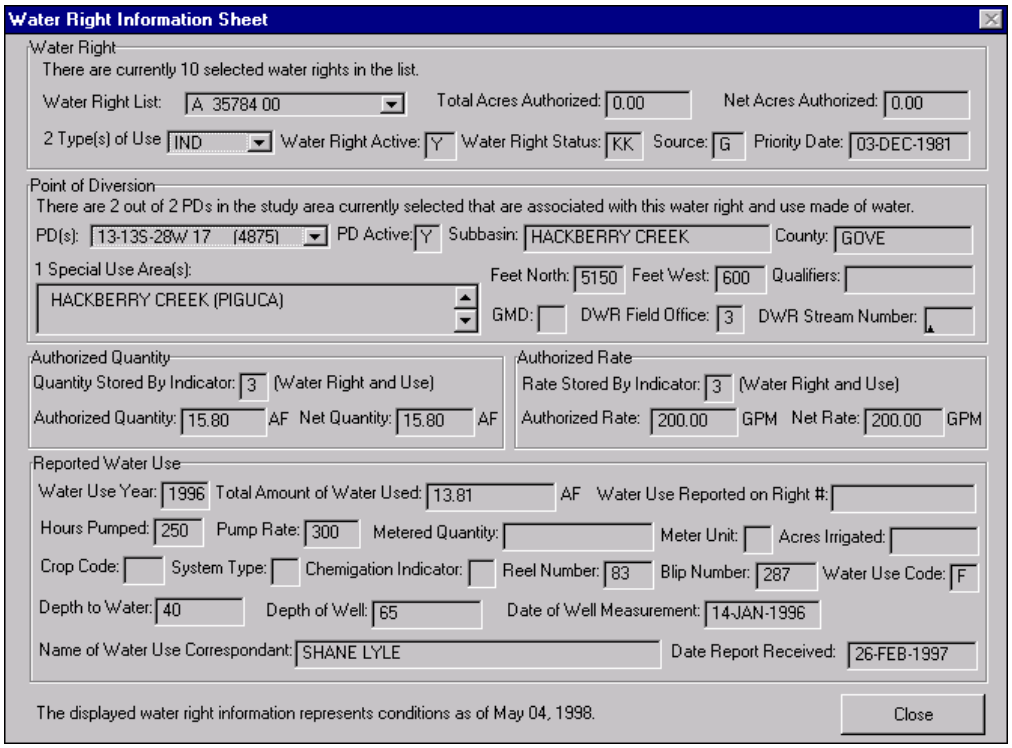

Figure 19

As you select a unique water right from the list, all the uses made of water associated with that water right are loaded into the *Type(s) of Use* list. In addition, all of the PDs authorized under that water right are listed in the *PD(s)* list. Just like the *Point of Diversion Information Sheet*, information on the form will change as you select unique values for a water right, use made of water, and PD from the list boxes.

When a water right is authorized to use multiple PDs, the map display will draw several magenta colored graphic star symbols over those PDs. A single, solid filled graphic star symbol represents the PD that is currently selected from the *PD(s)* list for the unique water right. The other PDs that are associated with the water right, but are not selected in the multiple PD list, are marked by a graphic star outline that is "hollow" or transparent in the middle.

Selection Routines

In addition to the manual selection tool provided on the *WIMAS Tools* window, there are several options to query and select water rights based on database values or the spatial extent of the points of diversion. These selection tools allow you to base the summary and information sheets only on water rights that meet a specific criteria.

PD Query Builder

The *PD Query Builder* button allows you to generate a query string to select water rights based on specific values using ArcView's native query tool (Figure 20). To create a query string, first double-click on the field name that is going to be queried. This will drop the field name into the lower text window of the query builder. Select an operator (e.g. =, >, <=, etc...) for the field name by clicking on the appropriate symbol button. Finally, select a unique value for that field by double-clicking on its entry in the values list. A query string also can be created by typing it manually into the text window. This may be necessary depending on the number of water rights in your study area. If there are too many values for a field, the values list will be empty.

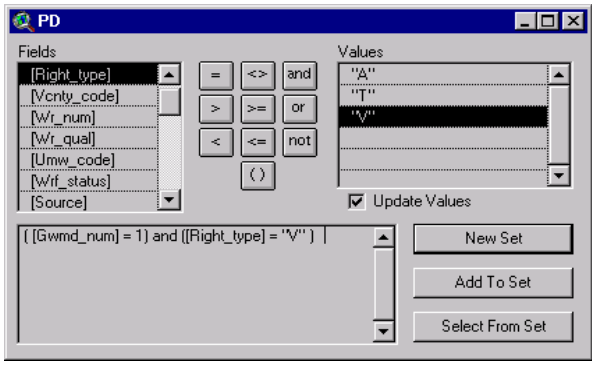

Figure 20- Query Builder

In the example shown in Figure 20, the query string will select all water rights in the map display that are vested and coded as being in the Ground Water Management District #1.

Once the query string is established, you can select from the database in three ways. Clicking on the *New Set* button will create a new selected set. Water rights that may have been selected before and do not match the query string will be unselected. Clicking on the *Add to Set* button will add additional water rights to the selection set that previously were unselected. Water rights that were previously selected will remain so. The *Select From Set* button will query and select only water rights that are currently selected. Refer to your ArcView manual for more information on building query strings and to the *Entity and Attribute Information* section of the metadata file for PDs listed under the WIMAS *Data Set Reviewer*.

Select PD by Theme

The *Select PD by Theme* button can be used to select PDs by their spatial relationship to other map features. For example, you can select all the PDs that lie within the geographical extent of a subbasin within a county or all the PDs that are within 10 miles of a town or stream segment

.

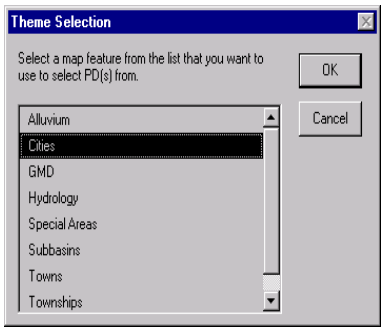

Figure 21- Base Theme Selection

After selecting the *Select PD by Theme* button, you will be prompted to select the GIS layer you want to use to select PDs from. For example, if you wanted to select all the PDs within 5 miles of a city, you would select the "Cities" layer from the *Theme Selection* window (Figure 21).

Once the base selection layer is identified (cities in this example), the *Base Theme Feature Select* window will prompt you to physically select the features from the base layer using the mouse. Features from the base layer can be selected and unselected by double-clicking on a single feature or drawing a polygon around a set of map features within the map display. Features from the base layer will turn yellow in color when they are selected.

You now have the option to enter a buffer distance, in miles, around the select features from the base layer that you want to select PDs from. In the example shown in Figure 22, all PDs within 5 miles of the town of Saint John will be selected. If the buffer distance was 0, then only the PDs actually located within the boundaries of Saint John would be selected.

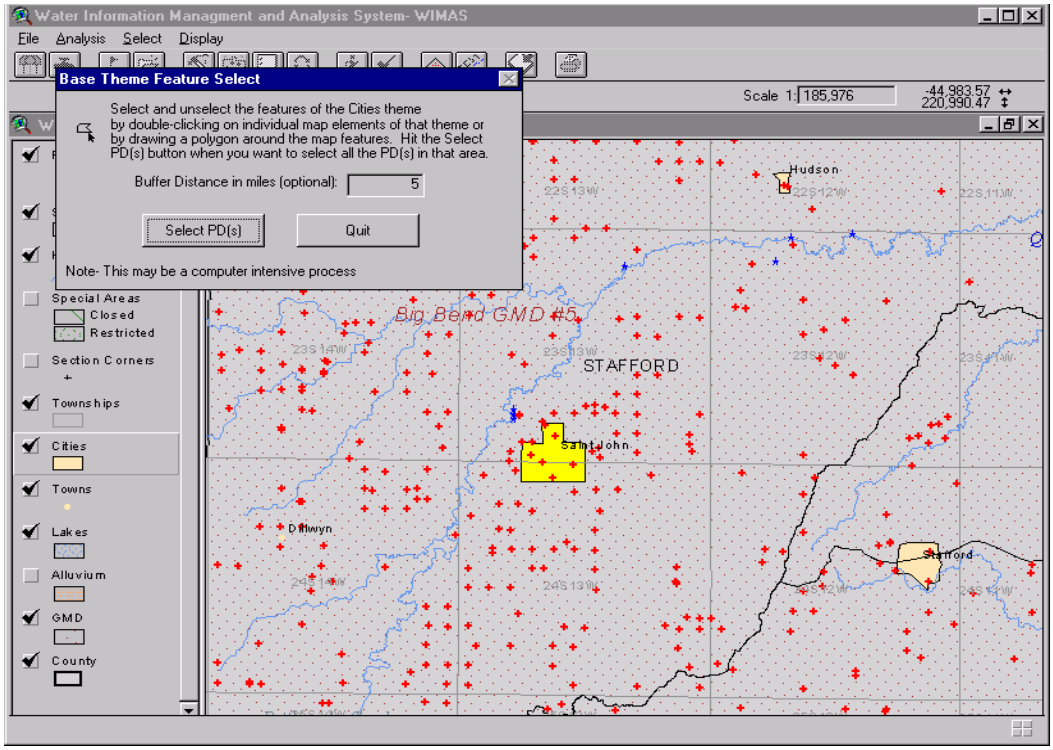

Figure 22- Feature select for base layer

When the features from the base layer have been selected and an buffer distance entered, hit the *Select PD(s)* button. Using the example from Figure 22, all the PDs within 5 miles of the town of Saint John are now selected (Figure 23). All summary and information sheets will now pertain only to water rights that lie within 5 miles of Saint John, Kansas.

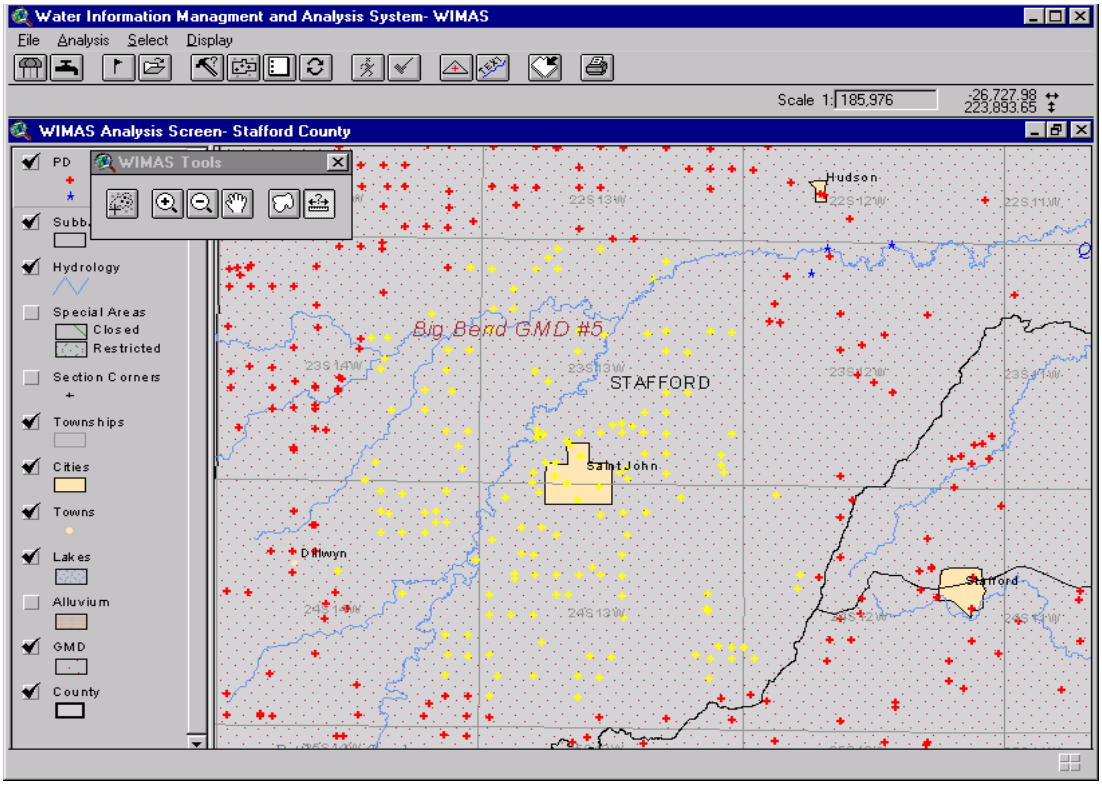

Figure 23- Selected water rights within 5 miles of Saint John, Kansas

Clear PD Selection

The *Clear PD Selection* button simply unselects all PDs on the map display. Use this button to start queries or theme selection routines from scratch.

Switch PD Selection

The Switch PD Selection button will toggle between selected and unselected PDs. All PDs on the map display that are selected will become unselected and all PDs that were unselected will become selected when this button is clicked. Using the example from Figure 23, if you wanted to select all the PDs within Stafford County, except for the ones lying within 5 miles of Saint John, this button would switch the selection.

Safe Yield Analysis

The intention of the Safe Yield Analysis is to identify how much water is available for appropriation given the annual potential ground water recharge and the amount of water currently appropriated within a distance, typically 2 miles, of a point. The Safe Yield Analysis routine is only available if the study area is based on a buffer distance for an existing individual water right or a proposed PD for a new water right application.

The Safe Yield Analysis starts by identifying where the PD is located. If your study area is based on a buffer distance around an existing water right that contains more than one PD, you will be prompted to select one from the set. Once the location of the PD is established, WIMAS will identify if the PD is in an area open, restricted, or closed to new water rights, calculate the estimated annual potential ground water recharge at that point, calculate how much of that recharge is available for appropriation, total how much water is currently appropriated in the circle, and list how much water is then available for additional water rights (Figure 24).

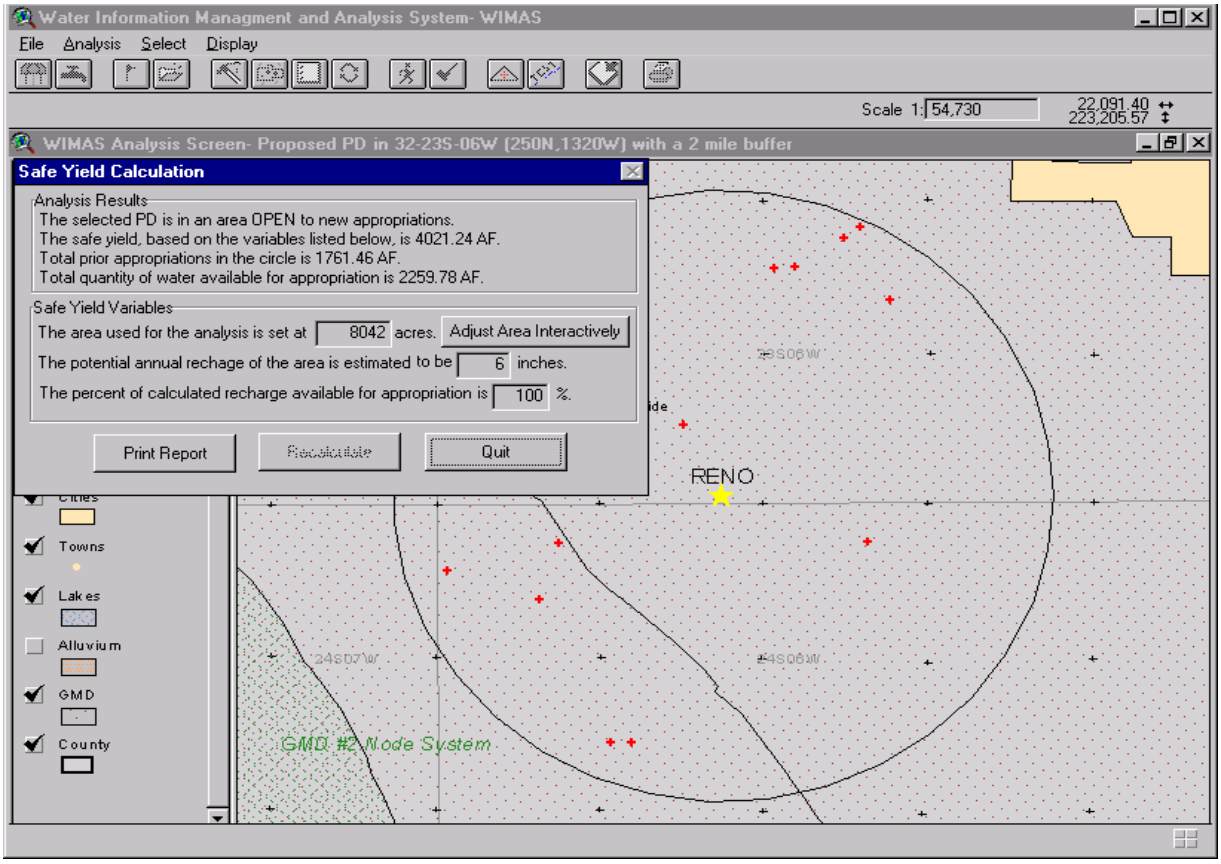

Figure 24- Safe Yield Analysis Results

The variables used in the analysis can be changed and the Safe Yield value recalculated. The area used by the routine can be changed by typing in a new area value or measuring a new area on the map display. By clicking on the *Adjust Area Interactively* button, you will be prompted to draw a polygon around the area you wish to use in the analysis routine. The potential annual recharge and the percent of recharge available can also be changed by typing in new values. After changing any of the Safe Yield variables, click on the *Recalculate* button to update the rest of the form.

A report can be created by clicking on the *Print Report* button. A Safe Yield Report Sheet will be created in Windows WordPad that lists the study area, the Safe Yield results, the variables used, the date for which the water right information is valid, and a listing of the individual water rights used (Table 2). The water rights used in a Safe Yield Analysis do not include domestic rights, term permits, or temporary permits. If you re-run the Safe Yield Analysis, you will need to close the current WordPad document or save the document file to a new name before a new report is generated.

Table 2- Example Safe Yield Report Sheet.

Safe Yield Report Sheet.
Proposed Pd In 32-23s-06w (250n,1320w) With A 2 Mile Buffer.

Analysis Results

The selected PD is in an area OPEN to new appropriations.
The safe yield, based on the variables listed below, is 4021.00 AF.
Total prior appropriations in the circle is 1761.46 AF.
Total quantity of water available for appropriation is 2259.54 AF.

Safe Yield Variables

The area used for the analysis is set at 8042 acres.
The potential annual recharge of the area is estimated to be 6 inches.
The percent of calculated recharge available for appropriation is 100 %.

Authorized Quantity values are as of May 04, 1998 and are based on Appropriated and Vested ground water rights and possible stream nodes for GMDs. Domestic, Term and Temporary water rights have been excluded.

There are 10 water right(s) and 13 point(s) of diversion within the circle.

File Number	Use	ST	SR	Q4	Q3	Q2	Q1	FeetN	FeetW	Sec	Twp	Rng	ID	Qind	Auth_Quant	Add_Quant	Tacres	Nacres
A 6318	00	IRR	NK	G		NW	SW	SE		31	23	6W	1	WR	64.00	64.00	50.00	50.00
A 7718	00	IRR	NK	G				3960	1350	6	24	6W	1	WR	89.00	89.00	140.00	140.00
A 9291	00	IRR	LO	G		NC	W2	NE		4	24	6W	1	WR	120.00	120.00	80.00	80.00
A 11203	00	IRR	NK	G				2700	2600	32	23	6W	1	WR	192.00	192.00	143.00	143.00
A 12881	00	IRR	NK	G				2000	2000	6	24	6W	2	WR	49.00	49.00	76.00	76.00
A 18394	00	IRR	KQ	G		SW	SW	NW		6	24	6W	3	WR	30.00	30.00	20.00	20.00
A 29734	00	IRR	LO	G		NE	NW	SW		8	24	6W	2	WR	207.00	207.00	138.00	138.00
Same						NW	NW	SW		8	24	6W	1					
A 30788	00	IND	KE	G		SE	SW	NW		28	23	6W	1	WR	707.59	707.59	0.00	0.00
Same						SW	SW	NW		28	23	6W	2					
A 31686	00	IND	KE	G				4030	2800	28	23	6W	3	WR	278.01	278.01	0.00	0.00
Same								4380	2250	28	23	6W	4					
A 40299	00	MUN	KK	G				1879	1318	28	23	6W	6	WR	24.86	24.86	0.00	0.00

Restrictions Check

The *Restrictions Check* button tests a proposed PD for spacing distance and if it is subject to other water right restrictions. As such, this analysis function is only available when the study area is based on a buffered distance around a proposed PD for a new water right application.

The restriction check displays a report based on the PD's location (Figure 25). The report first identifies which KDA-DWR recognized subbasin the PD is located in. It then lists any special use area and the status of that area which may apply to a new water right application. The policy or GMD regulation governing that area is also provided. The report closes by identifying the well spacing requirements for that area and indicates if the proposed well location meets that condition. A circle, based on the well spacing requirement, is drawn around the PD on the map display.

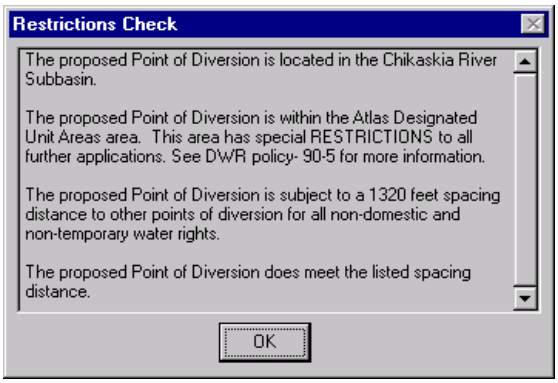

Figure 25- Restriction Check Report

Spacing distances are required only for ground water rights and their associated wells. Spacing distance requirements for new water right applications can change based on where the PD is located in the state. Both the Southwest Kansas Groundwater Management District #3 and Northwest Kansas Groundwater Management District #4 base their well spacing requirements on how much water will be appropriated by the proposed water right. If the proposed PD falls within one of these GMD boundaries, you will be asked to select a spacing distance, based on the respective GMD's appropriation levels, before the restriction check will continue.

Change PD Display

By default, PDs are drawn based on the source of water for each water right. Clicking on the *Change PD Display* button will toggle the map display between plotting the PDs by the use made of water or by source of water supply for the water rights. This legend (located to the left of the map display) will only show the unique sources or uses of water that are found within the study area. For example, if a study area only contains irrigation water rights, the other types of water uses will not be shown in the legend.

Toggle Theme Labels ON and OFF

This button gives you some control on labeling themes on the map display. By clicking on the button, you will be provided with a list the GIS layers or map themes that can have their labels toggled on and off. If the selected data layer from the list is currently labeled, the labels will be erased. If the selected data layer from the list is not currently labeled, it will be labeled. All of the data layers will be labeled by the name of the feature with the exception of the PD theme which will be labeled by all associated water right numbers. If you select to label PDs by their water right number, only PDs currently selected within the map display will be labeled.

This tool is useful if you either change the map projection or zoom in or out of the starting extent of the map display which sometimes causes the labels to "slide" from their respective map feature. When this happens, simply toggle them off and then back on again. The label tool can also be used to reduce the amount of clutter on the map display.

Depending on your screen and window size, map extent, and number of features to be labeled, some features might not be labeled since the text on the map display will not overlap. In addition, only features within the current map extent of the map display will be labeled.

Add Theme

The add theme button allows you to add other ArcView shape files, ARC/INFO coverages, or raster images to your current map display. Additional data files may be used to spatially select water rights or provide more information on the map display. If you are adding an outside vector based data set, its native projection has to be set to Geographic (decimal degrees) or it will not align properly with the other WIMAS data files. If the additional data file is not stored natively in a Geographic, decimal degree projection, the file will be added to the map display, but will not align properly with the other WIMAS data files. All of the original data sets provided in the WIMAS program are in a Geographic, decimal degree projection, based on the NAD27 datum.

Images and other raster-based data sets are not affected by ArcView's projection routines. As such, you can add image files, such as DOQs or Landsat files, and set the WIMAS projection parameters in the WIMAS Start Screen to match that of image's native projection. This will allow the decimal degree, geographic based data files of WIMAS to be re-projected automatically and align properly with the raster-based files.

Zoom to Study Area

Clicking on this button resets the map display back to the extent of the starting study area. This is useful if you zoom or pan to a certain area of the map and wish to return back to whole study area.

Print Map

The *Print Map* button will generate a map that is based on the current map display. All maps generated from WIMAS are landscape in orientation and based on the currently selected printer's page margins. To setup a printer, go to the *File* menu and select *Printer Setup*. This will activate the Windows Print Manager where you can select and set the properties for your printer.

After selecting the *Print Map* button, you will be prompted to select a landscape paper size. The dimension of each size is provided in inches. If the selected paper size does not match your current printer settings, WIMAS will prompt you to adjust the printer accordingly. Most commonly, the printer paper orientation is not set to "landscape".

Next you will be prompted to accept or change a default title for the map and specify a map scale (Figure 26). Leaving the scale set to *Fit to page* will allow the map to be automatically scaled based on the map extent and paper size. See *Printing Maps to Scale* section below if you want the map to be plotted at a specified scale.

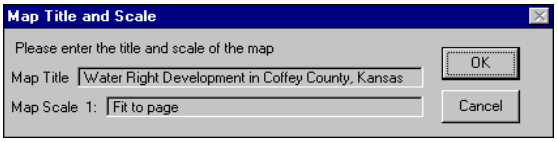

Figure 26- Map Title and Scale

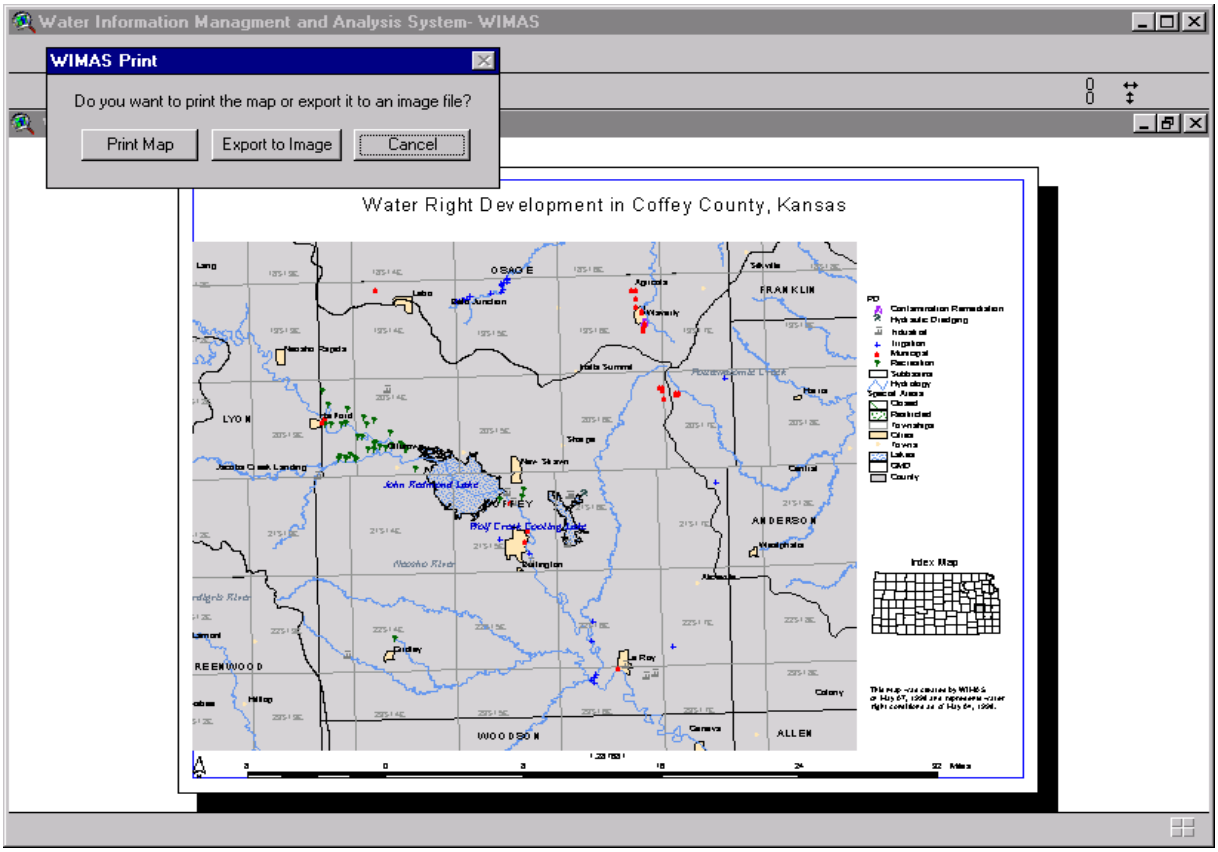

Figure 27- Example Map of Coffey County, Kansas

WIMAS then generates a map based on the visible GIS layers in the map display. The map will contain a title, legend, index map, scale bar and text, north arrow, and the date the map was created and the date for which the water rights are valid. Once created, you have the option to send the map to the printer by clicking on the *Print Map* button. The map can also be converted to an image format by clicking on the *Export to Image* button. For example, you could save the map as a Placable WMF image file (.wmf extension) and import it into a WordPerfect document.

Printing Maps to Scale

Map scale is the relationship between distances measured on a map and distances measured on the actual earth surface. Map scale is usually represented as a ratio, such as 1:100,000, which is defined as 1 unit of measure on the map represents 100,000 units of measure on the earth. This ratio is constant and can be used for all units of measure. For example, on a map with a scale of 1:63,360, one centimeter on the map would represent 63,360 centimeters on the ground. Likewise, since one 1 inch on the map represents 63,360 inches on the ground, the map could also be described as 1 inch on the map equals 1 mile on the ground.

Maps can be plotted to a specified scale by entering the actual ground denomination of the scale in the *Map Title and Scale* window (Figure 28). From this example, the map will be plotted at a scale of 1:24,000. WIMAS will try to draw the entire map display at this scale on the actual map sheet. If the selected paper size is not large enough for the specified scale of the WIMAS map display, the map will still be drawn to your specified scale. However, areas falling outside of the graphic map area on the paper will not be displayed. You can conduct a quick check to see the effects a specific map scale may have by entering a scale for the WIMAS map display before creating a map. This can be done by entering the desired scale in the scale line at the upper left corner of the map display. After typing in your scale, hit the *Enter* or *Return* key and the map display will redraw based on that scale.

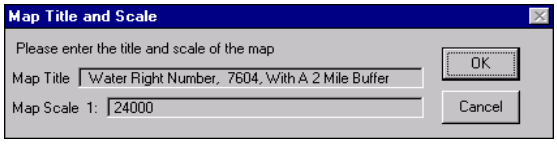

Figure 28- Setting the Map Scale

Updates

All water right information for WIMAS is extracted from the PD ArcView shape file. As this file is updated semi-annually, it can be downloaded from the DASC's ftp site at http://gisdasc.kgs.ukans.edu. After you have downloaded the updated PD.ZIP file from the DASC, there are some steps you need to take in order to get the updated information available to WIMAS.

An ArcView shape file is really a series of files containing the same name with different extensions. Depending on processing steps, there may be as many as 7 files associated with a single ArcView shape file. Before you uncompress the file downloaded from the DASC, you should delete all of the PD.* files associated with the PD shape file within the \WIMAS\COVERS directory. Simply uncompressing the PD.ZIP file in the \WIMAS\COVERS directory may not replace all the necessary files. The files that should be deleted include the PD.AIH, PD.AIN, PD.DBF, PD.SHP, and PD.SHX and possibly the PD.SBN and PD.SBX files. After deleting the files, uncompress the downloaded PD.ZIP file from the DASC into the \WIMAS\COVERS directory.

WIMAS Execution Speed

WIMAS allows you to query water rights anywhere in the State of Kansas. As such, all of the data files are state-wide in extent and can be large in storage size. Combined with the robustness of the ArcView 3.0a software, response times for the WIMAS program may suffer depending on your computer hardware and setup configuration.

Within the GIS community, there has been much discussion on the optimal hardware configuration for ArcView. Since ArcView 3.0a is a 32-bit application, the proper computer

operating system should be considered. Having adequate levels of RAM, 32 mb and greater, and a good video card have also been recommended to improve performance.

If you have a strong understanding and background with the functionality of ArcView, the supporting GIS layers can be "clipped" to a smaller extent. For example, if you only work in a four county area in southwest Kansas, you don't need the statewide GIS layers used in WIMAS. Using ArcView, you could clip all the ArcView shape files, located in the \WIMAS\COVERS directory, down to a smaller area. Once all the GIS layers have been processed, replace them with the original files using the same name. If you pursue this option, the newly clipped shape files have to maintain their original name or WIMAS will not operate properly. Several of the GIS data layers also have indexes generated on several of their respective database fields. Depending on the size of your clipped set, you may want to re-index these items. Table 3 provides a listing of the GIS layers and database fields that are indexed.

Table 3- GIS Layers and Index Fields

GIS Data Layer	Indexed Fields
County	Upname, Name
Cr_areas	Name, Policy, Status
Dwrbasin	Bsn-name
Dwrswims	Rr1name
Gmd	Name
Lakes	Name
PD	Wr_id,Vcnty_code, Wr_num, Wr_qual, Umw_code, Source, Pdiv_id Basin_name, Cnty_code, Add_quant, Nacres_irr, Af_used, Acres_irr
Ppl	Name
TWP	Ident

Known Problems

There are some known problems that may occur within WIMAS that are still being investigated. WIMAS, in its current version, is a non-customizable application, however, it is possible to unintentionally save information to the original project file. If you click on the "x" in the upper right hand corner of the main WIMAS window, you will be prompted to save changes to WIMAS.APR. By doing so, you save program links to the temporary files used by WIMAS within its original project file. This will have no effect on the WIMAS program itself. However, if you ever delete all the files from the temporary directory used by WIMAS (which you should do periodically), the next time you run the WIMAS program you will be prompted for the location of those files (Figure 29).

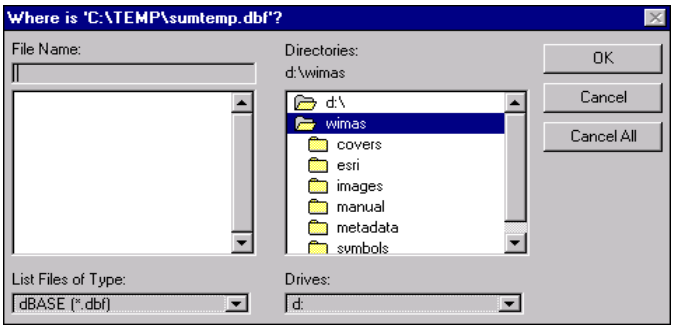

Figure 29- TEMP directory error

Hitting the *Cancel All* button will tell ArcView to stop looking for these files. As you run the various WIMAS routines, the new temporary files will re-establish the program link.

Other known problems include a rare "assertion error" when WIMAS passes a report to Windows WordPad. Simply closing the Summary Form or Safe Yield Results window and reactivating them usually fixes the problem. The scale bar on maps created by WIMAS will be off center with larger paper sizes. This is more of a nuisance and does not effect the accuracy of the scale bar itself.

Lastly, most of the polygon fill patterns on the map display are vector fills that are suitable when printing hardcopy map outputs to the printer. When adding additional data sets to the map display, the vector fills sometime stretch out across the map display. The next time the map display is re-drawn, either by panning, minimizing and then maximizing the map display window, or turning a theme off and back on, the fill patterns will display properly.

WIMAS Extension for ArcView

Much of the functionality of the WIMAS program can be incorporated into normal, independent ArcView projects by using the WIMAS extension. The WIMAS extension will provide the ability to summarize authorized quantity or reported water use and list water right information by unique points of diversion or individual water rights. To load the extension, copy the \WIMAS\EXT\WIMAS.AVX file to the \ESRI\AV_GIS30\ARCVIEW\EXT32 directory. The WIMAS extension will appear as an option in the Available Extensions list within ArcView. When the extension is activated within ArcView, a new menu will be added the View GUI called WIMAS.

In order of the extension to work, the active theme representing points of diversion and the associated water rights of the view has to have a database containing field names and data associated with a KDA-DWR released GIS data set. Refer to the \WIMAS\METADATA\PD.TXT file for a proper listing of the database items and structure.