

# METIER Course n°2

## Information Management in Environmental Sciences

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### **Introduction to ArcView 3**

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## I. Brief Overview of ArcView

ArcView is a software program, developed by [Environmental Systems Research Institute](#) (ESRI), of Redlands, California, which is used to display and analyze geospatial data. ArcView Version 3.2 is the currently available version of ArcView, and is used for this exercise. ArcView version 8, presently under development, has an interface very similar to that of ArcInfo 8. A parallel exercise to this one, [Introduction to ArcInfo 8](#), introduces that interface.

All activities within Arcview are organized with a **Project**, which may consist of a number of **Views**, **Tables**, **Charts**, **Layouts** and **Scripts** (Scripts are programs in ArcView's Avenue language and this exercise does not include user-defined scripts). The functions of Arcview include: displaying coverages in a view, viewing the related attribute tables of this view, relating attribute tables with a key item, plotting charts to display spatial information, and creating layouts of the view and related tables and charts.

## II. Goals of the Exercise

- To serve as an introduction to Arcview
- To give you experience in working with Views, Tables, Charts, and Layouts in Arcview
- To produce a layout on which is shown a map connected to charts of data measured at locations on the map.

## III. Computer and Data Requirements

To carry out this exercise, you need to have access to a PC which runs ArcView 3. You will be working with the following shapefiles during this exercise:

1. A polygon shapefile of the counties of Texas, called **Texas**
2. A point shapefile of pan evaporation gage data, called **Evap**

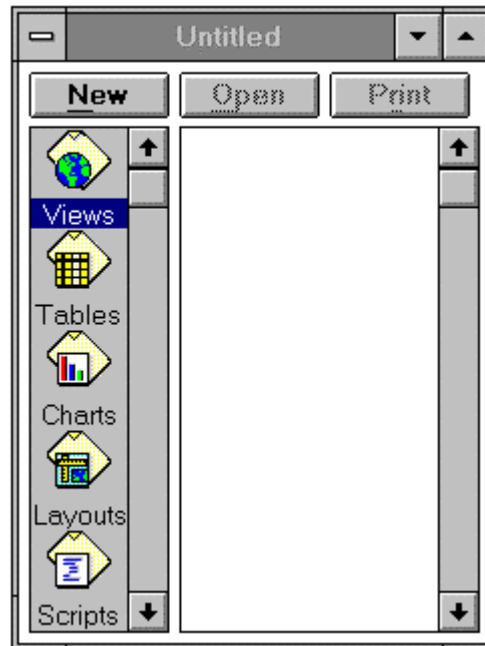
These shapefiles consist of three files each (**evap.dbf**, **evap.shp**, **evap.shx** and **texas.dbf**, **texas.sbn**, **texas.sbx**, **texas.shp**, **texas.shx**) You can get them from the server `\\commun_tpl\Texas` They can be copied to your working directory over the network using filemanager.


## IV. Procedure

### 1. Start Arcview


Execute ArcView on your machine. On PC's this can be done by clicking on the Arcview Icon in the Program Manager Window.

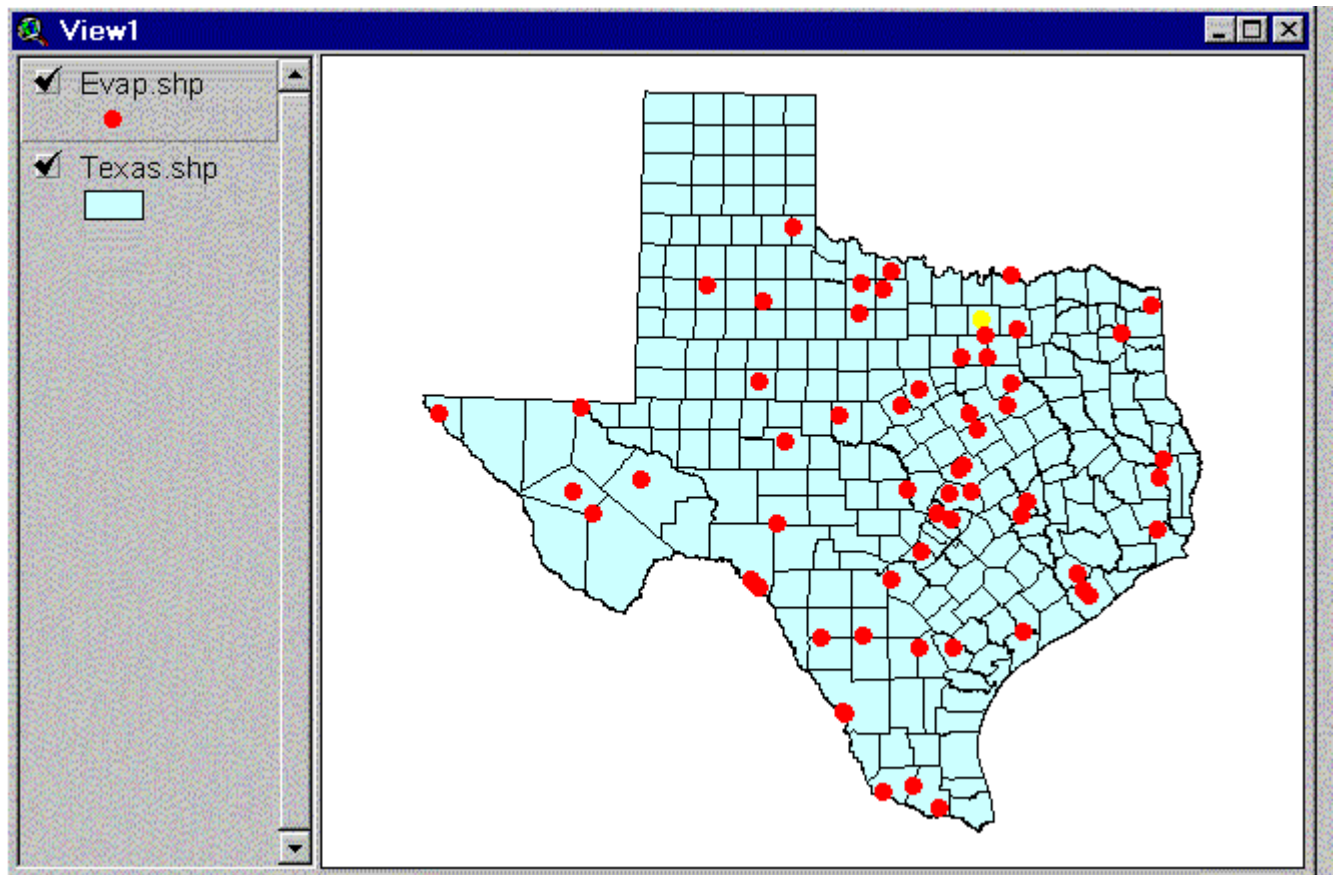
When ArcView is first executed, a new untitled **Project** window is opened. This window includes several icons marked **Views**, **Tables**, **Charts**, **Layouts**, and **Scripts**. This is the main Project window, which allows you to create new Views, Charts, etc., or to open existing ones that you have already created in that project.



**Help!** If you are lost and don't know how to do something, ArcView has on-line help which is accessed by hitting the  symbol in the display window.


## 2. Display Themes in a View

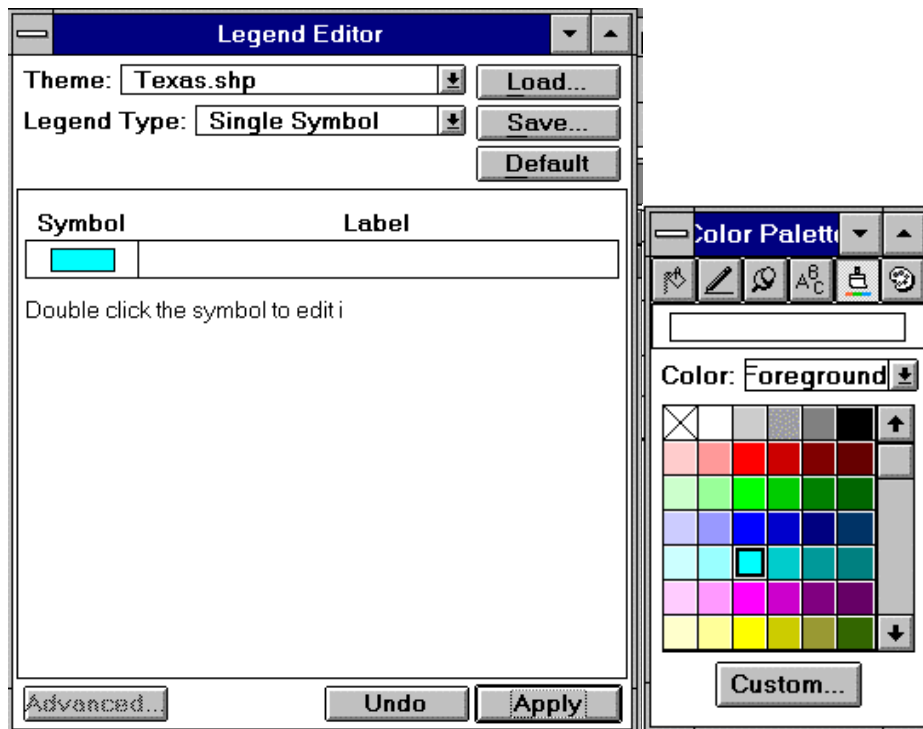
Now, be sure that the **View** icon is highlighted in the Project window and click on **New** for a new view. Drag the view window out of the way and resize it if necessary. Add a new theme to the view by clicking on the  button on the top tool bar. Select **Feature Data Sources** in the **Data Source Type** slot (it might be already selected). Go to your local workspace directory either by typing the directory name into the pathname box or double-clicking on the directory with the mouse. Highlight the two coverages shown: **Texas.shp** and **Evap.shp** (hold the **Shift** key while selecting the second coverage), and click on **OK** to add them to your View. They will each show up as a bar in the legend portion of the View window with the name of the shapefile shown on it. For the View you are working with, the shapefiles **Evap.shp** and **Texas.shp** are called **Themes**. Click on the raised box to the left of the Theme names **Texas.shp** and **Evap.shp** to make a check mark and see the coverages displayed in the View window. Drag the legend bar for the polygon coverage (Texas) below that for the point coverage (Evap) to show points on top of polygons. Dragging a theme is accomplished by clicking beside the theme symbol, holding down the mouse and dragging the box that appears.



Once you've got your Project set up, you can save it to a file by making the Project window active and choosing the menu option **File/Save Project**. A Project file has the extension .apr and contains information about the structure of your project, including the pathnames to the data displayed in it. The Project file is an ASCII file that can be viewed with a text editor if you are curious about what it looks like. It is wise to periodically save the Project as you carry out this exercise so that you can recover all your work in the event that you crash Arcview before completing the exercise.

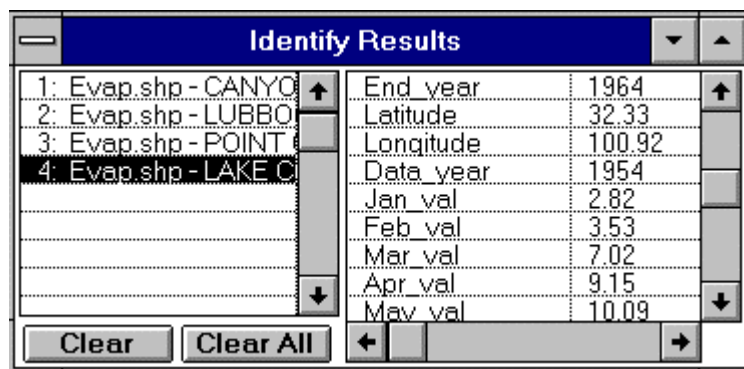
### 3. Adjust the Display of the Themes

The legend for a Theme can be adjusted by double-clicking on that Theme's name. This brings up the **Legend Editor**. Adjust the coloring of a theme by clicking on its Symbol box and using the  paint brush in the top right corner of the **Color Palette** which appears. Select **Apply** in the Legend Editor to get the new color. Close the Color Palette and Legend Editor boxes using the icon in their upper left corner.



You can zoom in or zoom out from a portion of the View window using or . To zoom to the extent of active Themes, use the tool in the upper row of the tool bar. A Theme is active if its legend bar in the View window appears raised. Click on the Theme's legend bar to make it active.

By clicking the icon in the View tool bar and then clicking on a map feature in the View, you can find out information about any feature in the active Theme (a display of its record in the data table). If you click on a feature and don't see the correct record displayed, check to see that the correct theme is highlighted in the View window legend bar.



#### 4. Open a Table


To View tabular information associated with a Theme, first activate the Theme of interest by clicking on the Theme name in the legend bar of the View window, then click on in the top row of buttons to open the Table.

#### Selecting Features in the Table


By clicking on a row in a Table you can highlight that row and the corresponding feature in the map.


Attributes of Evap.shp							
<i>Stat_name</i>	<i>Stat_civ</i>	<i>Datum</i>	<i>Beg_mth</i>	<i>Beg_year</i>	<i>End_mth</i>	<i>End_year</i>	
CHILDRESS 13 NW	CHILDRESS	1710.00	2	1975	6	1978	↑
IOWA PARK EXP STATION	WICHITA	980.00	9	1947	2	1964	
DENISON DAM	GRAYSON	610.00	1	1948	5	1992	
LAKE KEMP	BAYLOR	1170.00	9	1974	5	1992	
LUBBOCK 9 N	LUBBOCK	3250.00	1	1952	2	1956	
LAKE KICKAPOO	ARCHER	1060.00	2	1948	2	1964	
SPUR	DICKENS	2310.00	8	1947	3	1964	
WRIGHT PATMAN D & S	CASS	280.00	1	1981	5	1992	
TEXARKANA DAM	CASS	280.00	3	1956	2	1958	↓

Notice how there is a one to one correspondence between a record in the data table and a geographic feature in the map. This table-map linkage is one of the key things that makes a GIS operate effectively.

To make sure that the row you've selected is easy to see, promote to the top of the table using the  icon. By holding down the shift key you can highlight several features at once.


### Selecting Features Geographically in the View

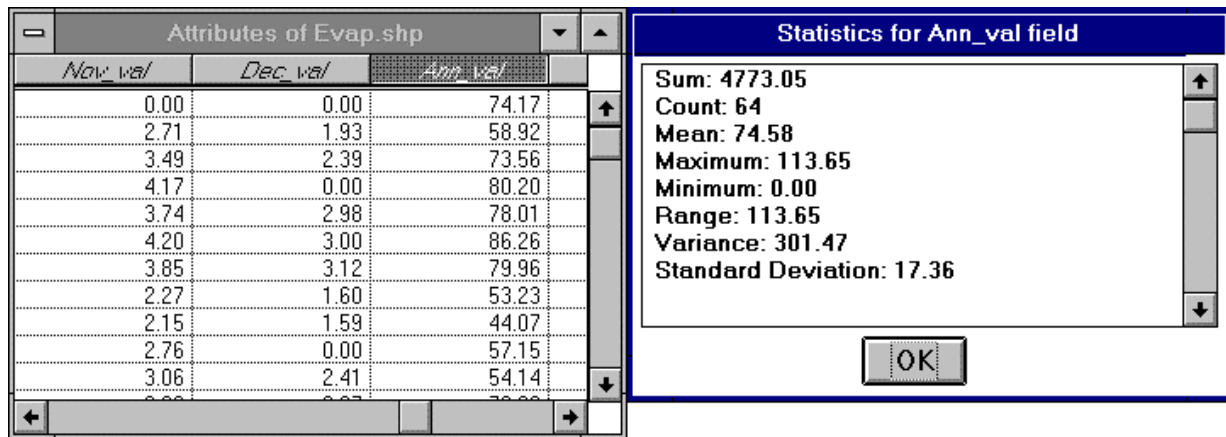
Geographic features from a particular theme can be selected graphically by highlighting the theme, clicking on the  tool, and then clicking on the features in the view. Again, by holding down the shift key, you can add features to the set you've previously selected. You can also drag a box over a region on the screen and select all the features in that region. If you attempt to select features graphically and don't succeed, check that you've clicked on the theme name in the legend bar so that it is highlighted.

By clicking on the  icon you can unselect all records. By holding down the shift key and clicking on a selected record, it will be unselected.

The data that you are examining are summary statistics of pan evaporation records at various sites in Texas. The attributes of the data, shown in column in the data table, include the name of the station, the city it is located nearest, the datum (elevation above mean sea level of the station in feet), the beginning and ending month and year of records, the latitude and longitude of the station in decimal degrees, and the values of the monthly and annual pan evaporation at this site in inches per month or per year, respectively. You'll see that there are missing values at some stations. The stations at Hidalgo in South Texas, and Lubbock in North Texas make an interesting comparison of evaporation conditions in the State.

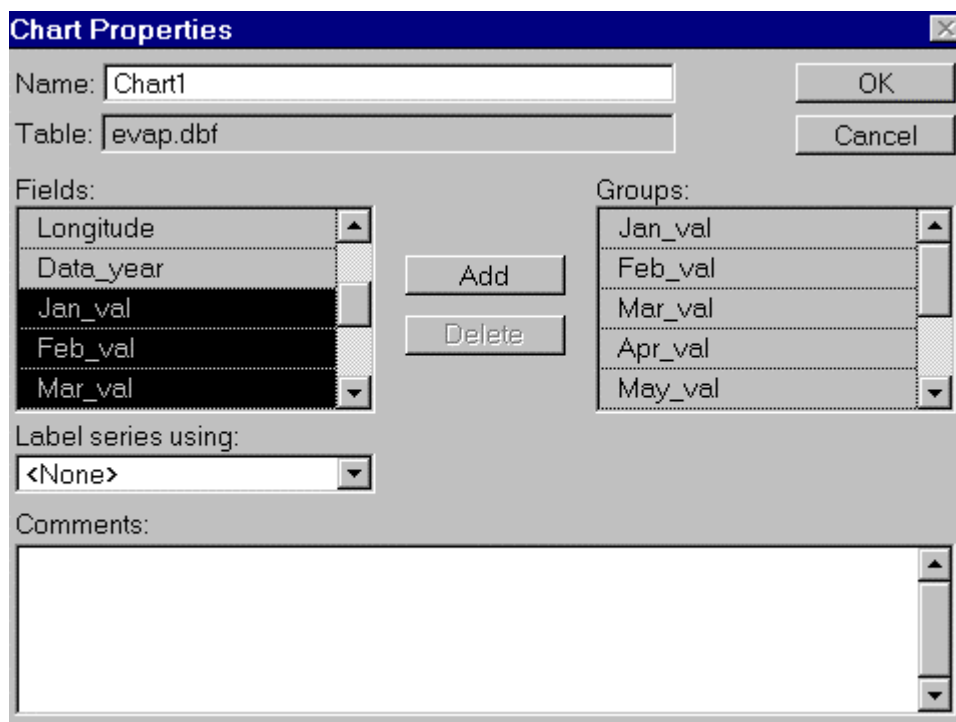
### Selecting Particular Fields in the Table

In the Table associated with Texas.shp, there are many data fields. You can see all of these fields by scrolling to the right using the scroll bar at the bottom of the Table. You can determine summary statistics for a particular field by selecting that field (depressing its header label) and then selecting **Field/Statistics** from the Menu Bar. If you have records selected in the table, the statistics function will summarise the statistics of these records only. If you want the statistics of all the records to be summarised, make sure that you have cleared all the selected records using the  button before calculating the statistics.

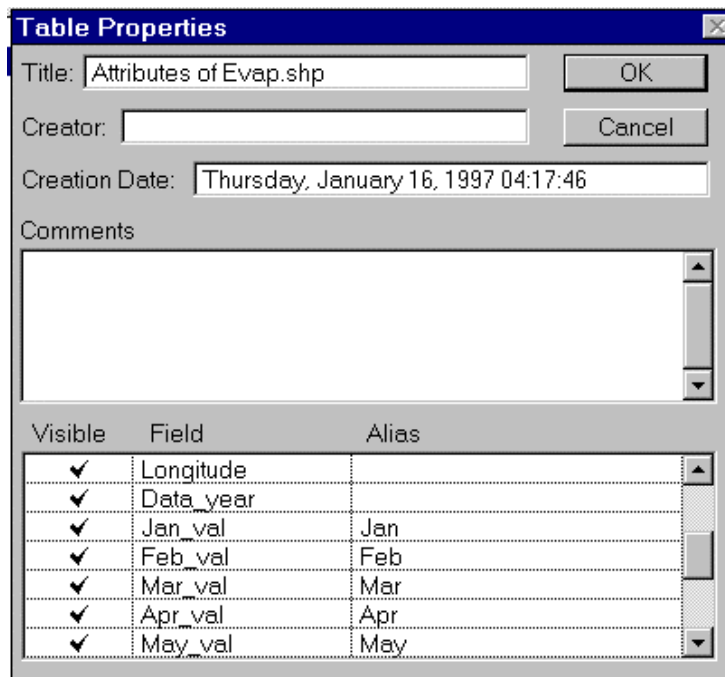



### 5. Make a Chart

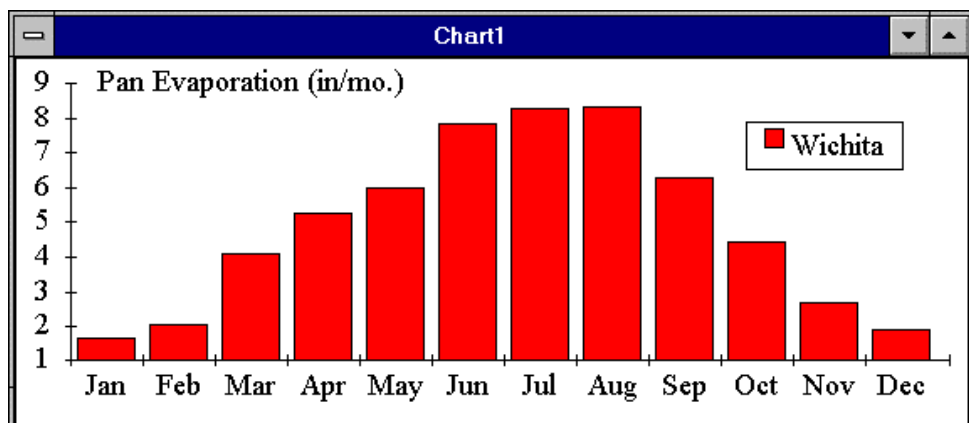
A chart can be plotted of one or more records selected from a table. Select a particular gage record by clicking on its symbol on the view or its record in the table. With the table open, click on the **Chart** icon in the Project window, select the items from the table to be added to the chart in the properties box and give the chart a name. For our exercise, we wish to plot the monthly evaporation, so highlight the months on the left hand side and click on the box labeled **Add**. The user can also select the labels for the chart data in the **Label series using:** box.



Again, multiple fields can be selected by holding down the shift key. Once this is done, click on the box labeled **Add**. After clicking OK, a Chart will be plotted. You can change the form of the Chart using items in the top tool bar. The horizontal axis of the Chart is automatically labeled using the field names you selected for plotting. If these are too long to fit on the chart, you can make shorter aliases for these field names by making the Table active, selecting the menu item **Table / Properties**, and entering text into the column labeled **Alias**. For example, you can replace the label Jan\_val with Jan, etc.



To Edit Features of the Chart, select the Chart Edit tool  and then click on the feature you wish to Edit. You can change the nomenclature of the legend and the chart title and location in this way.




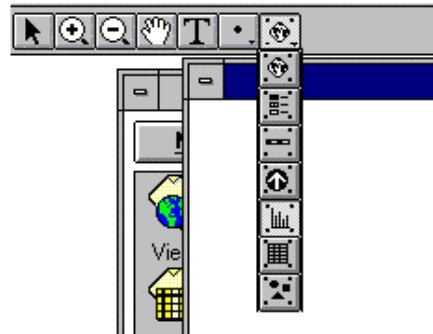
### 6. Make a Layout





A Layout allows a user to combine Views, Tables, Charts, Legends, and Text into one document for





printing. To create a new Layout, double-click on the **Layouts** icon in the Project window. To work with a Layout, it is useful to enlarge the Layout window (by dragging on the window corner(s) with the

mouse). After enlarging the window, click on the **Zoom to page**  tool to maximize use of the window space. As illustrated in the image below, by clicking and holding the left mouse button on the furthest icon to the right on the lower tool bar, you can add a number of different objects to the Layout. From top to bottom, the objects that you can add are a View, a Legend, a Scale, a North Arrow, a Chart, a Table, or a Graphic. After selecting one of these items, you can draw a box on the Layout to specify the location and size of the selected object.



Begin by selecting a view  and drawing a box to accommodate it. When you've drawn the box, a dialog box will come up asking you to select the view to show in the box. Select **View1**, and you should see your view of Texas show up. You can add another object template to the layout using the right hand side tool in the lowest row of the upper tool bar. Select the chart object  to add a chart. To connect the chart visually to the corresponding point in the view use the draw tool  which is selected from the list of icons under the  button. When drawing the line you'll find that it automatically snaps the end points of the line to the grid points shown in the Layout window. To stop that happening, click off **Snap to Grid** in the **Layout/Properties** window.

You can add text to a Layout using the  button. You can also draw points, lines, and polygons using . If you find that the lines you are drawing are not in quite the right locations, use **Layout/Properties** and click off the "Snap to Grid" box. To change the size of the text you've added, highlight the text and use **Window/Show Symbol Palette** and the text icon to alter the text size. Text size of 14 point is the default. Usually 24 or 36 point looks good in layouts. Similarly, to change the line thickness use the same palette and select the Line icon. Line thickness of 1 is the default.

## 7. Do Something Creative!!

Now that you are familiar with the operation of Arcview, you can make some new maps, charts or tables of different variables in places that are of interest to you.

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**Credits :** this Practical Work has been adapted from materials designed by David Maidment and Francisco Olivera (Center for Research in Water Resources, University of Texas at Austin ).

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