

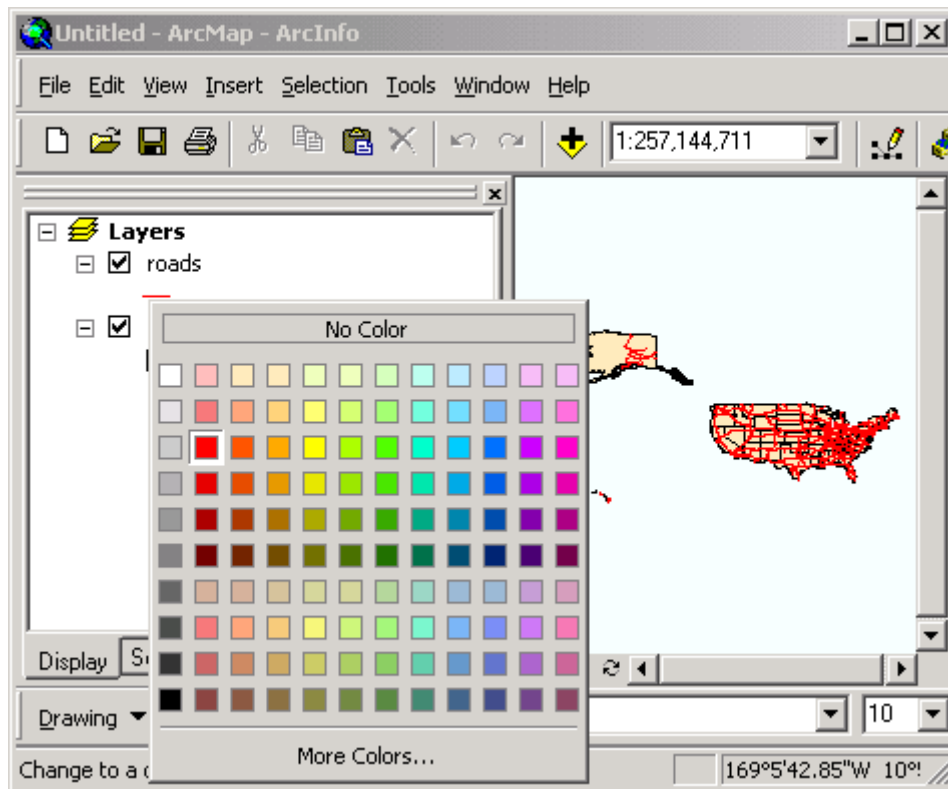
## Section 2: Manipulating Display Parameters in ArcMap

### Symbolizing Features and Rasters:

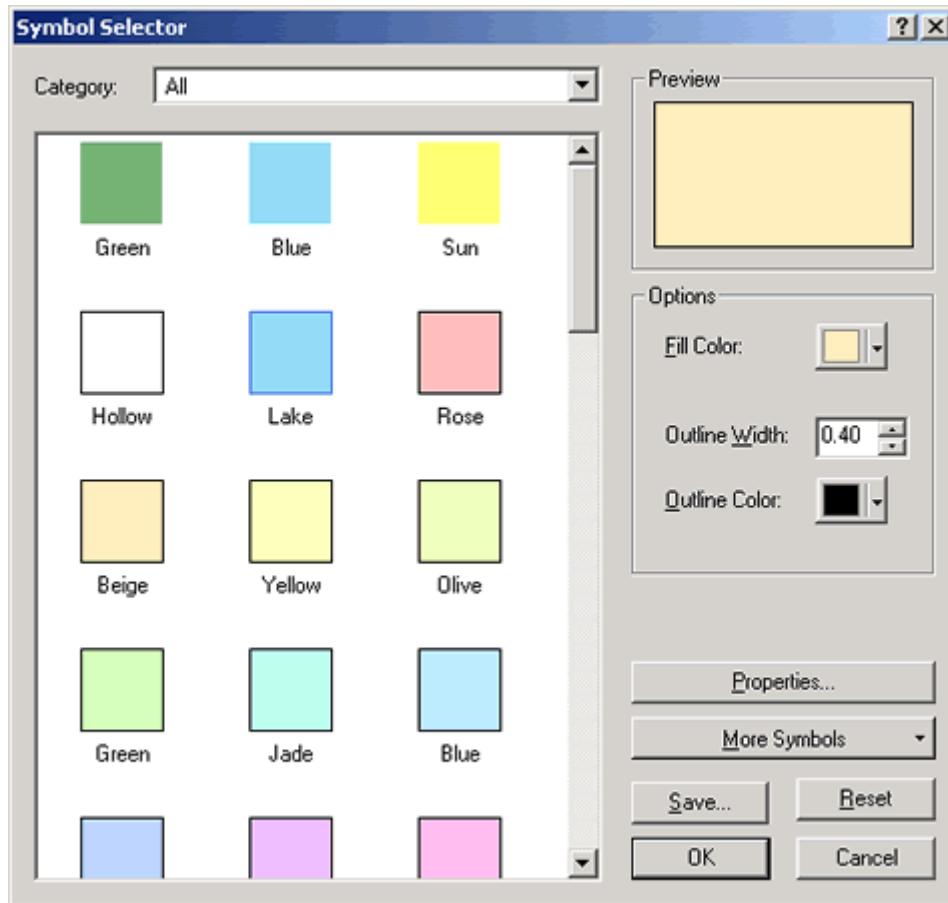
Data sets that are added to ArcMap™ a default symbology. The user can change the default symbology for their features (point, line, polygons) and rasters.

- Changing Simple Feature Symbology

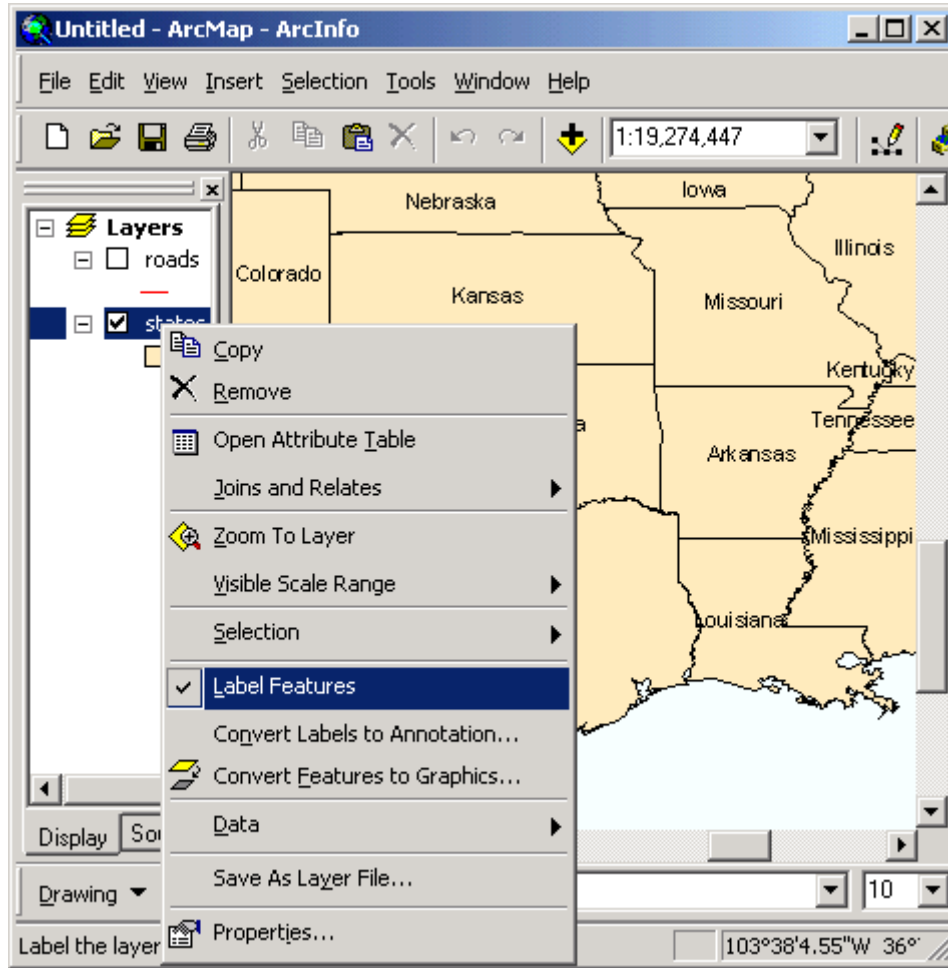
To change the color of a symbol for a specific data layer, the user can right-click on the symbol in ArcMap's table of contents. A color palette will appear, and the user can select the color of choice.



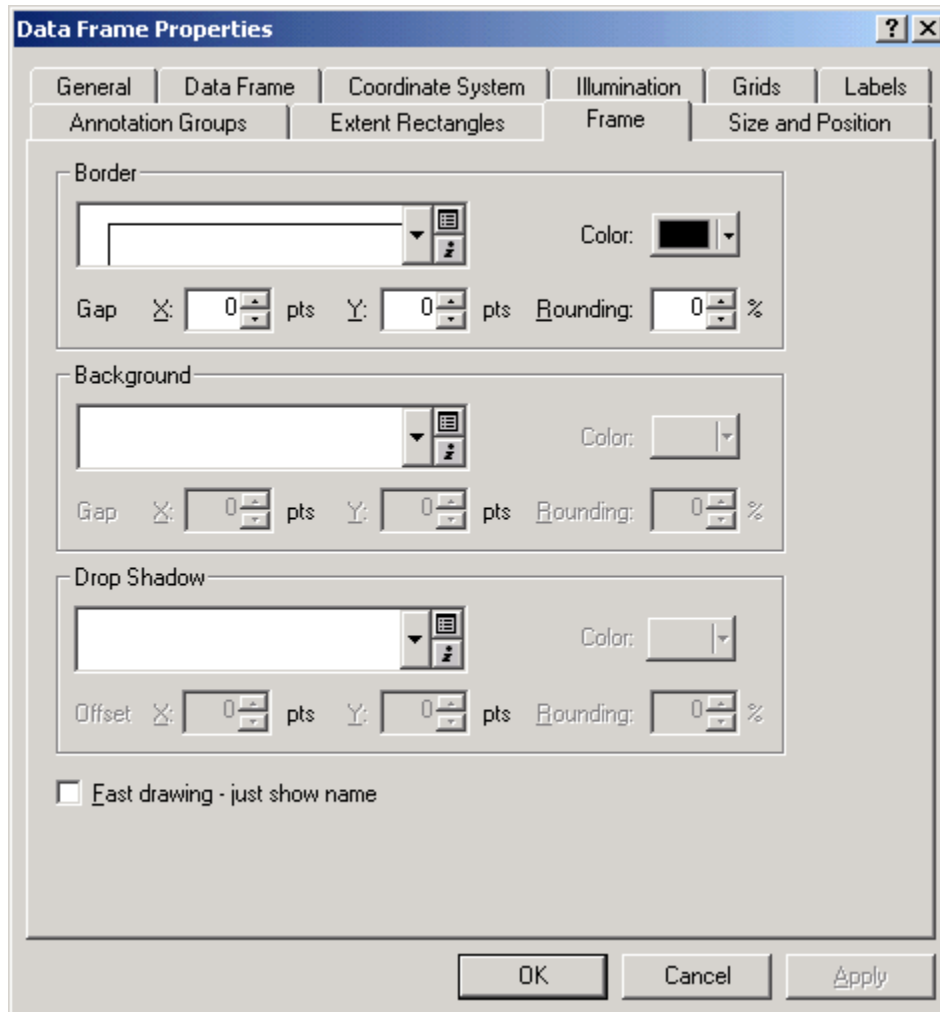
Polygon features are drawn with two symbols, a fill and an outline. To change the color or width of the outline, the user can click on the symbol for the desired data layer in the table of contents. The **Symbol Selector** dialog box opens. The left side of the dialog box contains predefined symbols. The options frame on the right allows the user to select a color and set an outline width.



In addition to changing the colors of symbols, the user can also have features within the map display to be labeled. The user can do this by right-clicking on the LAYER of interest in the table of contents (NOTE: click on the layer name and NOT the symbol) and selecting the **Label Features** option.



The user may also change the background of the map display. This can be done by right-clicking on the data frame and clicking **Properties**. The **Data Frame Properties** dialog box opens. The user should click on the **Frame Tab**, click on the **Background** drop down arrow, select the desired color, and click **OK**. The background color will then be applied to the map display.

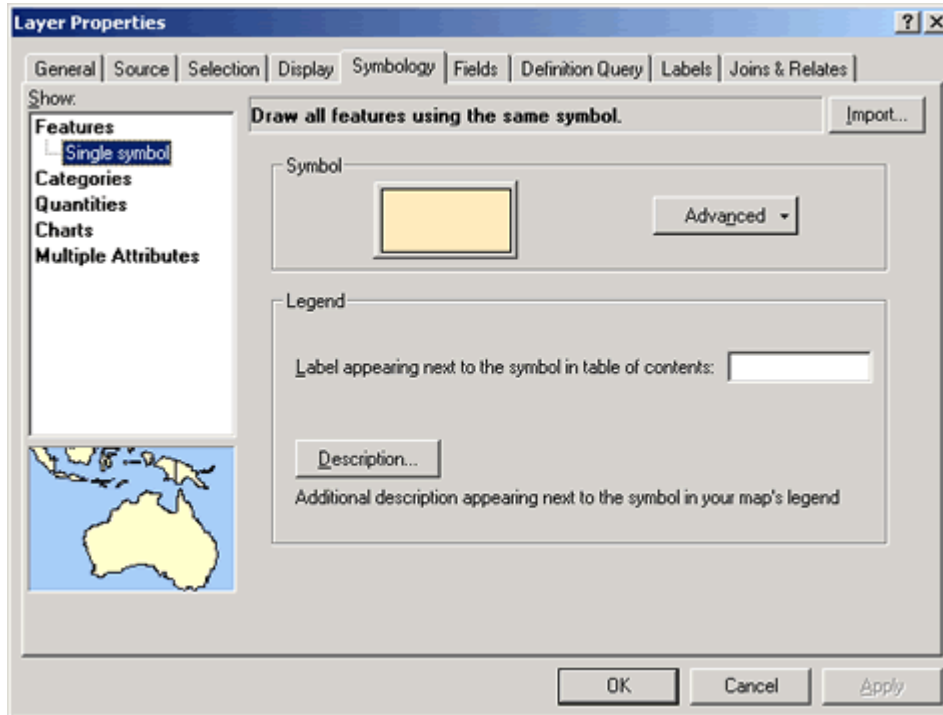


- Changing a Feature's Symbology using Categorical Attributes:

The user can change a feature's symbology to make it more informative by assigning a different symbol to each unique value, or to distinct ranges of values, in the layer's attribute table. For example, a land use land cover map may contain a particular symbol (or color) for each land use type present (all forest polygons may be represented with the color green, all crops may be represented by yellow, and all urban areas may be white, etc...). This example describes the representation of categorical attributes, or attributes that contain names or descriptions. On the other hand, attributes that contain measurements or counts of features are called quantitative attributes. For example, one may choose to symbolize a map of countries in Africa by their square kilometers in measurement; likewise, the user may choose to symbolize a map of the United States by their population.

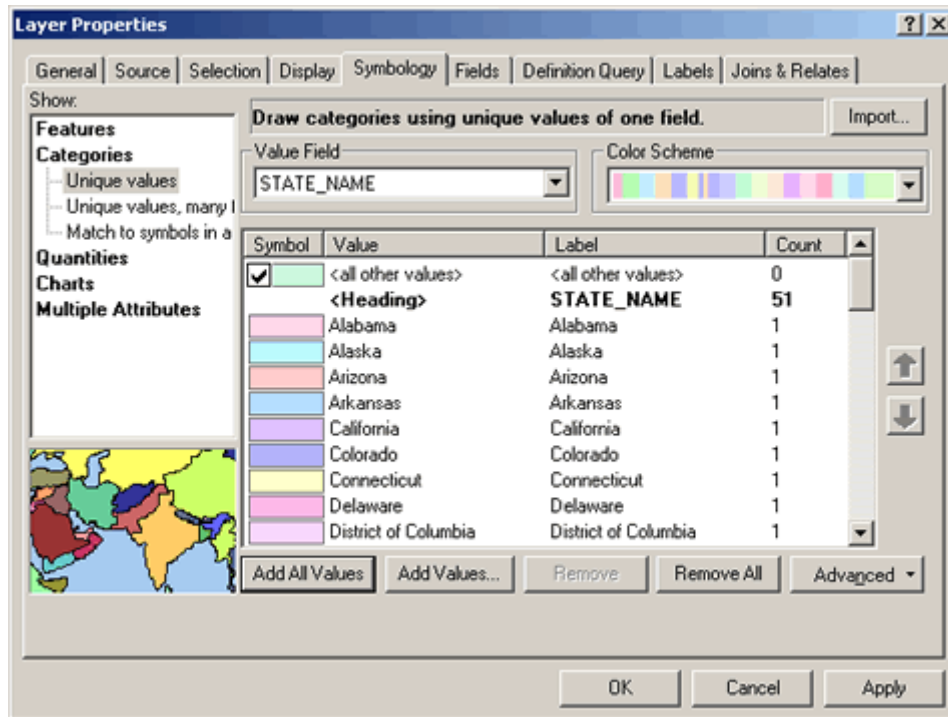
If the user wishes to assign a unique color to a particular class or name within the attribute table, the user can right-click on the desired layer and click **Properties**. The **Layer Properties** dialog will open, and the user should choose the **symbology** tab.

(<http://libinfo.uark.edu/gis/tutorial.asp>)

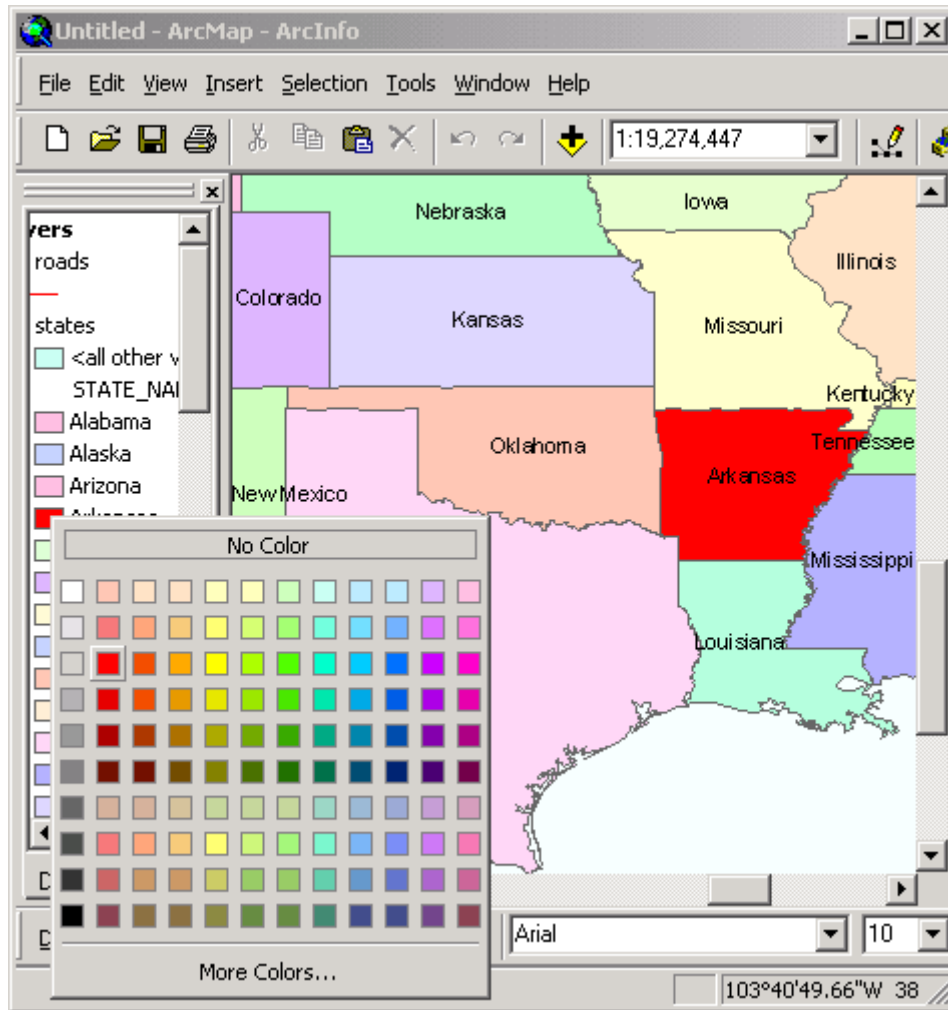


By default, the features are symbolized with a single symbol (meaning all of the states in a U.S. map will have the same color). If the user wishes to change the representation to a categorical one (where each state has a unique symbol), the user should click **Categories** in the **Show** box of the **Layer Properties** Dialog.

A Value Field from the attribute table should be selected. In this case STATE\_NAME was selected in order to show a different symbol for each state. The color scheme of choice may also be selected. Once these parameters are set, the user should press the **Add All Values** button to get a listing of all the categories and their associated unique symbol. Once the user is satisfied with the symbology, the user can press OK. The new color scheme will be applied to the map display.



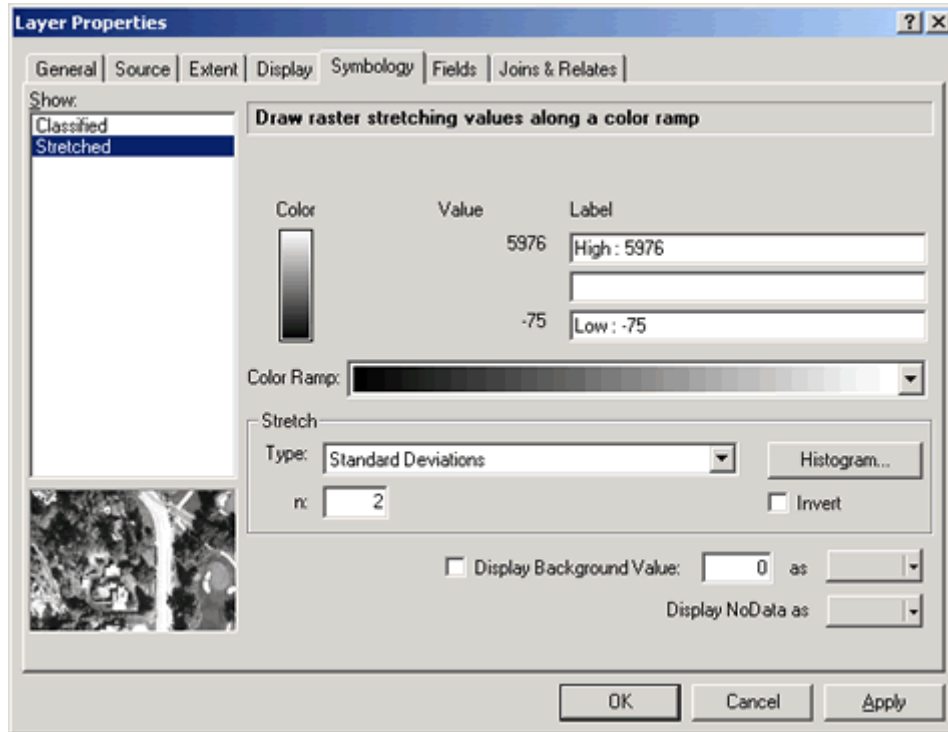
Once a color scheme has been applied, the user can change the individual color of a particular feature (in this case: a state). This is done by right-clicking on the symbol next to the name of the feature (in the table of contents), and selecting the desired color.



### Changing Raster Symbology:

When a raster is symbolized, colors are assigned to cell values or ranges of cell values. Raster values are usually continuous, and are symbolized by color ramps.

By default, rasters are displayed with a gray scale. If the user, however, can change the color range for their raster. This can be done by double-clicking on the layer name inside ArcMap's table of contents. The **symbology** tab should be selected. In the color ramp, the user can select a new range of colors to be applied to the map display.



### Classifying Features and Rasters:

When a user wants to see where attribute values lie in relation to one another on a continuous scale, they can symbolize quantitative attributes (attributes that are counted, measured, or estimated amounts of something).

These values often need to be divided into groups to make symbology more meaningful.

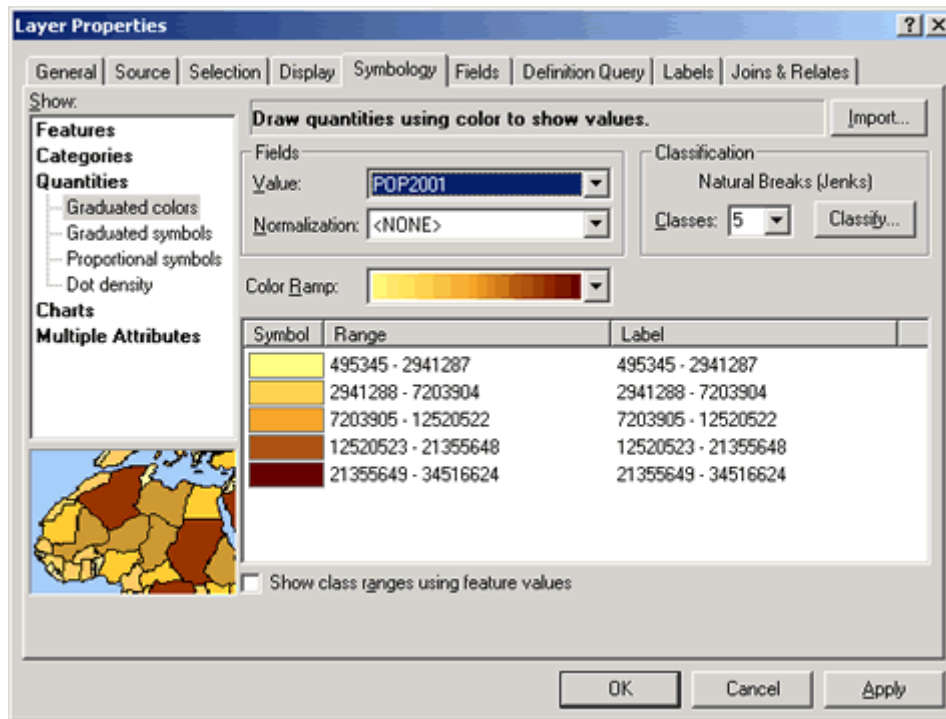
ArcGIS™ has four ways to apply scaled symbology:

1. Graduated Color: These symbols are more commonly used. It displays features as shades in a range of colors that change gradually (also called a color ramp). This symbology is best used with polygon layers.
2. Graduated Symbol: These symbols are used to represent features using different marker sizes. Normally used with point layers.
3. Proportional Symbol: These symbols vary in size proportionally to the value symbolized.
4. Dot Density: These symbols should only be used with polygon layers. They represent quantities by a random pattern of dots. The greater the value, the more dots.



To create a graduated color, the user must double click on the data layer name in the table of contents. The **Layer Properties** dialog will open. The **symbolology** tab should be activated.

In the **show** box, the user should click **Quantities** and select the **Graduated Colors** option. Within the value field, the drop down arrow should be clicked, and the attribute field of interest should be selected. In this case the 1999 Population field was selected for the U.S. data layer.

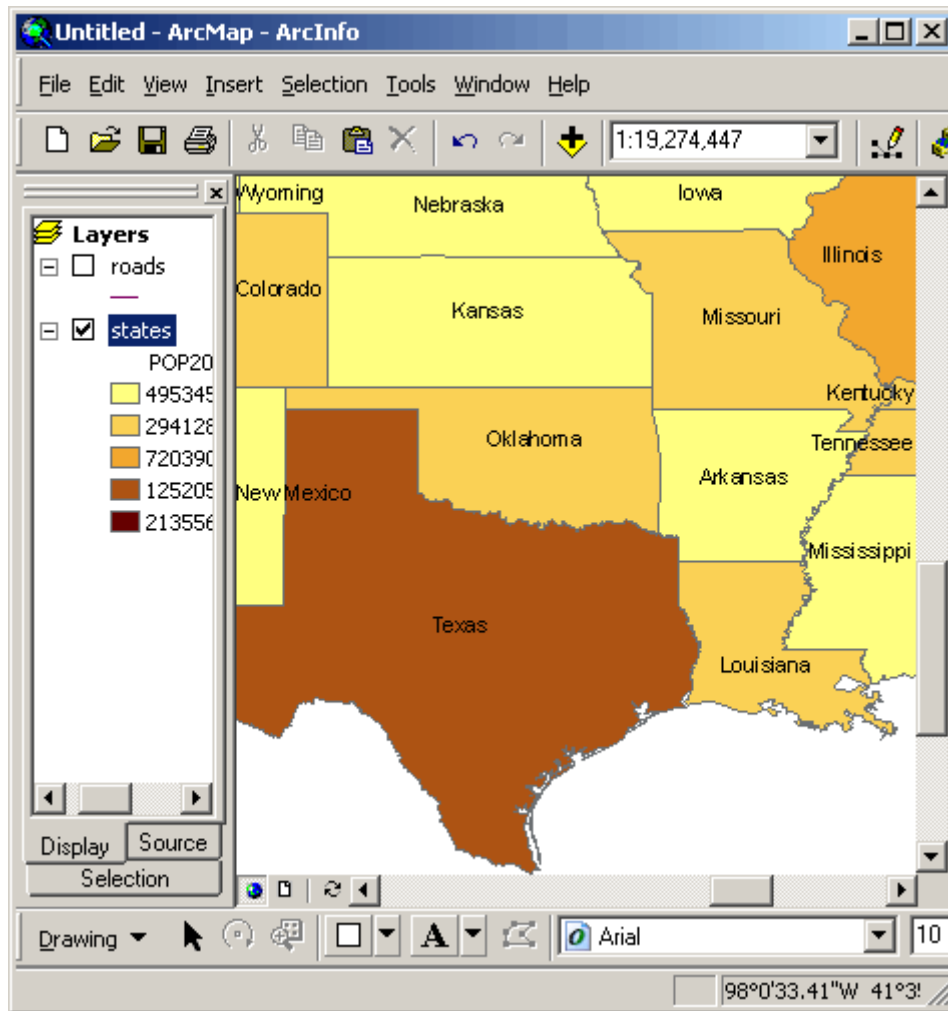


By default the values are grouped into 5 classes and the classification method is natural breaks. The following describes all classification methods that can be selected.

1. **Natural Breaks**: This classification creates classes according to clusters and gaps in the data.
2. **Equal Interval**: This classification creates classes of equal value ranges.
3. **Defined Interval**: This classification is like equal interval, but the interval chosen determines the number of classes produced instead of the the number of classes producing the interval.
4. **Quantile**: This classification creates classes containing an equal number of features.
5. **Standard Deviation**: This classification creates classes according to a specified number of standard deviation from the mean value.
6. **Manual Method**: This classification allows the user to set their own preferred class breaks.

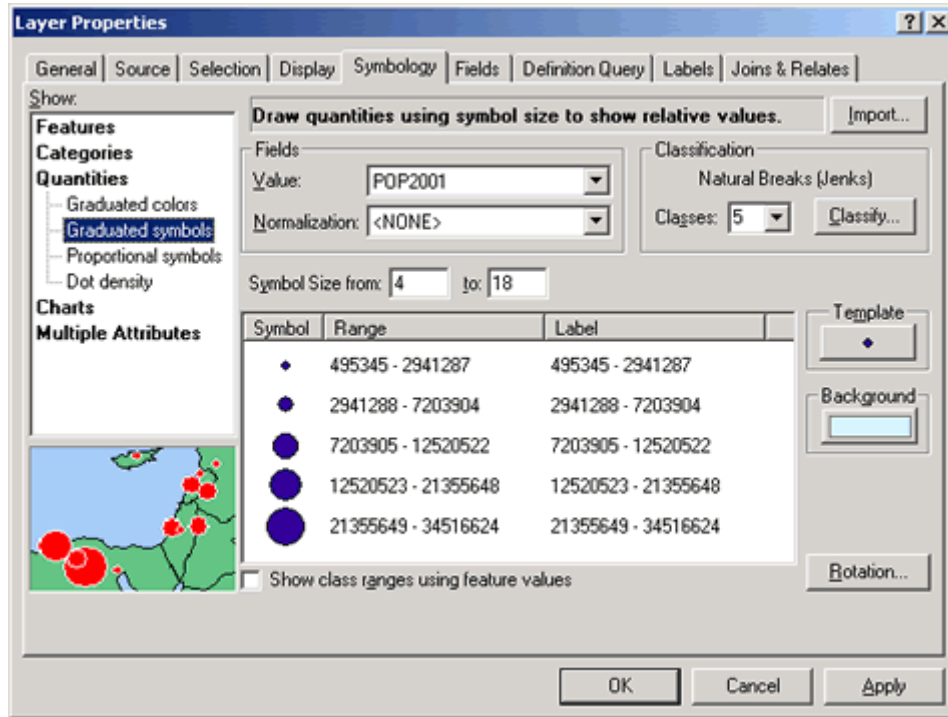
7. **Geometrical Interval:** This classification creates class ranges based on intervals that have a geometric sequence based on a multiplier (and its inverse)

Once a classification method is chosen, a designed color ramp should be chosen, and the OK button should be clicked. The specified symbology will then be applied to the map display.

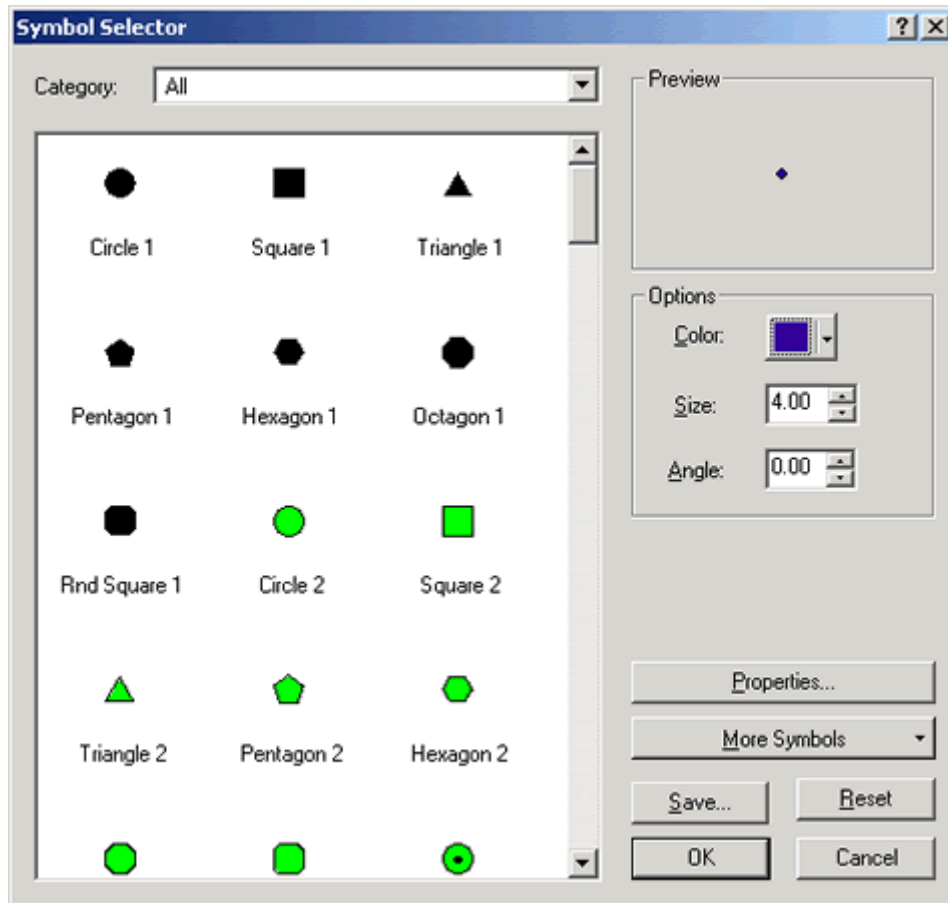


To create a graduated symbol, the user must double click on the data layer of interest in the table of contents. The **Layer Properties** dialog box will open, and the **symbology** tab should be selected.

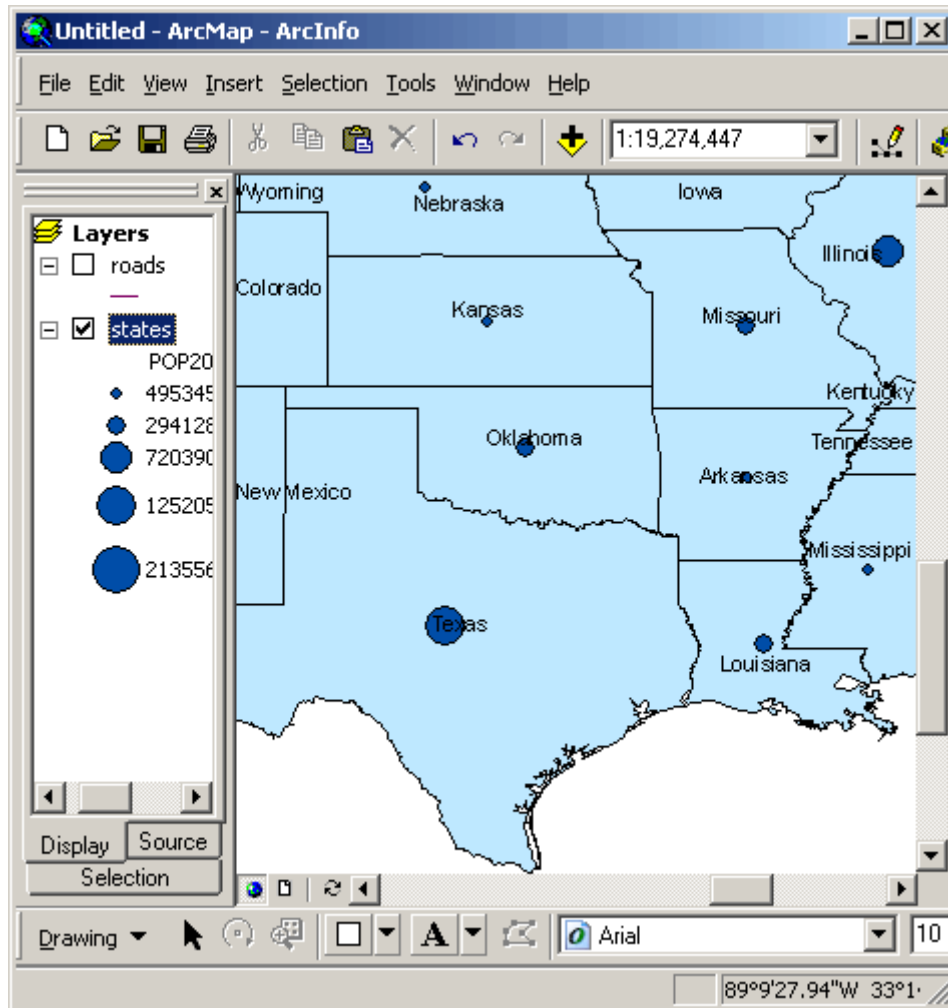
In the **show** box, the user should click **Quantities**, and then select **Graduated Symbols**. Within the value field, the drop down arrow should be clicked, and the attribute field of interest should be selected. The normalization method and the number of classes can then be selected.



In the symbol column, symbols will appear. The user can change them to any desired symbology by clicking on the point symbol in the **template** frame. In the **symbol selector**, the user can select the size, shape, and color of the symbol and select OK.

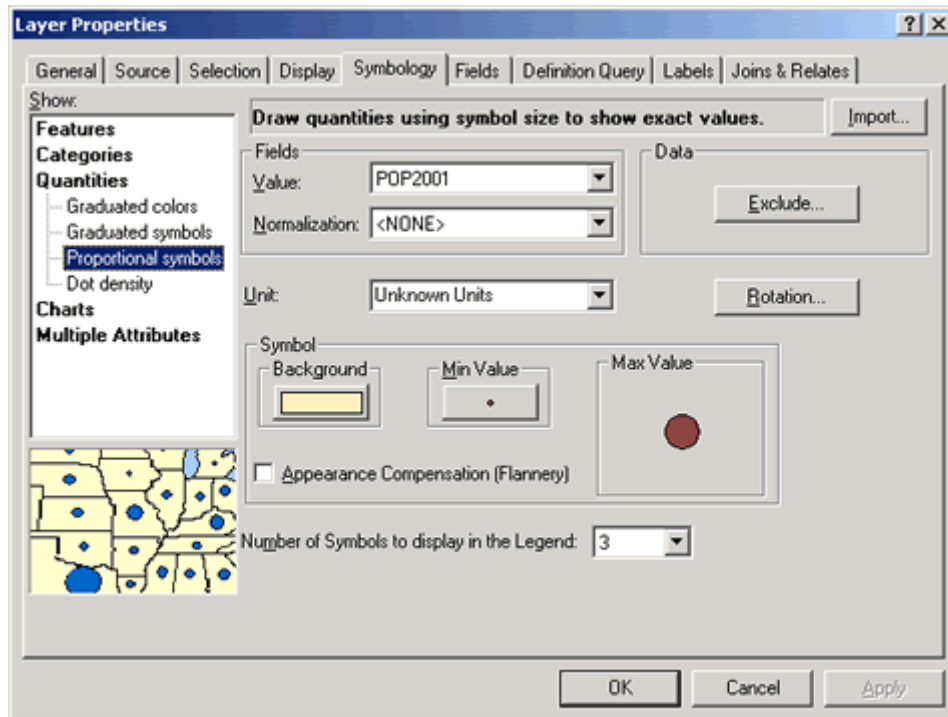


Once all parameters are set, the user can select OK. The map display will then be updated.

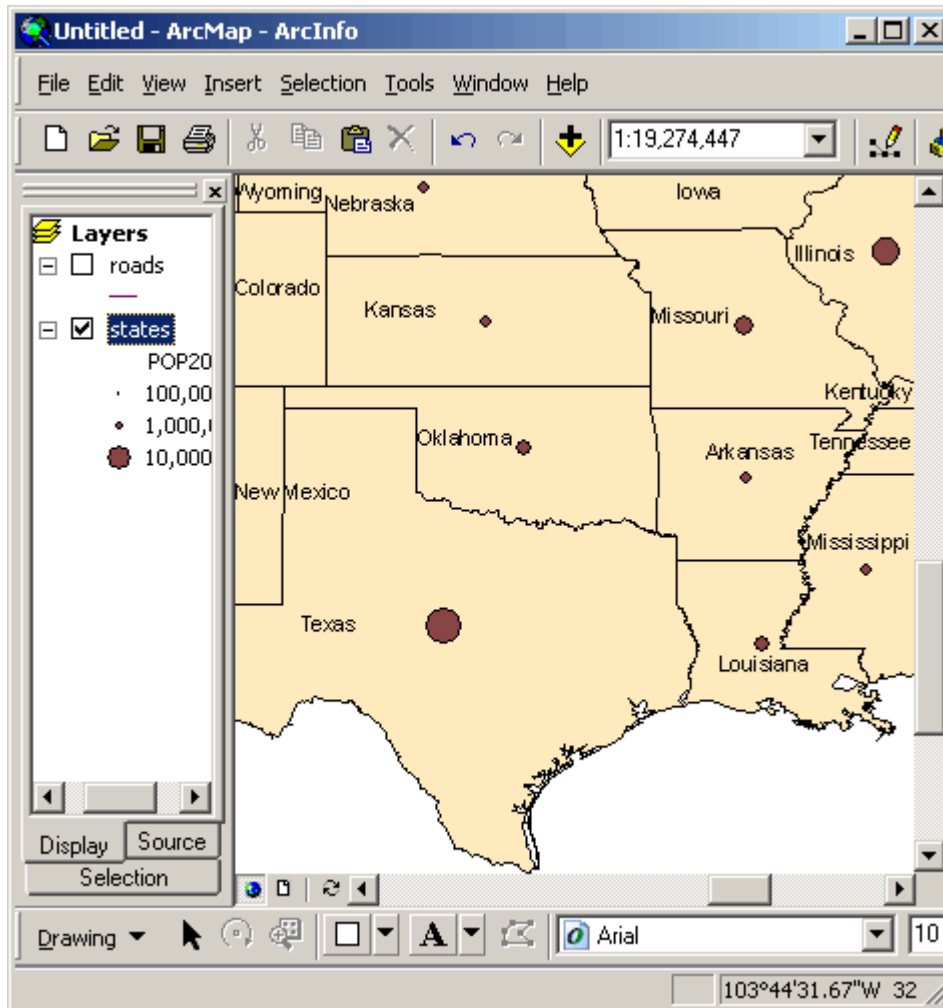


To create a proportional symbol, the user must double click on the data layer of interest in the table of contents. The **Layer Properties** dialog box will open, and the **symbolology** tab should be selected.

In the *show* box, the user should click **Quantities**, and then select **Proportional Symbols**.

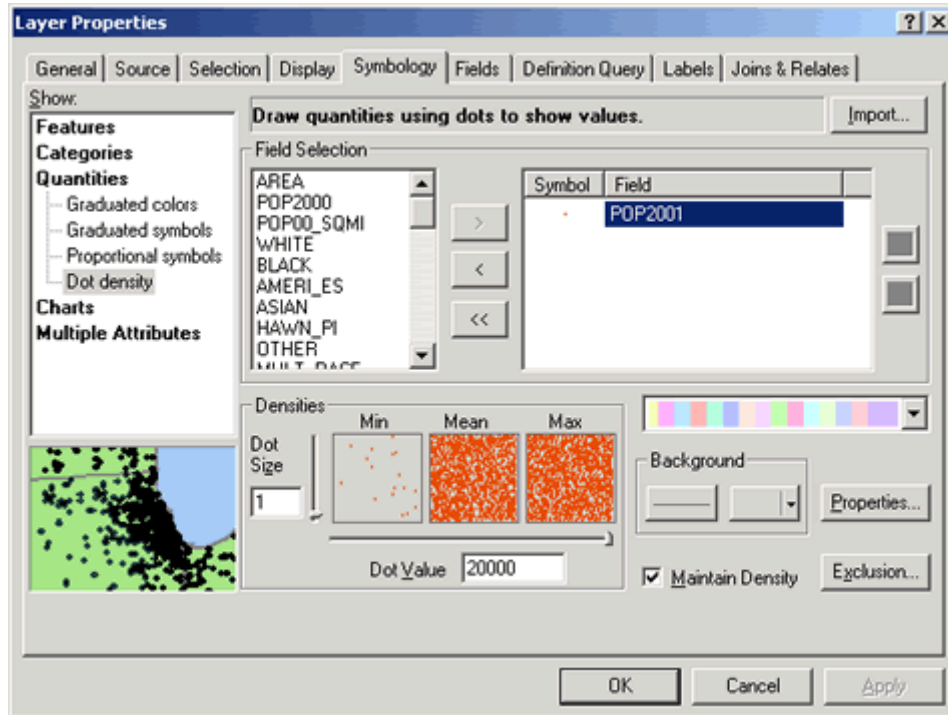


Once all parameters have been set, the user can click OK. The changes will be updated to the map display.



To create a dot density, the user must double click on the data layer of interest in the table of contents. The **Layer Properties** dialog box will open, and the **symbolology** tab should be selected.

In the **show** box, the user should click **Quantities**, and then select **Dot Density**.



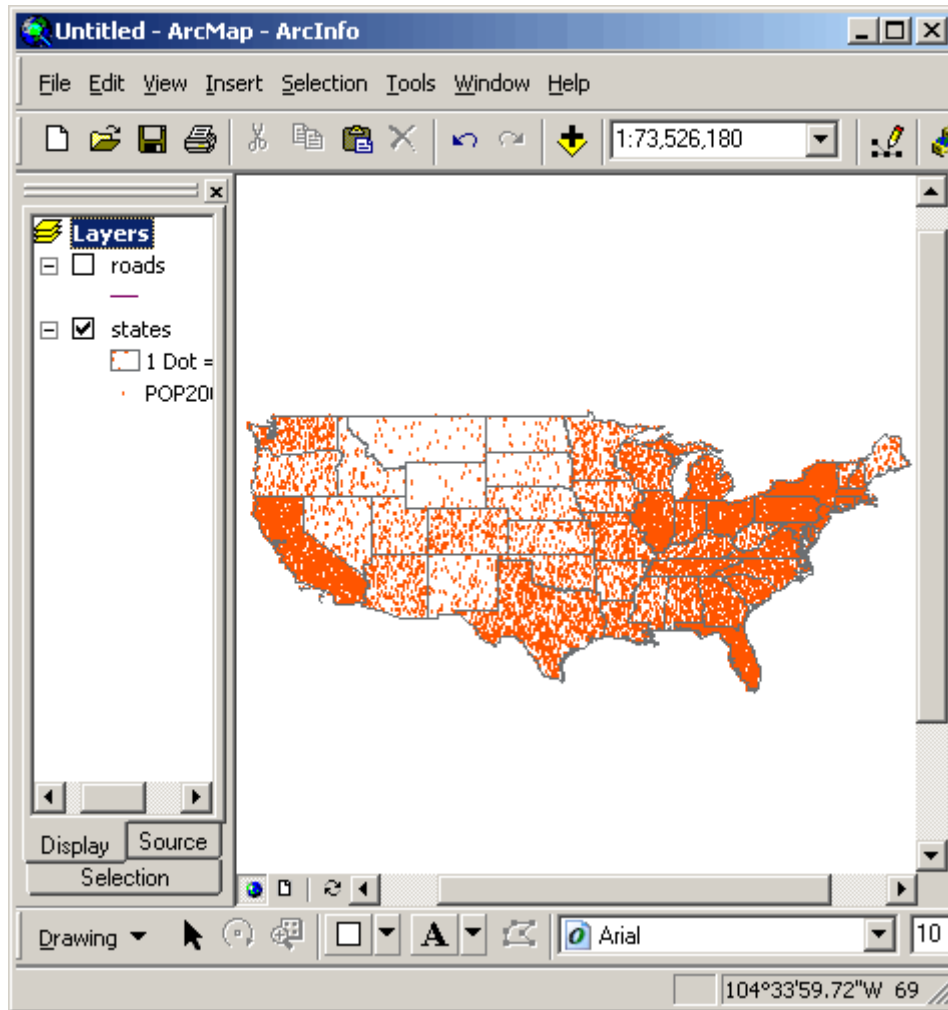
On the left side of the **Field Selection** frame, numeric fields in the attribute table are listed in a box. The user must select which field they wish to symbolize. In this case 2001 Population was chosen. A field is chosen by simply clicking on the field in the **Field Selection** box. This highlights the name of the attribute field to be symbolized. Next, the right arrow symbol (>) should be clicked. This adds the attribute field to the box on the right side of the frame and a dot symbol is assigned to it.

The color of the symbol can be changed by right-clicking on the dot symbol in the symbol column.

In the **Densities** frame of the **Symbology** tab, the dot value may be changed. This value means that one dot will represent that specified number of items. For example, using 2001 population and a dot value of 20,000, one dot on the map will represent 20,000 people. Please note that the location of the dot does NOT mean that there are 20,000 people at the location of the dot. The dots are randomly placed within the areal unit (polygon) - in this case each state.

Once all the parameters have been specified, the user may select OK. The changes will be updated to the map display.





### Classifying Features and Rasters:

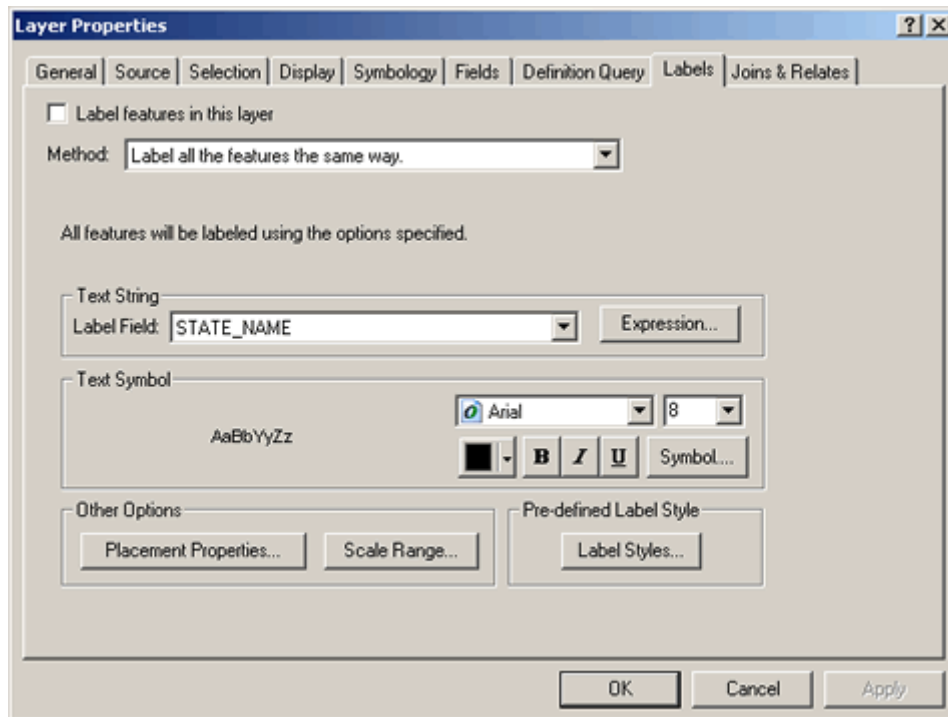
In ArcMap, feature labels represent values in an attribute table. There are a variety of label styles to choose from for countries, cities, streets, and other common features. The user can choose from these available styles or create their own fonts, sizes, and colors.

There are two main types of labeling in ArcGIS: **dynamic** and **interactive**.

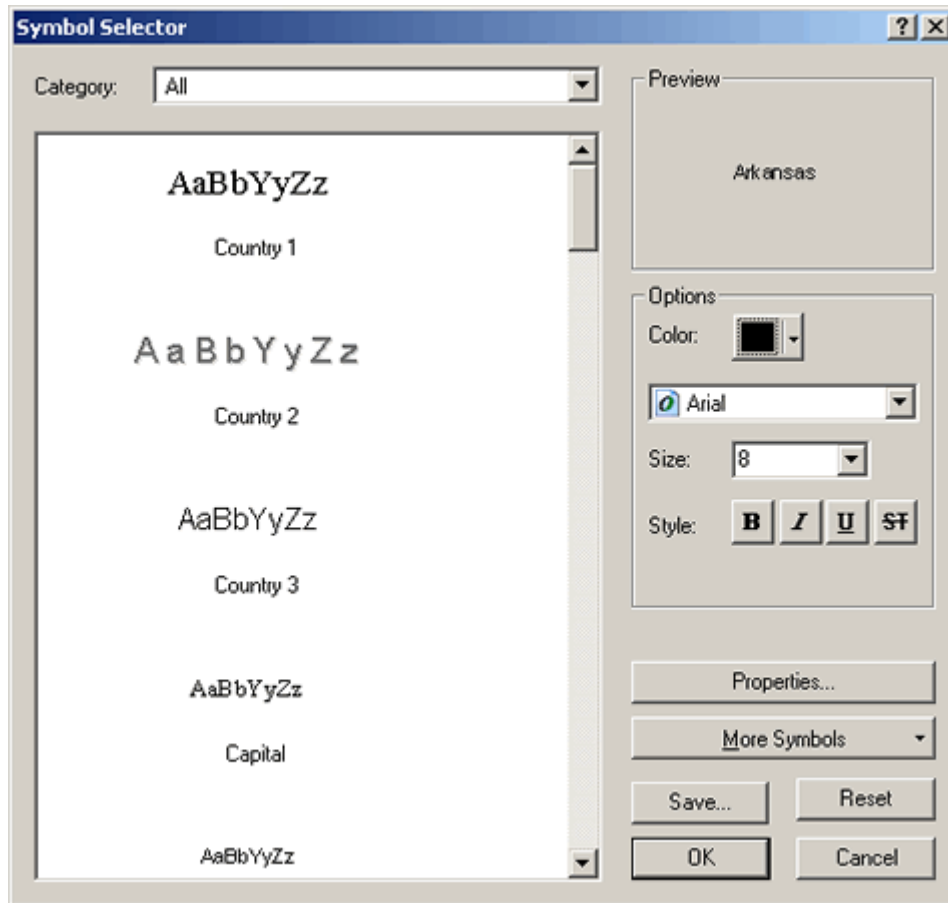
- The user can choose to use dynamic labels. This allows the user to label all features in a layer at once and have ArcMap adjust the label placement as the user works with the map. With dynamic labels, ArcMap will prevent the labels from overlapping regardless of the zoom level.
- The user can also choose to use interactive labels. This allows the user to label features one at a time in positions chosen by the user. Once these labels are placed, they can be selected, moved, and individually modified. With interactive labels, ArcMap will not prevent overlaps or manage the labels in any way.

To create and change the properties of a **dynamic label**, the user must first right-click on the layer name in the table of contents. **Label Features** should be selected.

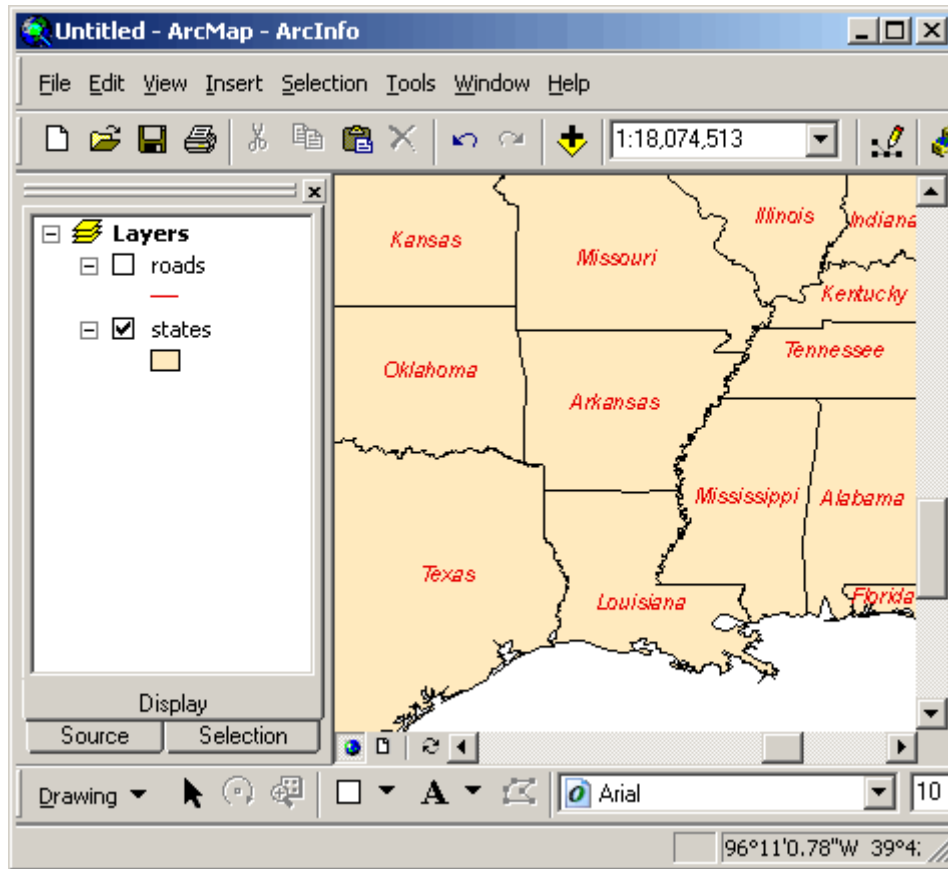
In order to change the font and the color of the labels, the user must right-click on the layer name in the table of contents and click **Properties**. On the **Layer Properties** dialog, the **Labels** tab should be selected.



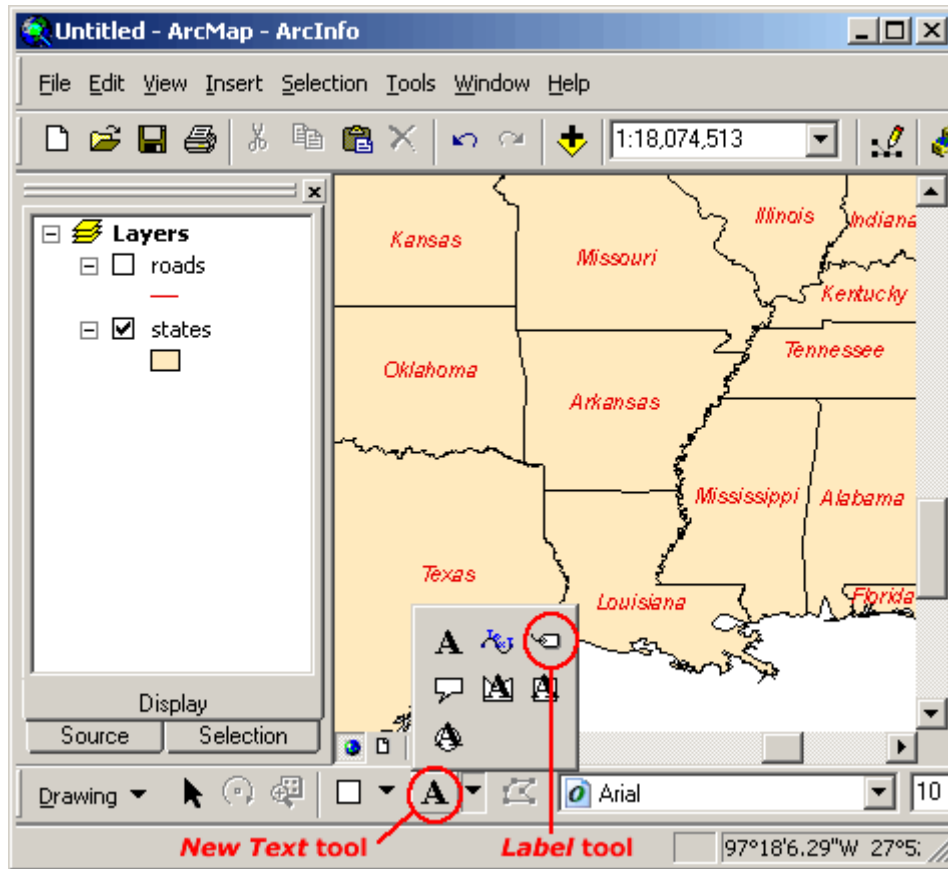
The Label Field drop-down list in the middle of the dialog shows which field in the attribute table is being used for the labels. Below this section, the label's symbology can be previewed. In order to change the font and color of the label, the **Symbol** button should be clicked. The **Symbol Selector** dialog box will open.



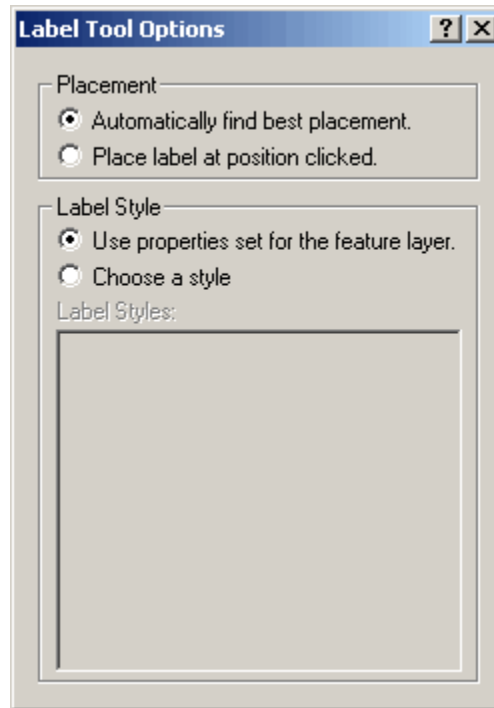
This dialog box allows the user to change the color, size, font, and properties of the label symbol. When the user is finished setting the new parameters, OK can be clicked. The labels will be updated in the map display.



To create an interactive label, the user must first click the drop-down arrow by the **New Text** tool on the **Draw Toolbar**. Within the selection of tools, the user must select the **Label** tool.



Once the *Label* tool has been selected, the **Labeling Options** dialog box opens.

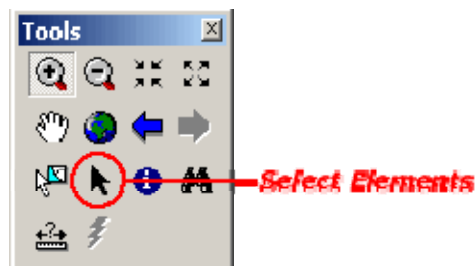


This dialog box allows the user to choose the labeling position or allow ArcMap to choose the position. If the user decides to initially allow ArcMap to find the best placement for the label, the position may always be adjusted later. Once the labeling options have been selected, the user may close the dialog box.

If the user decided to allow ArcMap find the best placement, he/she needs to click the map feature they want labeled. The label for that feature will appear, and the position of that label will automatically be determined.

If the user chose to select the desired labeling position, he/she needs to point and click the mouse in the area where the label should be placed. The label for that feature will be added in the position selected.

A label may be moved or deleted by selecting it with the **Select Elements** Tool on the **Tools** Toolbar. After the label is selected, it may be moved to another desired location or simply deleted by pushing the **Delete** key on the keyboard.



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