

FO 4313/6313 – Spatial Technologies Laboratory 10  
**GIS / ArcMap Software Familiarization / Data Exploration**

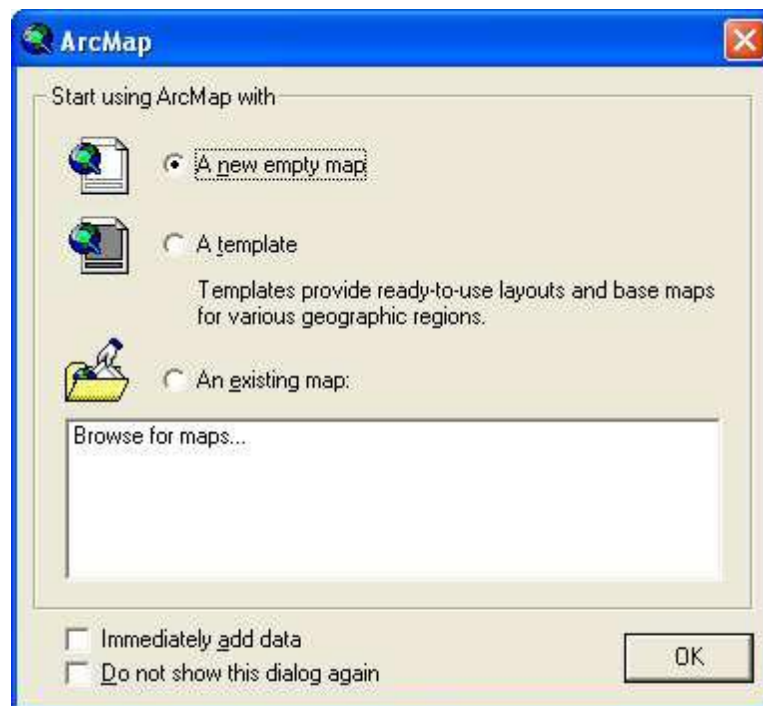
In the following laboratory exercise, you will learn GIS data retrieval and analysis skills with the ArcGIS software package by Environmental Systems Research Institute (ESRI). You will turn in two exercises and a map generated in the final lab. ArcMap is the top tier of a three tier family of software that also includes ArcEditor and ArcInfo. These are more robust and advanced programs that will not be used in this course. For more instructions on these programs you can enroll in GIS for Natural Resource Management (FO-4472/6472 and FO-4471/6471).

### 1. Computer Lab Rules

- No eating, drinking, smoking, chewing, dipping, etc.
- Do not abuse the equipment
- **Remember to back up your work!!!**  
“Computers fail at a rate that is directly proportional to the desperation of users.” (So don’t put off work until the last week)
- Close all programs before leaving the lab
- Remember: “There are always at least two ways to get the work done.”

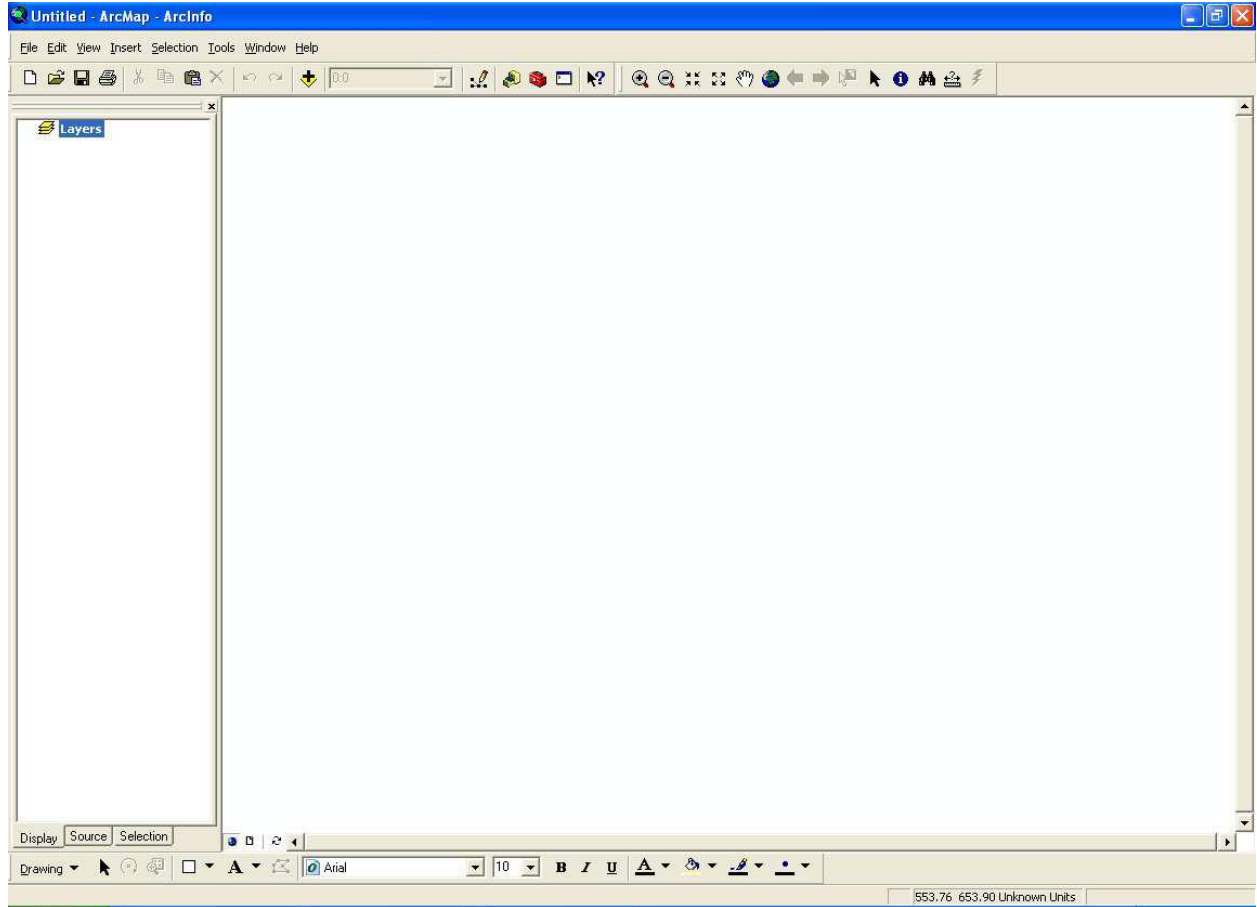
### 2. Starting ArcMap

To start the ArcMap program, click on the Windows **START** button in the lower left hand corner of the screen, then **Programs**. Find the **ArcGIS** group and then select the **ArcMap** icon from the menu. When ArcMap launches you should see the following screen:



Make sure that the “A new empty map” is selected and click **OK**.


You should have the following layout (or one similar to it) on your screen:




In ArcMap there are two main ways to view your data, **Data** and **Layout**. When you start ArcMap, you will be in the **Data view**. This is where you will be doing all your work until you are ready to make a map for printing. When you are ready to make a map will need to click on **View** select **Layout View**.

### 3. Add a New Layer

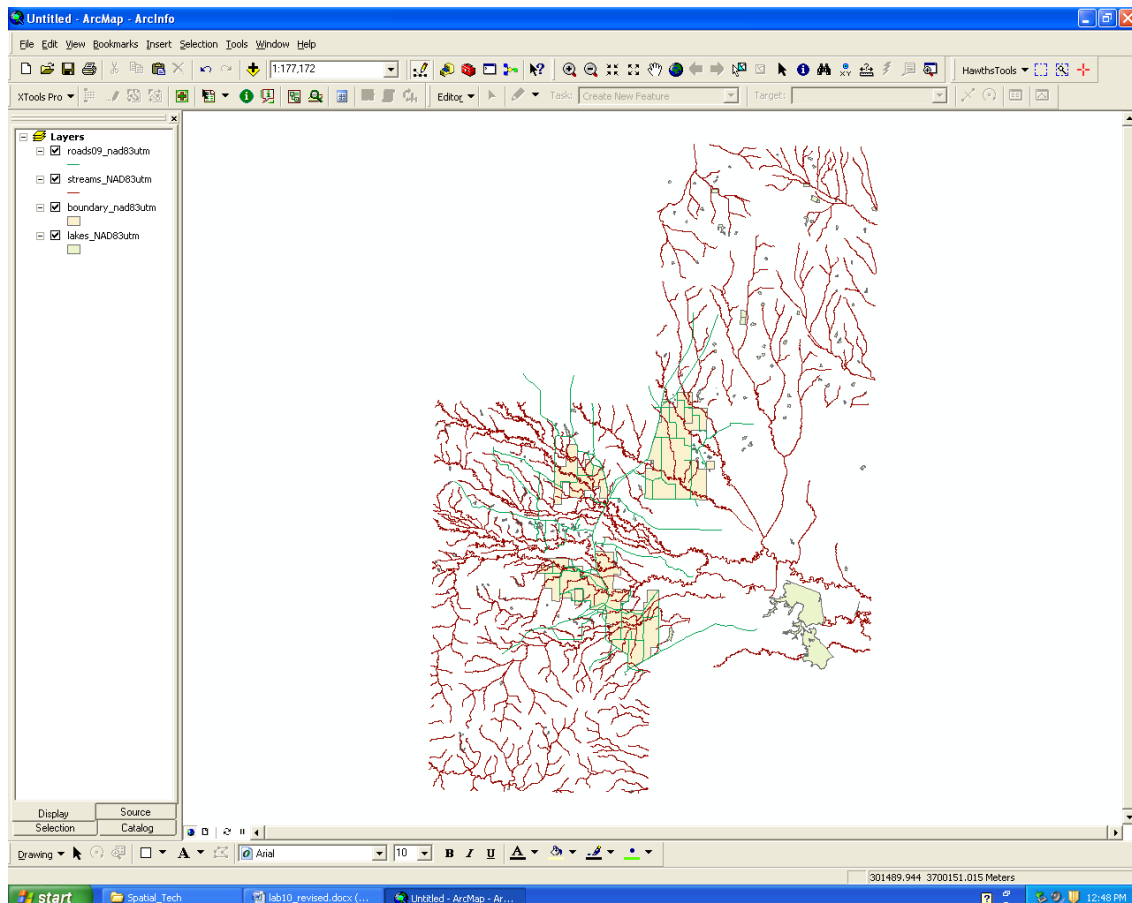
There are a wide variety of data types that ArcMap can display. The main types that will be used in this course will be shapefiles and coverages, which are the files specifically made by ArcMap. You will also use Mr. Sid and Imagine files, but no analysis will be done with these files. When you add data into the data view, you are adding a layer to your map. To add a new layer to the data view you will

need to click on the **Add Data**  icon located along the top of the screen. A standard file navigation window will appear. If the folder needed is not shown in

this window, you can navigate to it by use of the  button. You need to navigate to N:\GISData\StarrForest\May 09 Starr GIS and add the following files:

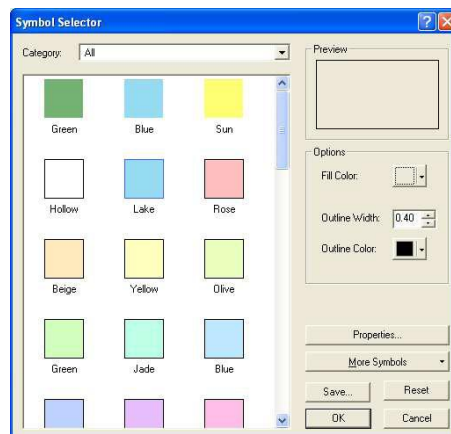
**boundary\_nad83utm.shp**  
**streams\_NAD83utm.shp**  
**roads09\_nad83utm.shp**  
**lakes\_NAD83utm**

You can select all four at the same time by holding down the Control key and clicking on the file names with your mouse. When you have the layers added to your view, your screen should appear similar to the following:

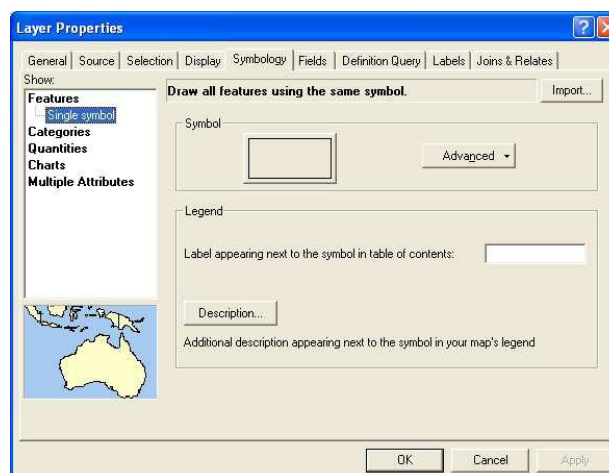


#### 4. Changing the Layer Legend

The layers that you have brought in will appear along the left-hand side of the screen in the table of contents. You may notice that you neighbor has the same layers but displayed in different colors. This is because ArcMap randomly selects colors in which to display layers, unless it is previously determined by the user. There are two ways to change the symbology (viewing properties) of a layer. The first is to click on the current symbol of the layer which is located directly below the layer name in the table of contents. When you do this, the following screen should appear:



The second method is to **right-click** the layer name in the table of contents and select the **Properties** menu. This brings you to the Layer Properties window. The window has a number of menus to choose from by selecting on the tabs across the top of the window. When you click on the **symbology** tab, you should see the following screen:



Take a few minutes to familiarize yourself with the different symbols and color patterns that are available.

**QUESTION:** In what order are the layers drawn on the screen: top-to-bottom **OR** bottom-to-top.

## 5. Roaming Around

Find the following icons on the toolbar and identify their function:



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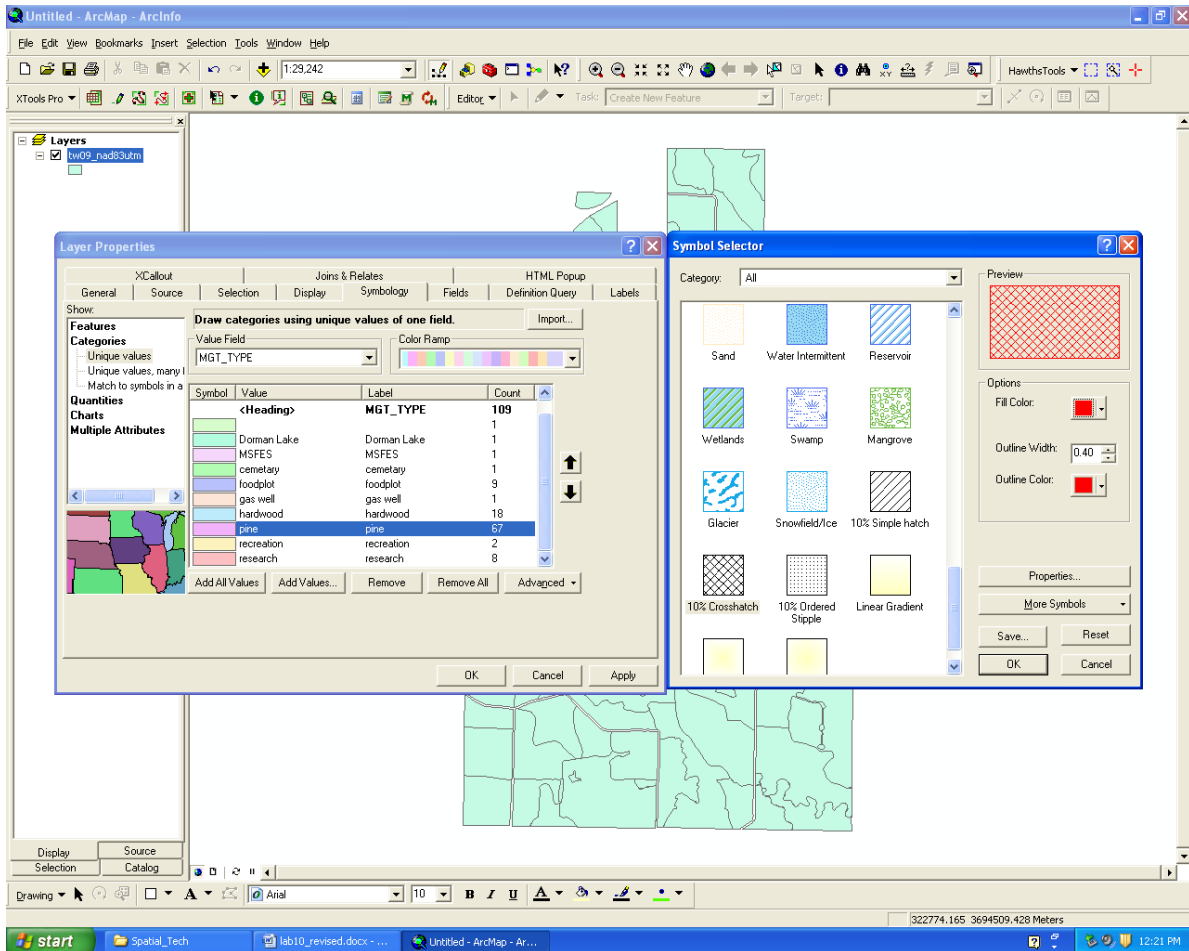


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## 6. Measurements

The measure button can be a very useful tool when you want to estimate a distance in ArcMap. The tool can be activated by clicking on the  icon in the toolbar. To find the distance between two or more points simply click once on your starting location and click once on the ending point. To stop the current measurement, **double-click** on the end point. By clicking the  icon the units can be changed.

1. Add the layer **tw09\_nad83utm**
  1. Right-click **tw09\_nad83utm** in table of contents and click **Properties**
    1. Click the **Symbology** tab.
      1. In the Show field on the left side of the window, click **Categories**, then **Unique Values**
        1. Click the drop-down arrow in the Value Field, and select **MGT\_TYPE**
          1. Click **Add All Values**
    2. We now want to make the pine stands visible.
      1. Double-click the box beside **pine**
      2. Scroll down and select the **10% Crosshatch** pattern
        1. Change both the fill color and outline color to red.



3. Click **OK**, then **Apply** and **OK**.

\*Now you can clearly see the pine stands on the map.

\* You can also see what type of management is taking place on each stand.

Find the 40 acre “research” stand on the east side of the Talking Warrior Unit and answer the following questions:

What should the length of one side be? \_\_\_\_\_

What did you get using the measurement tool? \_\_\_\_\_

Why was your measurement not exactly the distance expected?

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## 7. Identify Tool

To find out attribute information about any layer currently in the data view, you can use the identify  tool. After clicking the identify tool, go to the drop-down menu in the Identify window and select the **boundary layer**. This states that you only want to view information on the boundary layer. Now, you can click anywhere on the boundary layer and view that location's attribute data.

What information was given when you selected the following:

Talking Warrior Unit: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The 40 on the east side of the Talking Warrior Unit: \_\_\_\_\_

\_\_\_\_\_


\_\_\_\_\_

**Note:** The location of an object on the map (x, y, z coordinates) is referred to as the **spatial data**. The information shown in the Identify window is referred to as the **attribute data**. This information can also be observed by right-clicking the layer name in the table of contents and clicking **Open Attribute Table**.

Name: \_\_\_\_\_

Section: \_\_\_\_\_

### Lab Exercise 10: Exploration and Measurement

- 1) Start a new project by clicking the  button. You will be asked if you want to save changes, say no.
- 2) Add the boundary layer and edit the symbology to make it solid green.
- 3) Add the roads layer and edit the symbology to make the road dashed and red.
- 4) Add the river and lake layers as solid blue.
- 5) Zoom into the Talking Warrior unit around Dorman Lake.
- 6) Give the area and perimeter for Dorman Lake.

Area \_\_\_\_\_ Perimeter \_\_\_\_\_

- 7) Select the road segments for Dorman Lake road and report the road distance from the NE corner of Dorman Lake to Hwy. 25. \_\_\_\_\_

(Trick: use the **identify button** to select on the middle of the three sections of the road between intersections (selection will flash); you will have a list in a window that you can then look at to get the length of each section by selecting each item in the list)

- 8) Use the measure tool to give a straight-line distance from the NE corner of Dorman Lake to the intersection of Hwy. 25 and Dorman Lake Road. \_\_\_\_\_

### 9) Practice, Practice Practice.