

Section 3: Querying Data in ArcMap

Identifying, Selecting, and Finding Features:

There are many ways to retrieve information about features in ArcMap™. The user can **identify** features by clicking on them in order to display their attributes. The user can **select** features by clicking on the features to highlight them and look at their records in the layer attribute table. The user can **find** features by using known information about the feature in order to search the map for that particular feature.

- **Identifying Features:**

Perhaps the fastest way to get information about a single feature is to identify it, using the **Identify** Tool.

To use the **Identify** tool, the user must select it from the *Tools* Toolbar. Within the map, the user must click on the feature of interest in order to view the attribute information for that particular feature.

Step 1:
Make sure layer of interest is on top or that other above layers are turned off (unchecked).

Step 2:
Click on the Identify Tool.

Step 3:
Click on feature of interest.

Step 4:
Read feature's attribute information.

Layers: <Top-most layer>

states

- Arkansas

Location: (-92.530503 34.562431)

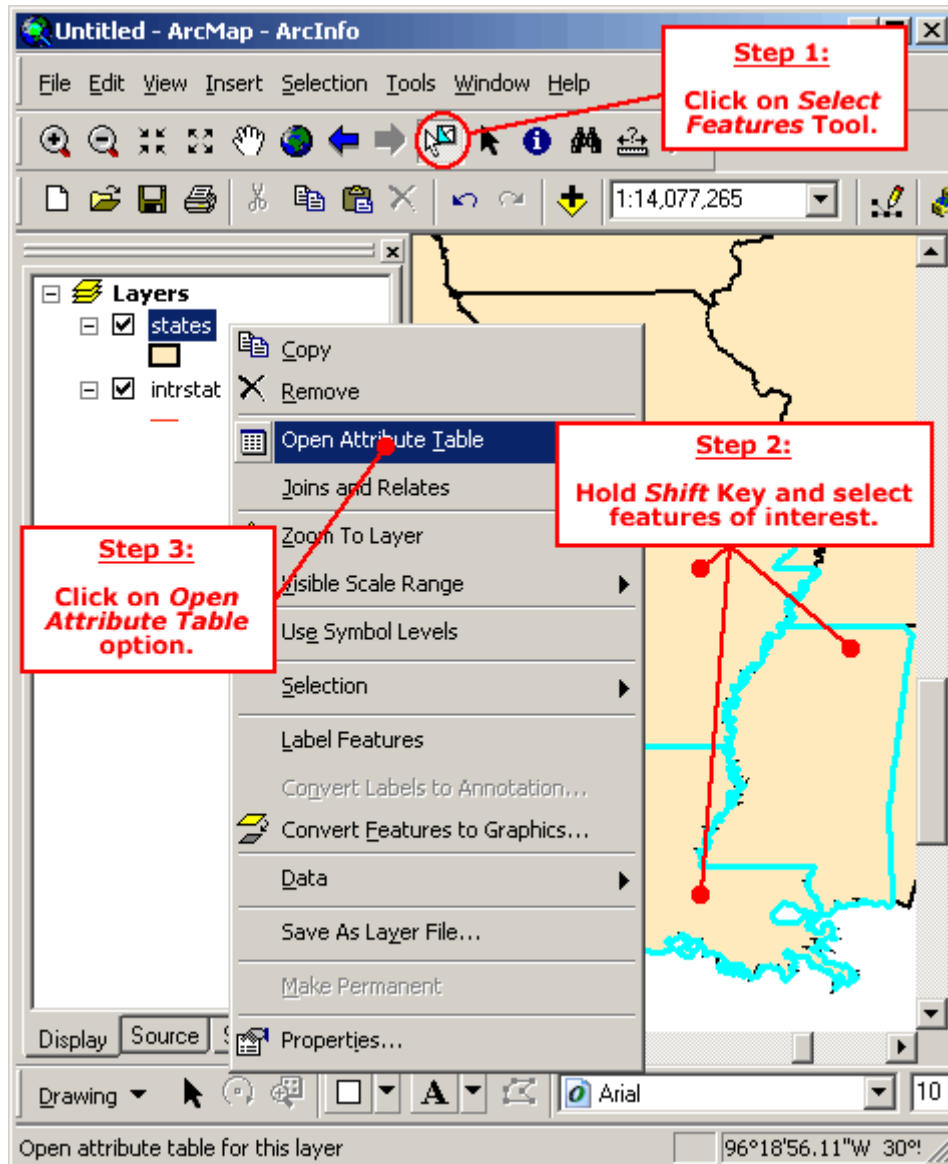
Field	Value
FID	46
Shape	Polygon
AREA	52913.232
STATE_NAME	Arkansas
STATE_FIPS	05
SUB_REGION	W S Cen
STATE_ABBR	AR
POP2000	2673400
POP2001	2706444
POP00_SQMI	51
WHITE	2138598
BLACK	418950
AMERI_ES	17808
ASIAN	20220
HAWN_PI	1668
OTHER	40412
MULT_RACE	35744
HISPANIC	86866
MALES	1304693
FEMALES	1368707
AGE_UNDER5	181585
AGE_5_17	498784
AGE_18_21	156692
AGE_22_30	301730

- **Selecting Features:**

If the user wants to compare information about several features, the best way is to select the features on the map and look at their records in the layer attribute table. The easiest way to select multiple features is by using the **Select Features** Tool on the **Tools** Toolbar.

To use the **Select Features** Tool, the user must select it from the **Tools** Toolbar. On the map, all features of interest may be selected by holding down the **shift key** and clicking on the various features of interest. The selected features will be outlined in blue. If a feature is selected by mistake it can be de-selected by holding down the **shift key** and clicking the feature again. All features that have been selected, can be cleared by clicking the **Selection** menu from the **Standard Toolbar** and selecting the **Clear Selected Features** option.

To view the selected features' attribute table, the user must right-click on the data layer where features have been selected. The **Open Attribute Table** option should then be clicked.



After the **Open Attribute Table** option has been selected, the attribute table will appear with all of the selected features highlighted in blue.

FID	Shape*	AREA	STATE_NAME	STATE_FIPS	SUB_REGION	STATE_ABBR
42	Polygon	51715.786	Alabama	01	E S Cen	AL
43	Polygon	47618.965	Mississippi	28	E S Cen	MS
44	Polygon	58629.222	Georgia	13	S Atl	GA
45	Polygon	30867.398	South Carolina	45	S Atl	SC
46	Polygon	52913.232	Arkansas	05	W S Cen	AR
47	Polygon	45835.844	Louisiana	22	W S Cen	LA
48	Polygon	55814.731	Florida	12	S Atl	FL

The user can group all of the selected attributes, by clicking on the *Selected* button at the bottom of the attribute table. Only those features that were highlighted will appear.

FID	Shape*	AREA	STATE_NAME	STATE_FIPS	SUB_REGION	STATE_ABBR
43	Polygon	47618.965	Mississippi	28	E S Cen	MS
46	Polygon	52913.232	Arkansas	05	W S Cen	AR
47	Polygon	45835.844	Louisiana	22	W S Cen	LA

Now the user can easily compare various attribute values, such as Area for each state. If the user wishes to see the states listed according to largest area, the user can right-click on the appropriate field name (in this case AREA), and the **Sort Descending** option may be selected from the context menu.

FID	Shape*	AREA	STATE_NAME	STATE_FIPS	SUB_REGION	STATE_ABBR
43	Polygon	47618.965	Mississippi	28	E S Cen	MS
46	Polygon	52913.232	Arkansas	05	W S Cen	AR
47	Polygon	45835.844	Louisiana	22	W S Cen	LA

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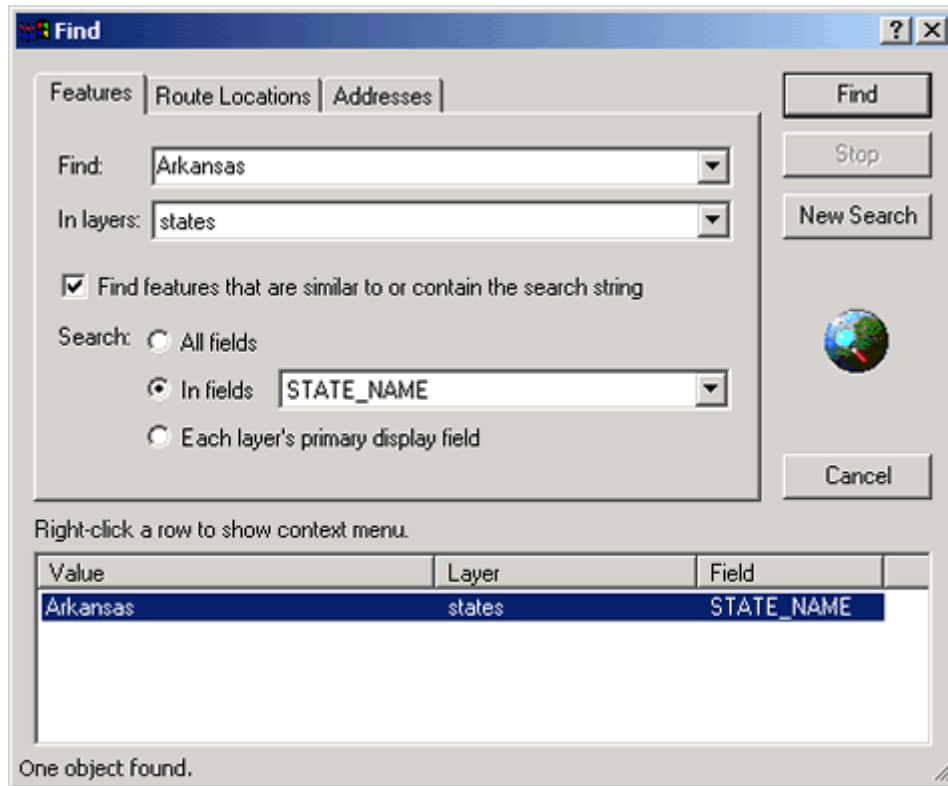
FID	Shape*	AREA	STATE_NAME	STATE_FIPS	SUB_REGION	STATE_ABBR
46	Polygon	52913.232	Arkansas	05	W S Cen	AR
43	Polygon	47618.965	Mississippi	28	E S Cen	MS
47	Polygon	45835.844	Louisiana	22	W S Cen	LA

- **Finding Features:**

When the user has a piece of information about a feature, but is not sure where that feature is on the map, the user can search the map for that feature using the known piece of information.

The user can find a feature, by selecting the **Find** tool on the **Tools** toolbar. When the **Find** dialog Box appears, the **Features** tab should be selected. The known attribute information should be typed in the **Find** box. In the **In Layers** drop down box, the layer that the user wishes to find features in should be selected. In the **Search** options, the user should choose to either search all fields in the attribute table or a specific field. Once all parameters are set, the **Find** button should be clicked.

In the following example, the State of Arkansas was found in the U.S. State Data Layer by typing in the known attribute information (i.e. state name = Arkansas).

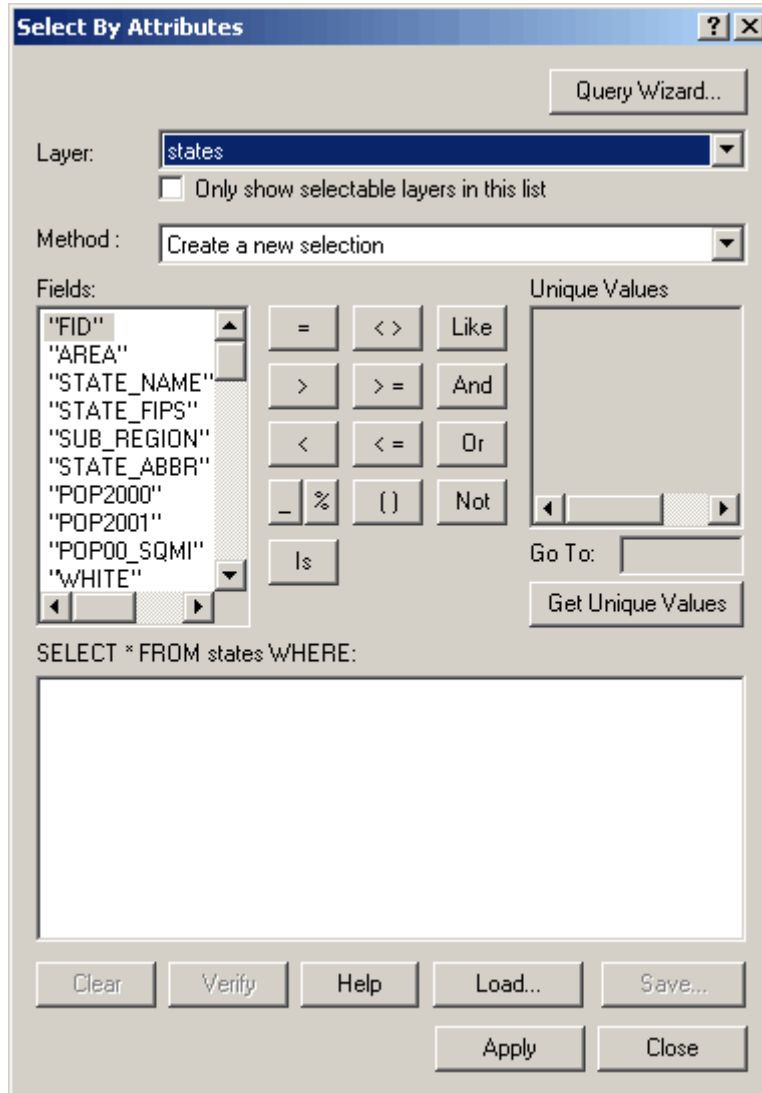


Once the **Find** button is clicked and the feature is found, the user can locate it on the map and get its attributes. This can be done when the user right clicks on the feature row found in the **Find** dialog box and clicks **Identify Feature(s)**. The feature will briefly flash within the map display and the **Identify Results** dialog box will open.

Selecting Features by Attributes:

In addition to identifying, selecting, and finding features, the user can select features by attributes by writing a query that automatically selects features that meet a specified criteria. The simplest type of query consists of an attribute (such as STATE_NAME), a value (such as 'Arkansas'), and a relationship between the two (such as 'equal to'). A more complex query combines these simple queries using operators like 'and' / 'or'. These queries are constructed using **Structured Query Language (SQL)**. ArcMap creates the query automatically in this format.

To create an attribute query, the user must click the **Selection** menu on the **Standard** Toolbar. The **Select by Attributes** option should be clicked. In the **Select by Attributes** dialog box, the **Layer** drop down arrow should be clicked and the data layer of interest should be selected.

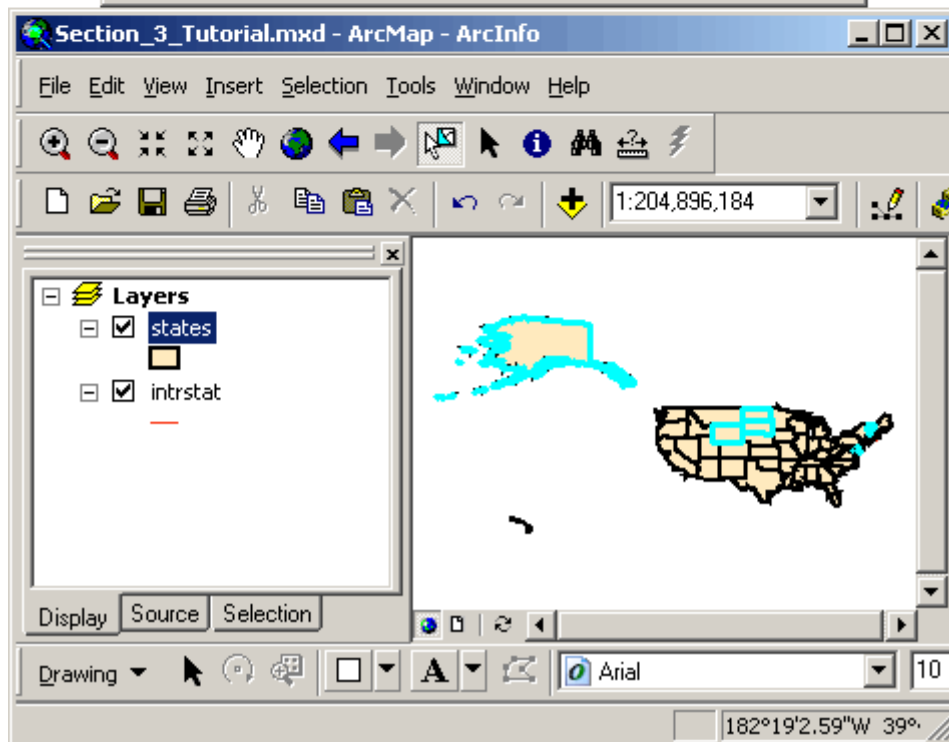
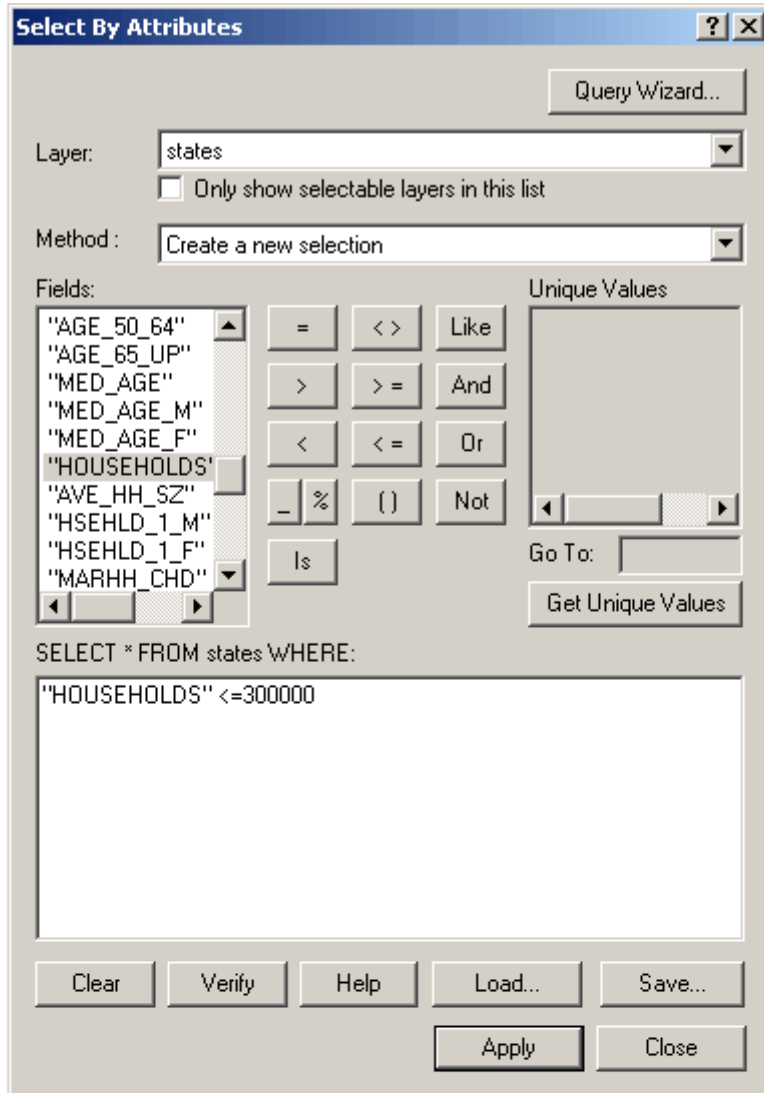


The fields in the attribute table appear in the **Fields** box on the left of the dialog box. When a particular field is highlighted, sample values display in the **Unique** values list on the right. If the user wishes to see all of the attribute values, the **Complete List** button may be selected. The buttons in the middle are used to choose operators and to connect queries.

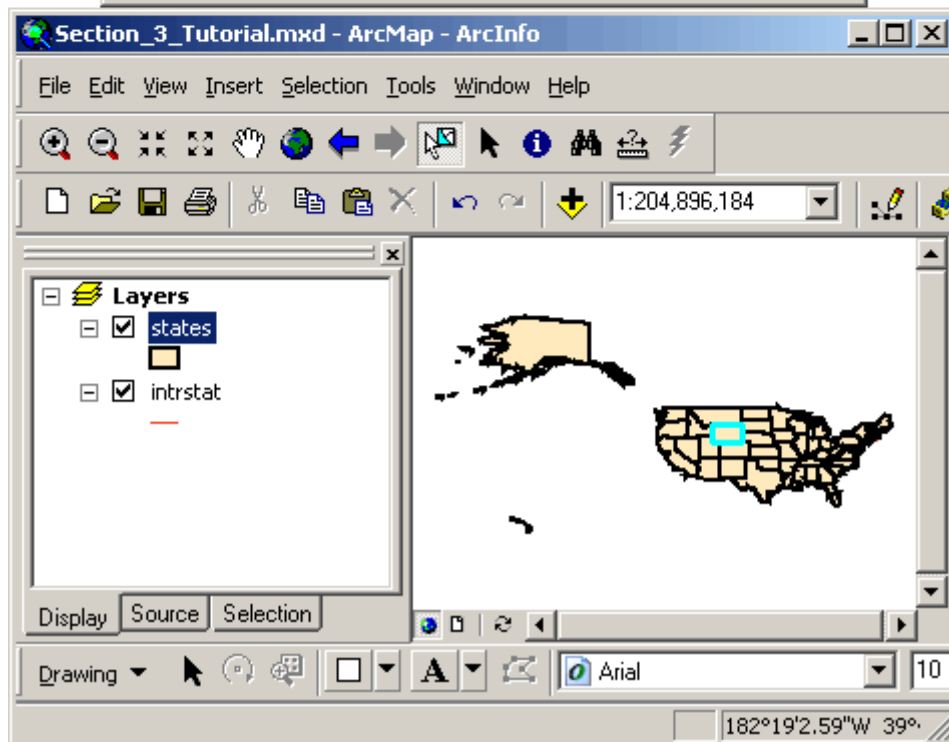
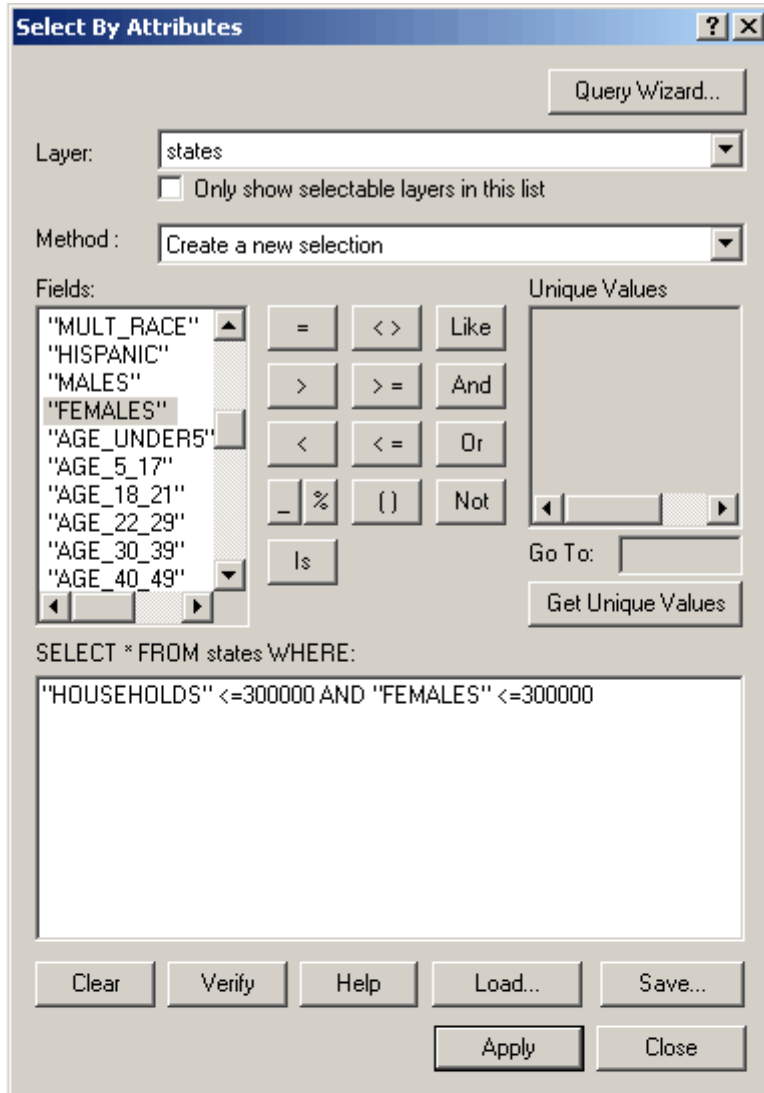
To perform a query, the user must double-click an attribute field of interest, in order for it to display in the bottom portion of the **Select by Attributes** dialog box. Then the user must click on the appropriate operator button. A unique value of interest may be double clicked on within the **Unique Values** box, or a value may be directly typed into the query string.

In the following example, all States were initially selected that had $\leq 300,000$ households.

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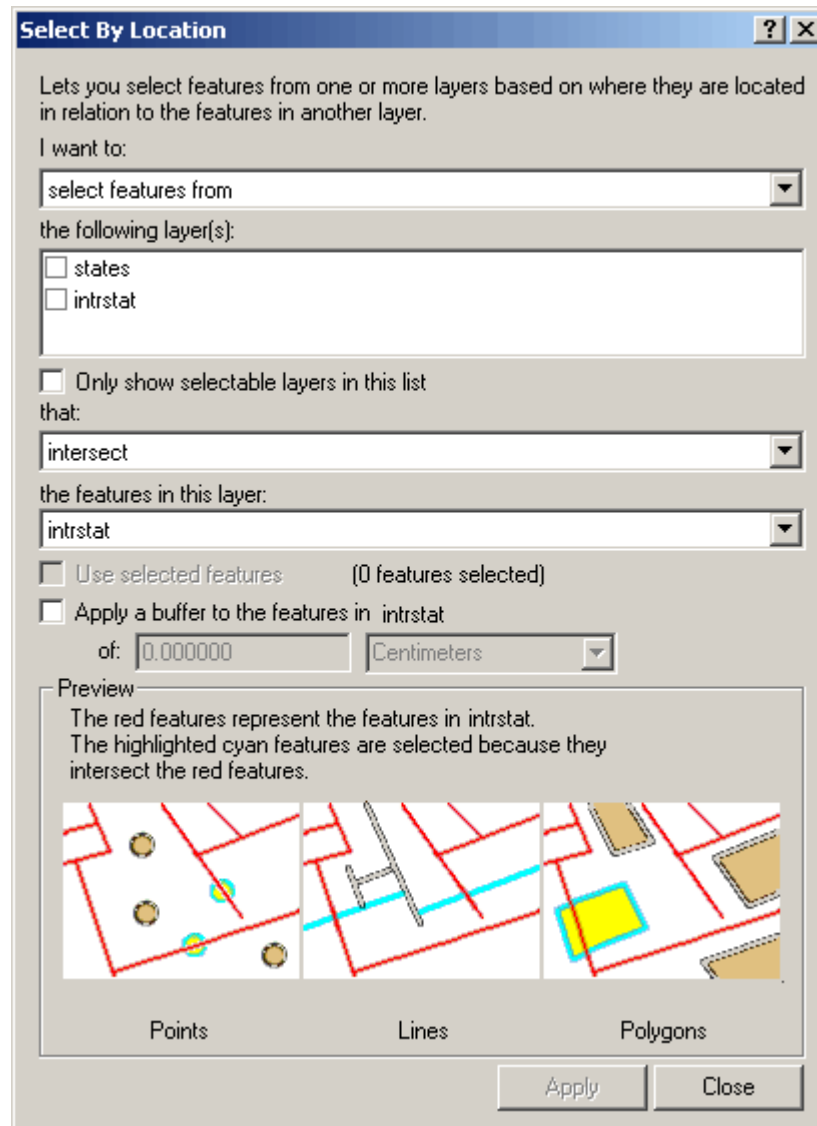
Then, all states were selected that had $\leq 300,000$ Households AND $\leq 300,000$ Females.



Selecting Features by Location:

Instead of selecting features by their attribute values, the user may also select them by their location (their spatial relationship to other features, whether in another layer or in the same layer). To select features by location, the user specifies a selection method, a selection layer, a spatial relationship, a reference layer, and sometimes a distance buffer.

To begin selecting features by location, the user must click the **Selection** menu and click the **Select by Location** option. The **Select by Location** dialog box opens.



By default, the selection method is **select features from**. This option should be used when the user wants to create a new selected set. The other options allow the user to add to an existing selected set of features, remove from an existing selected set of features, or select from an existing selected set of features.

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

Within the scrolling list of selection layers, the user may select the layer from which they wish to select features.

There is a list of spatial relationships that can be chosen using the drop down arrow. The following describes the various options that are available.

- **Are Crossed by the Outline of:** This method selects the features that are overlapped by the features of another layer.
- **Intersect:** This method selects any features that are overlapped by the features of another layer as well as those features that border the reference features.
- **Are Within a Distance of:** This method selects features near or adjacent to features in the same layer or in a different layer. The user must specify the numerical distance of interest.
- **Have Their Center in:** This method selects the polygon features in one layer that have their centroid in the polygon features of another layer.
- **Are Completely Within:** This method selects features in one layer that fall completely inside the polygons of another.
- **Completely Contain:** This method selects polygons in one layer that completely contain the features in another layer.
- **Share a Line Segment with:** This method selects line and polygon features that share line segments with other features.
- **Touch the Boundary of:** This method selects lines and polygons that share line segments, vertices, or end-points (nodes) with the lines in the layer. The lines or polygons will not be selected if they cross the lines in the layer.
- **Are Identical to:** This method selects any feature having the same geometry as a feature of another layer; however, the feature types (point, line, or polygon) must be the same.
- **Contain:** This method selects features in one layer that contain the features of another. The boundaries of the features ARE allowed to touch.
- **Are Contained by:** This method selects features in one layer that are contained by the features in another.

Next, the reference layer should be chosen using the drop-down arrow.

If the user wishes to apply a distance buffer, then the box next to the **Apply a buffer to the features in ...** option should be checked (or clicked). A distance and a unit of measure should be chosen.

Once all parameters are set, the **Apply** button should be clicked. The results will be selected in the map display.

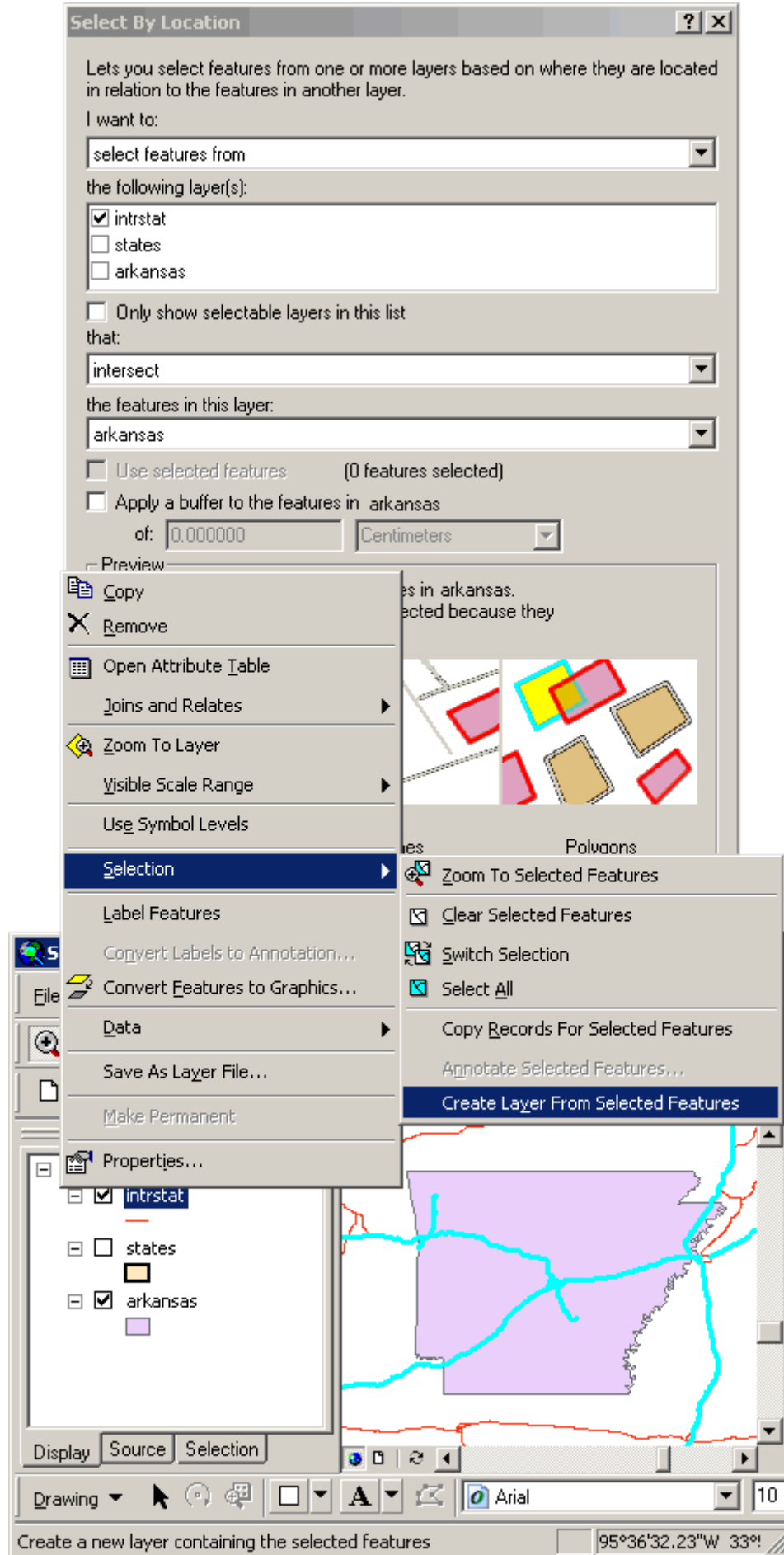
In the following example, all major roads were selected that exist in Arkansas using a layer that contained only the Arkansas state polygon and a U.S. road layer that contained all major U.S. roads.

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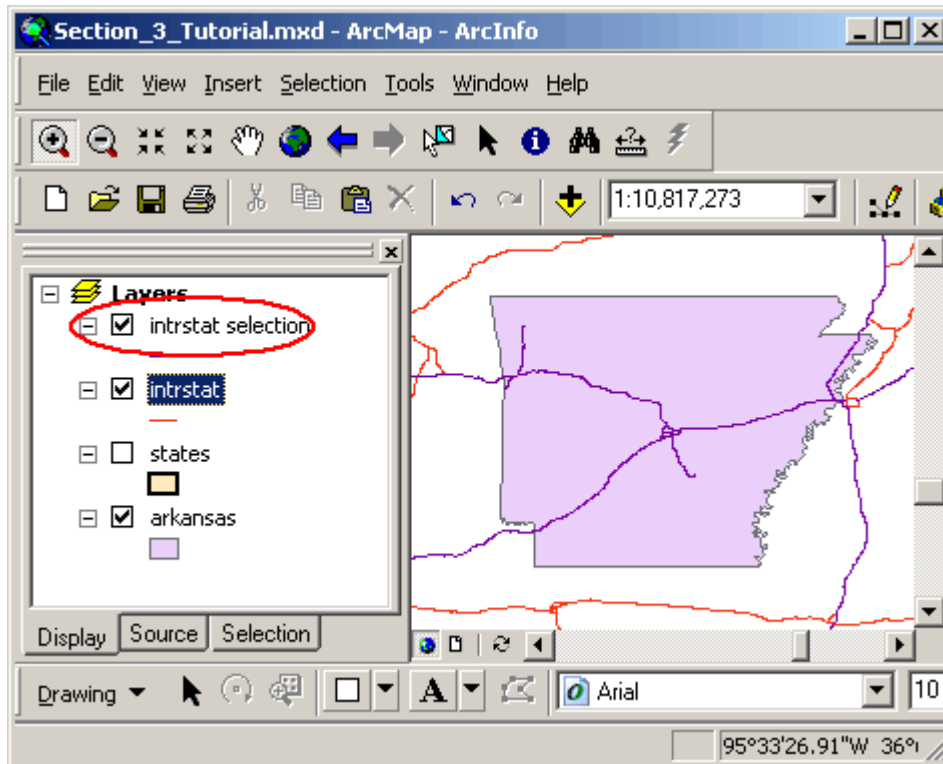
Selecting Features by Location:

Once a feature has been selected in can be converted into its own ArcMap data layer.

This can be done by right clicking on the name of the data layer in the table of contents that contains the selected feature of interest and clicking on the **Create Layer from Selected Features** option in the **Selection** menu.



The new layer will appear in the table of contents. This layer is given a default name that can be changed by right-clicking on the name, selecting **properties**, selecting the **General** tab, and typing in a new name in the **Layer Name** box.



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