

# **GIS MANUAL**

US Army Corps of Engineers  
Spatial Data Branch  
Mobile, AL

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## IMPORT GPS POINTS

Before you can update a property line you must first import the new GPS points. You can do this two ways:

?? You can use the OP-J Toolbox.

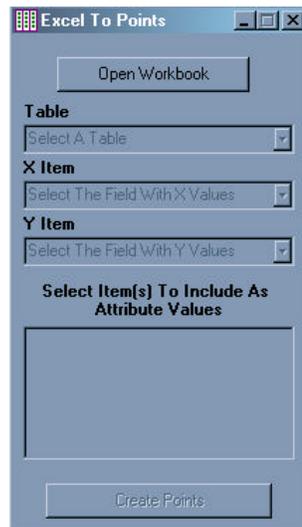
?? Or if the OP-J Toolbox is not available you can use ArcMap to create an Event Theme.

### IMPORT GPS POINTS - OPJ-TOOLBOX

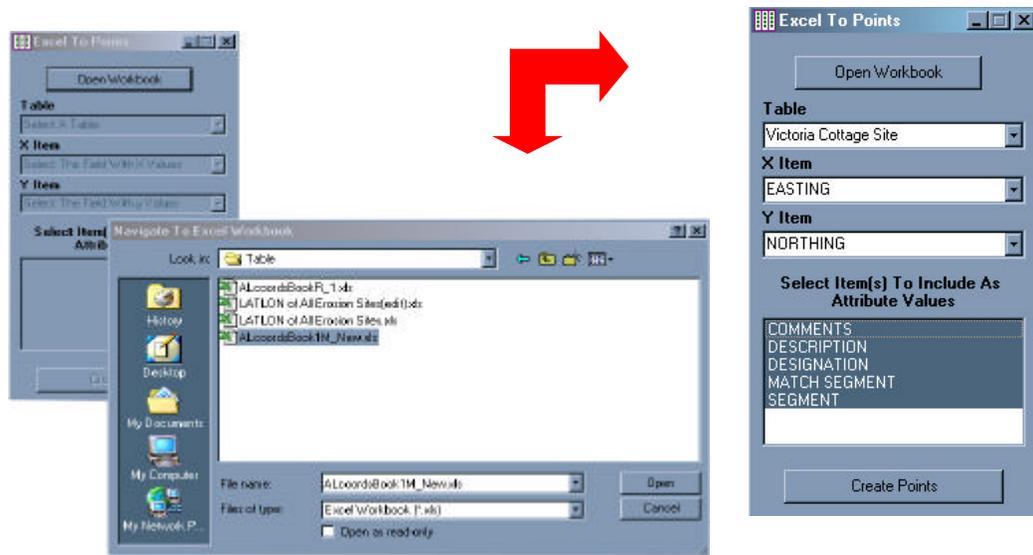
First click on the **OP-J Toolbox**. Click **Data Tools - Excel To Points**.



This opens the Excel To Points Wizard.



In the Excel To Points Wizard click **Open Workbook**. Go to desired Excel file and click **Open**. Change items to reflect desired table and x and y value. Click **Create Points**.



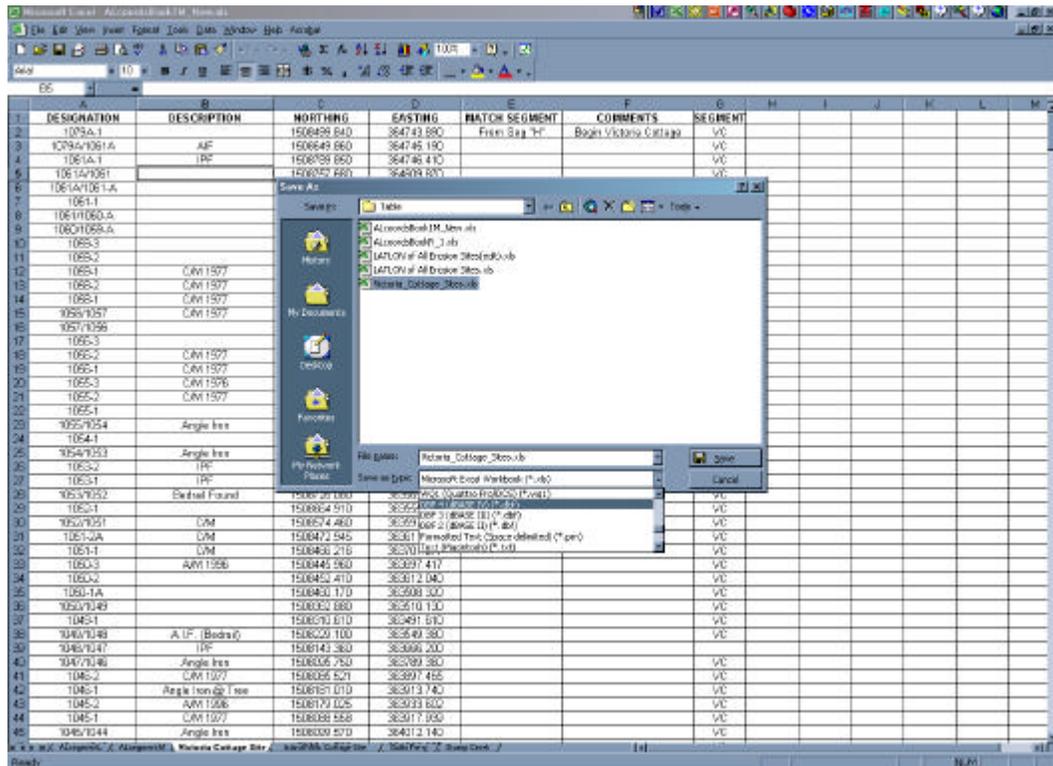
If you need to change the spatial reference (projection) of the shapefile click **Yes** and select the proper projection information, otherwise click **No**. Save the New Output Shapefile in desired location. The result is the placement of monuments in their correct X, Y positions on the map.



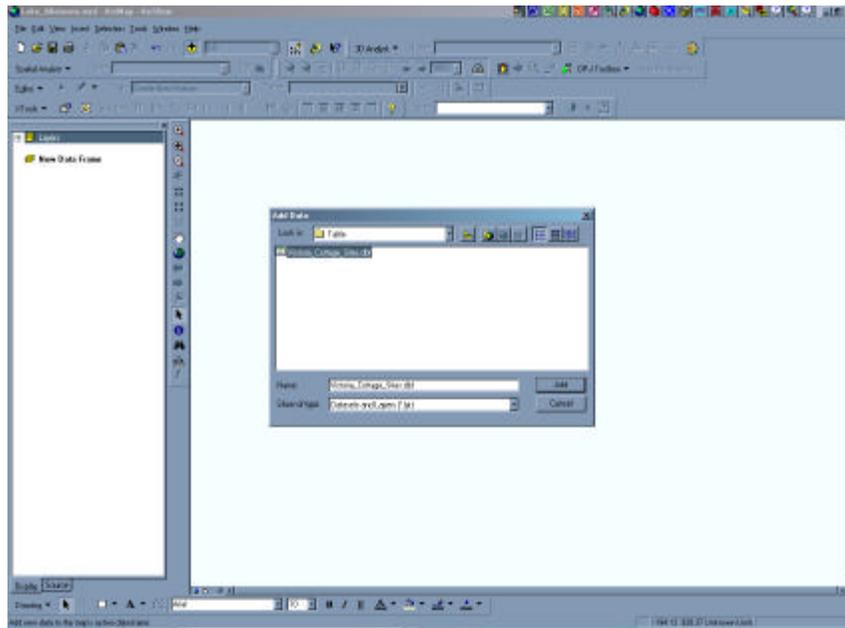
## IMPORT GPS POINTS – EVENT THEME

Before importing to ArcMap the Excel table must be saved out in dbf 4 (dbase IV) format for each worksheet.

*Note: Two information boxes will pop up saying that only the active sheet will be saved. Be sure to have the proper sheet select and press **OK** and then **Yes**.*

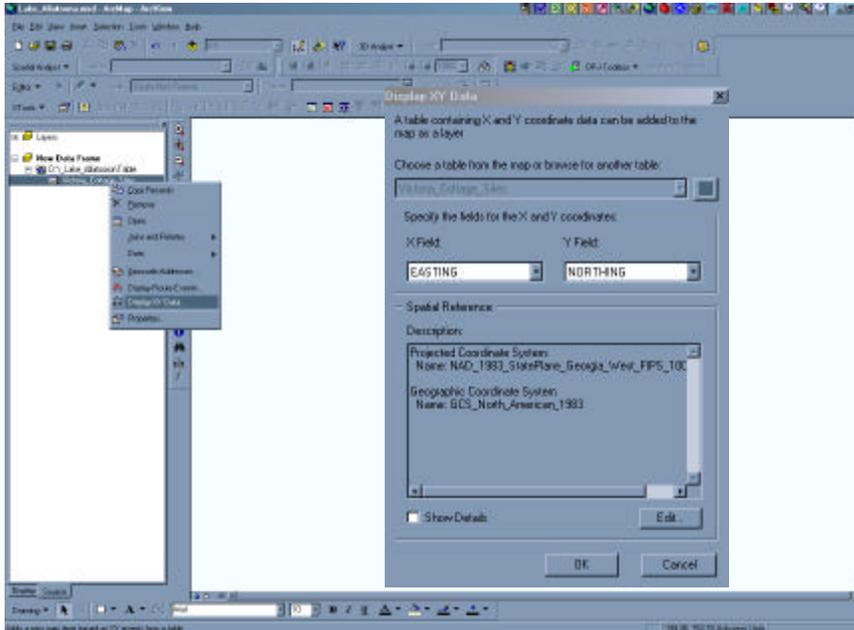


Open ArcMap and insert the database file that was just saved from Excel.



Right-click on the database and chose **Display XY Data**. Set the **X Field** and **Y Field** and change spatial reference to the correct coordinate system. Press **OK**.

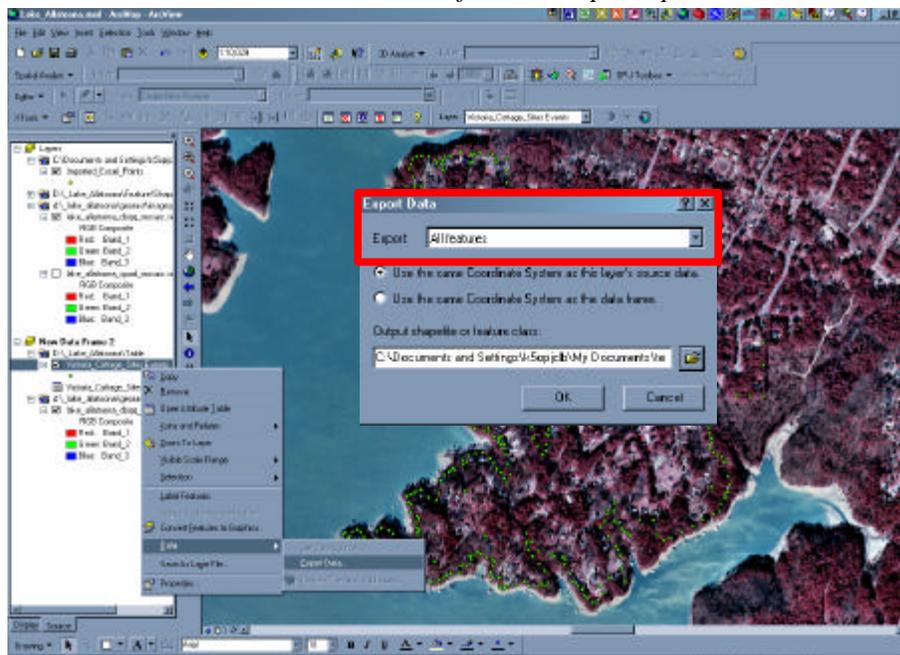
X	Longitude	Easting/West
Y	Latitude	Northing/South



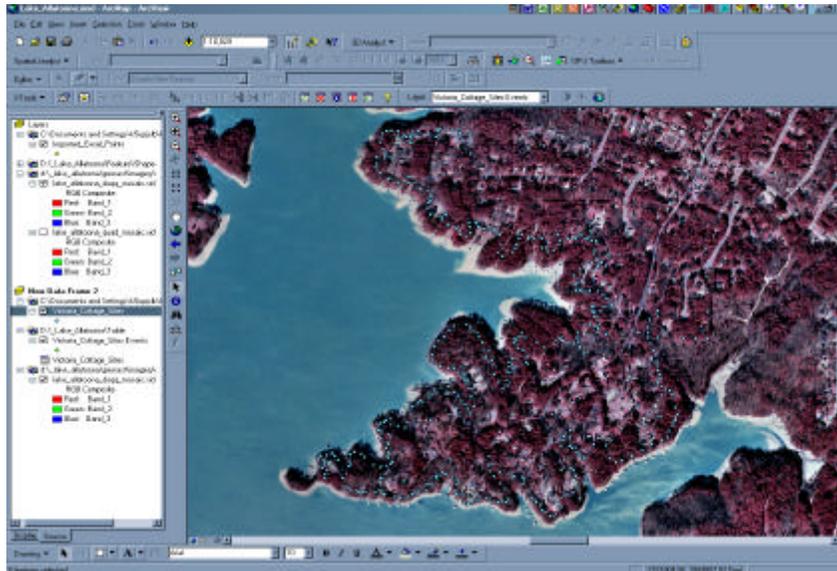
The new GPS points have been added using an Event Theme. Now you must Export the data out to make it a shapefile. Right-click on the Event Theme and click **Data** then **Export Data**. Save in desired directory and click **OK**.

*Note: The Event Theme is only temporary, if it is not exported, the file is be lost when the ArcMap project is closed.*

*If a feature selection exists, the user has the option to export only the selected features. To do so, select "Selected Features" from the export option selection list.*

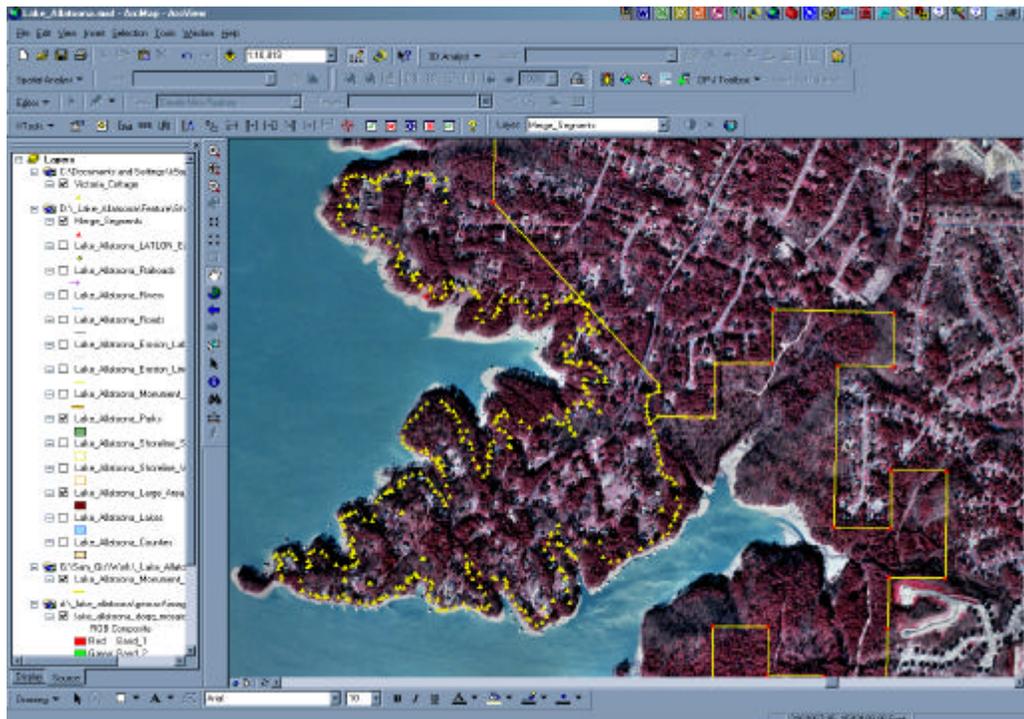


Click **Yes**, to add the new shapefile into the data frame. The event theme and database can now be removed from the project window.



## UPDATE PROPERTY LINE

Once the GPS points are in place the property line can be updated. In the sample below, the new monuments are shown in yellow and the current monuments are shown in red. The current property line is also shown in yellow.

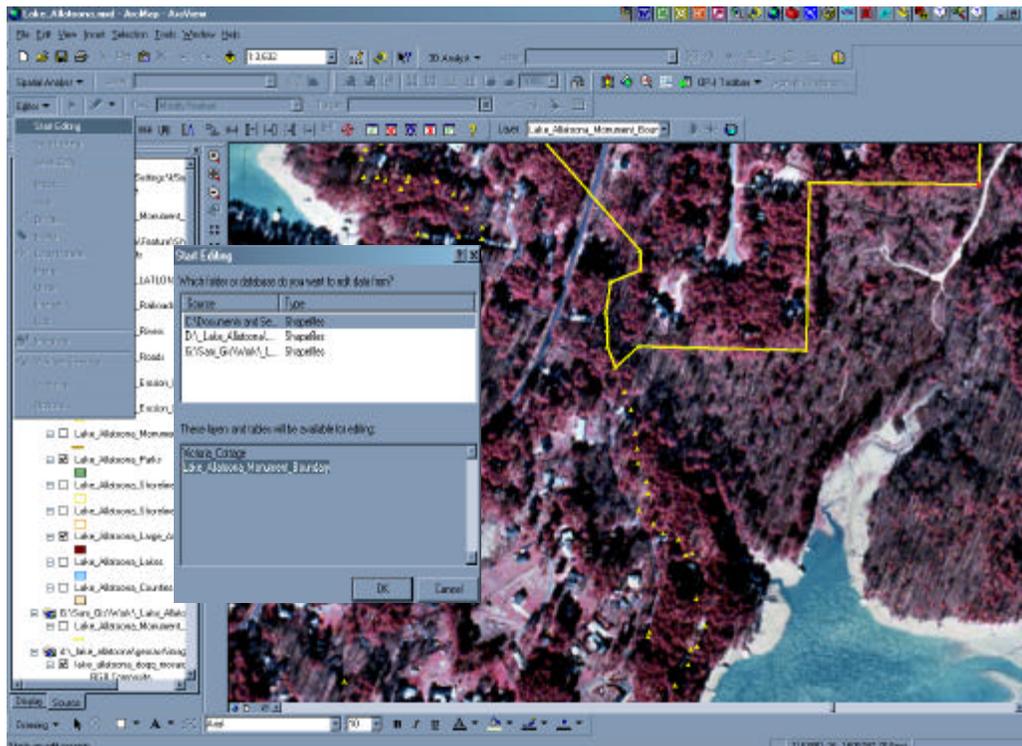


To start editing click on **Editor – Start Editing**. Then select the directory that the files you wish to edit reside.

*Note: The different shapefiles in each directory will appear below in “**These layers and tables will be available for editing.**” Statement.*

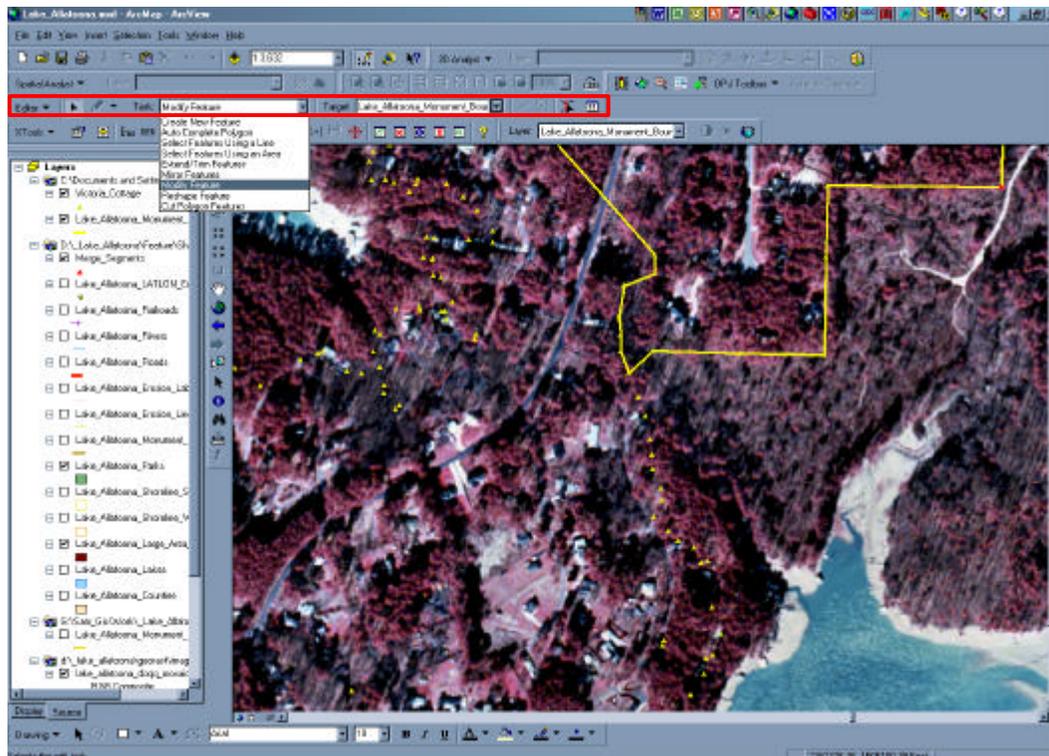
*If you do not see the Editor button, the Editor Toolbar needs to be turned on. To do so, right-click on any menu and select “Editor”.*

Once the desired file is selected click **OK**. At this point layers are ready to accept all changes to geometry and attribute values. To save edits, click the Editor Menu and select “**Save Edits**”.

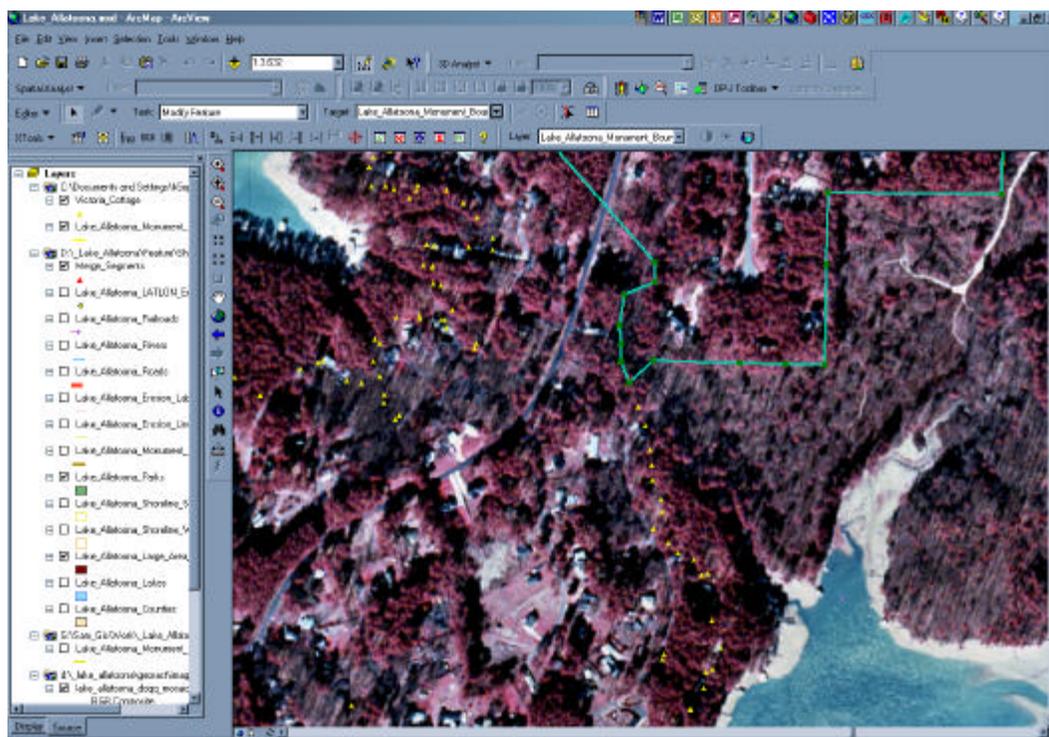


## UPDATE PROPERTY LINE – MODIFY FEATURE

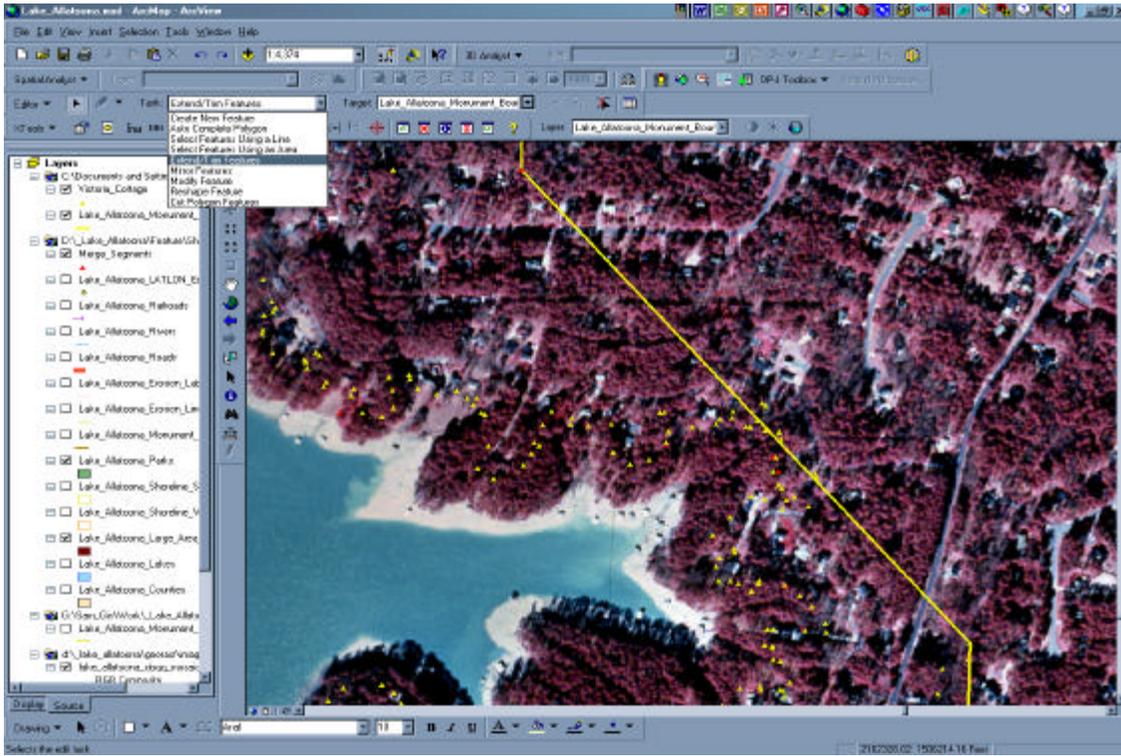
Using the example above, some of the vertices in the property line need to be readjusted. To move points or readjust a line, the feature must be modified within an edit session. Select **Modify Feature** next to the **Task** drop-down list on the Editor Toolbar. Be sure the **Target** layer is set to the Property Line or the layer that is to be modified.



Then click on the vertex tool  and click on the property line to select it.  
*Note: The selected line is now green with the vertex visible.*

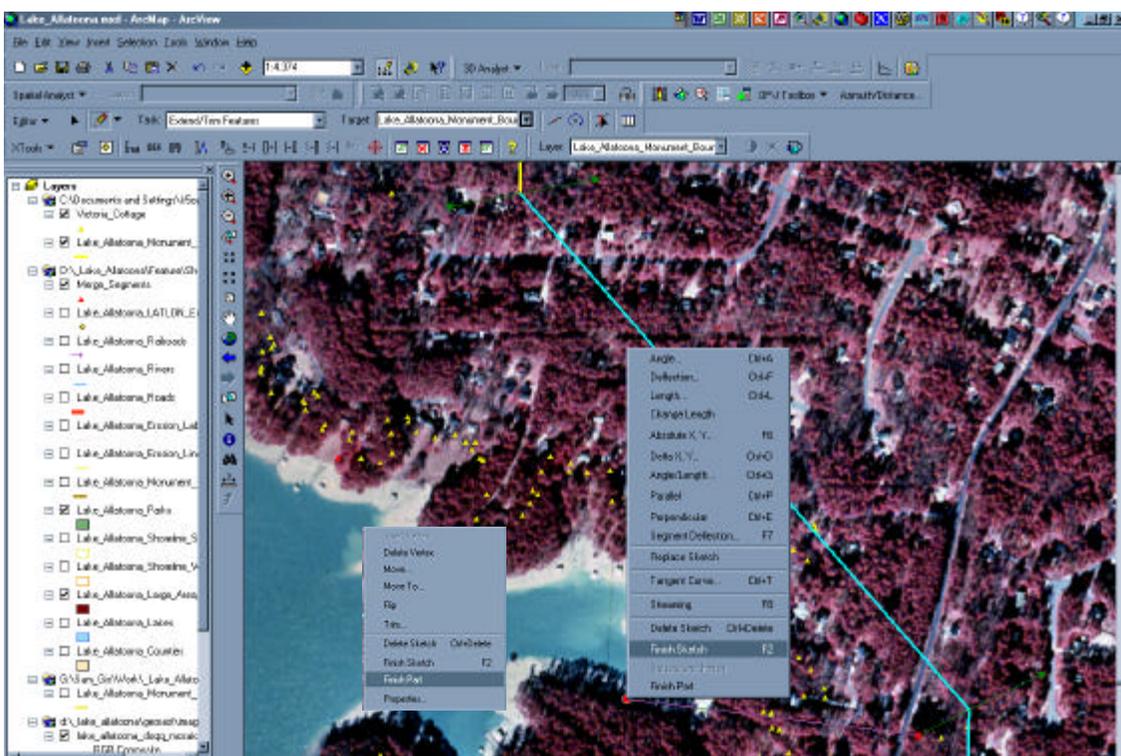




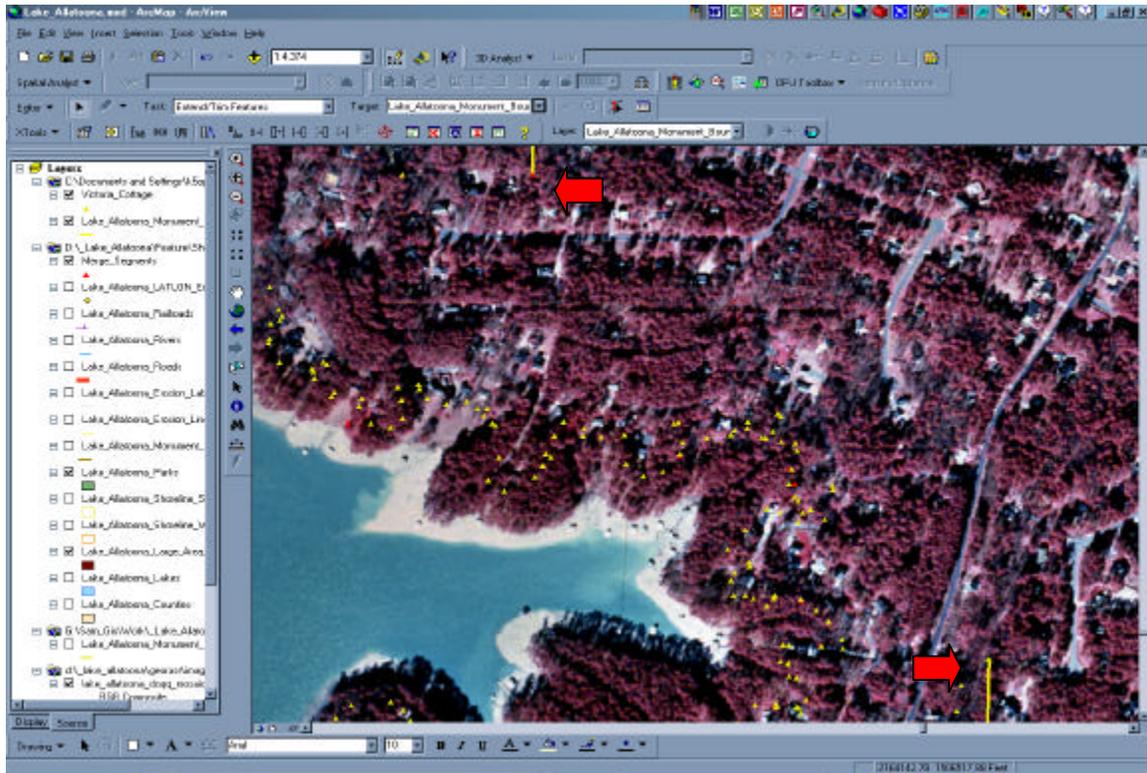


Click on the pencil tool.  Draw a line, left to right, through the top point right-click and select **Finish Part** and then draw a line, right to left, through the bottom point right-click and select **Finish Sketch**.

*Note: When drawing the line through the property line it should be noted that the line would disappear from the right side of the line. If the wrong part of the line disappears click undo and try drawing the line from the other direction.*

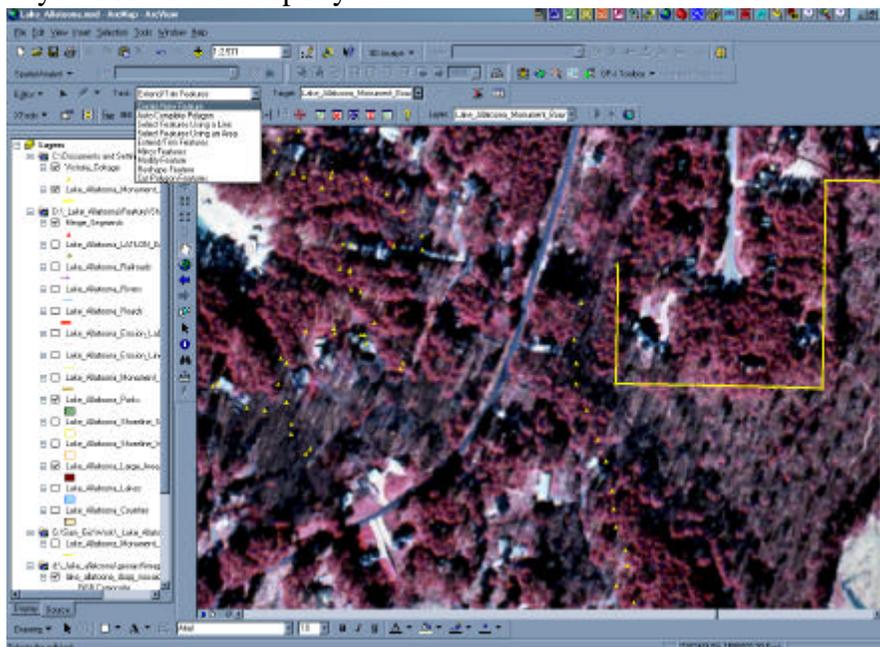


Below is how the property line should now look. Notice the missing section.



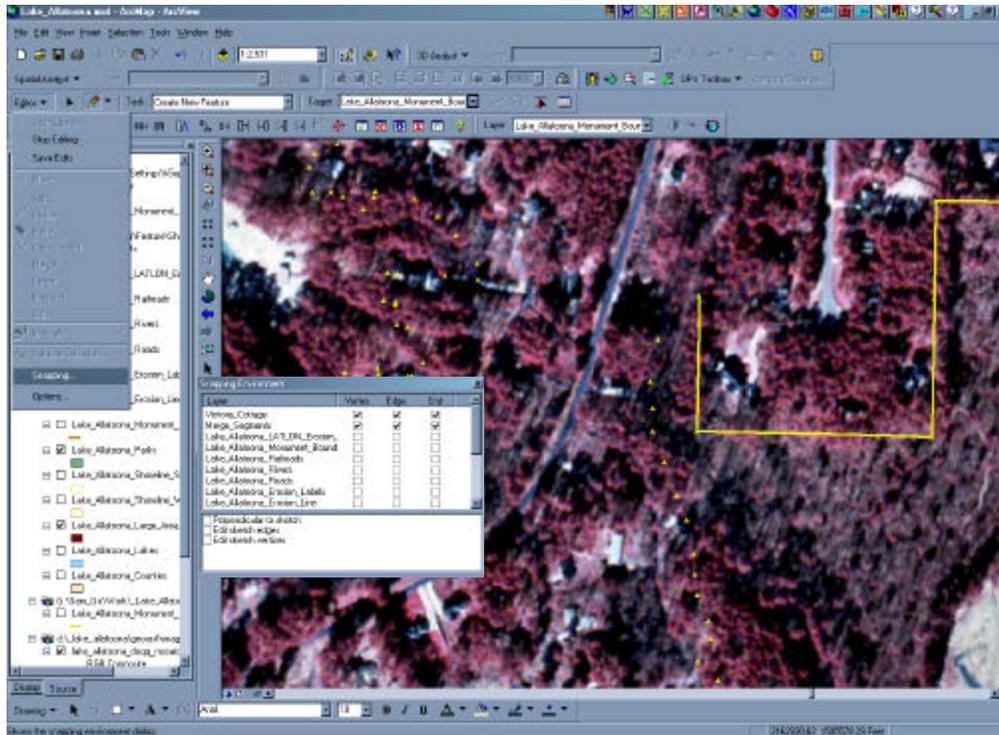
## UPDATE PROPERTY LINE – CREATE NEW FEATURE

Click on the drop-down arrow next to Task and select **Create New Feature**, be sure the Target layer is set to the Property Line.

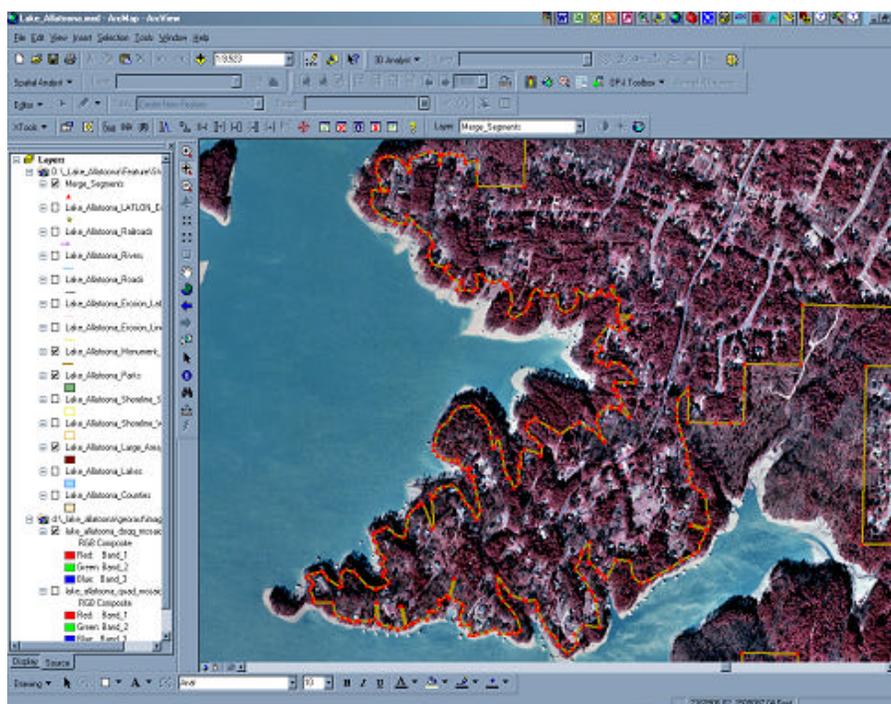


Click the pencil tool.  Click on **Editor** and select **Snapping**. Check Vertex, Edge and End for needed monuments and close the dialog.

*Note: Snapping is used to make sure that the new property line is connected to the old property line without gaps in the line.*

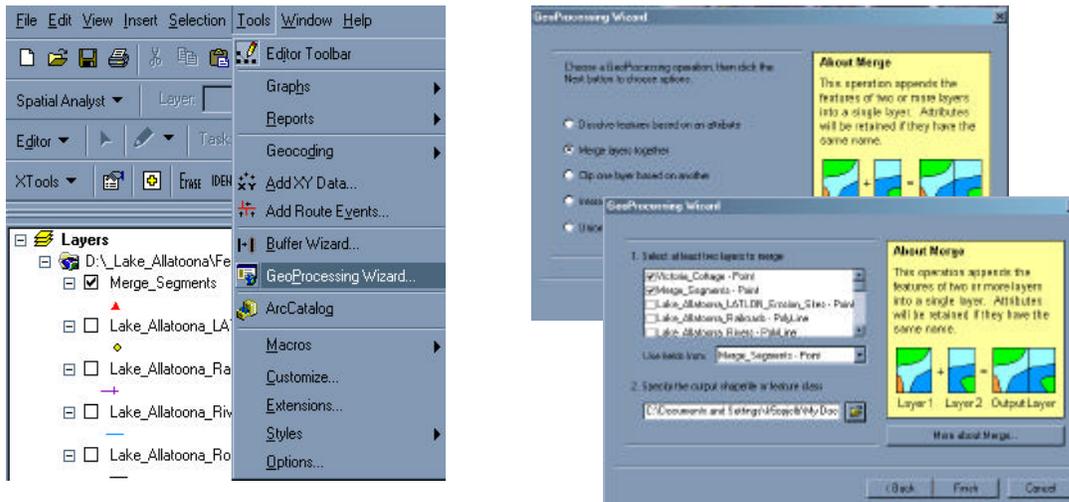


You are now ready to build your new property line. Using the pencil tool, start by snapping to the end of the property line at the monument. Then click on each additional monument until the new property line is complete.

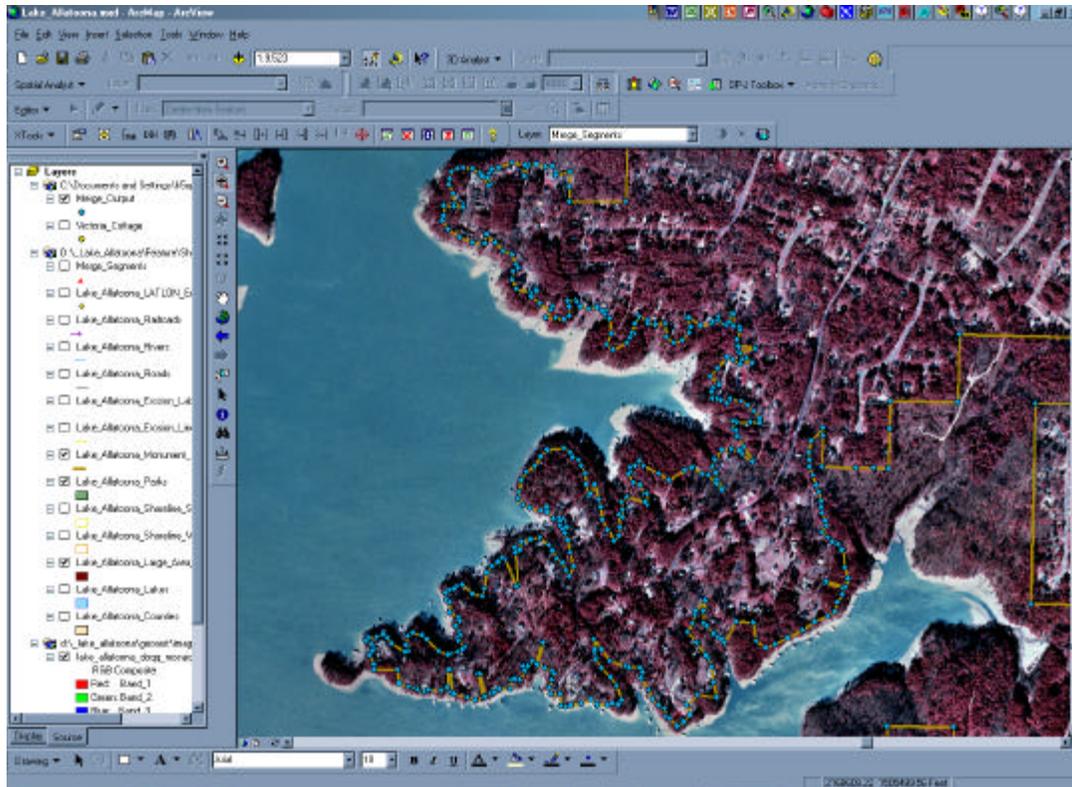


## MERGE LAYERS

To combine the existing monument shapefile with the new, use the merge utility. From the **Tools Menu – Geoprocessing Wizard**. Select **Merge Layers** together, then click **Next**. Select layers to merge and save in desired directory then press **Finish**.



Now all GPS points are joined into one shapefile. Notice all points are now blue.



## CREATE PARCEL/ALLOCATION POLYGONS (SHARED BORDERS)

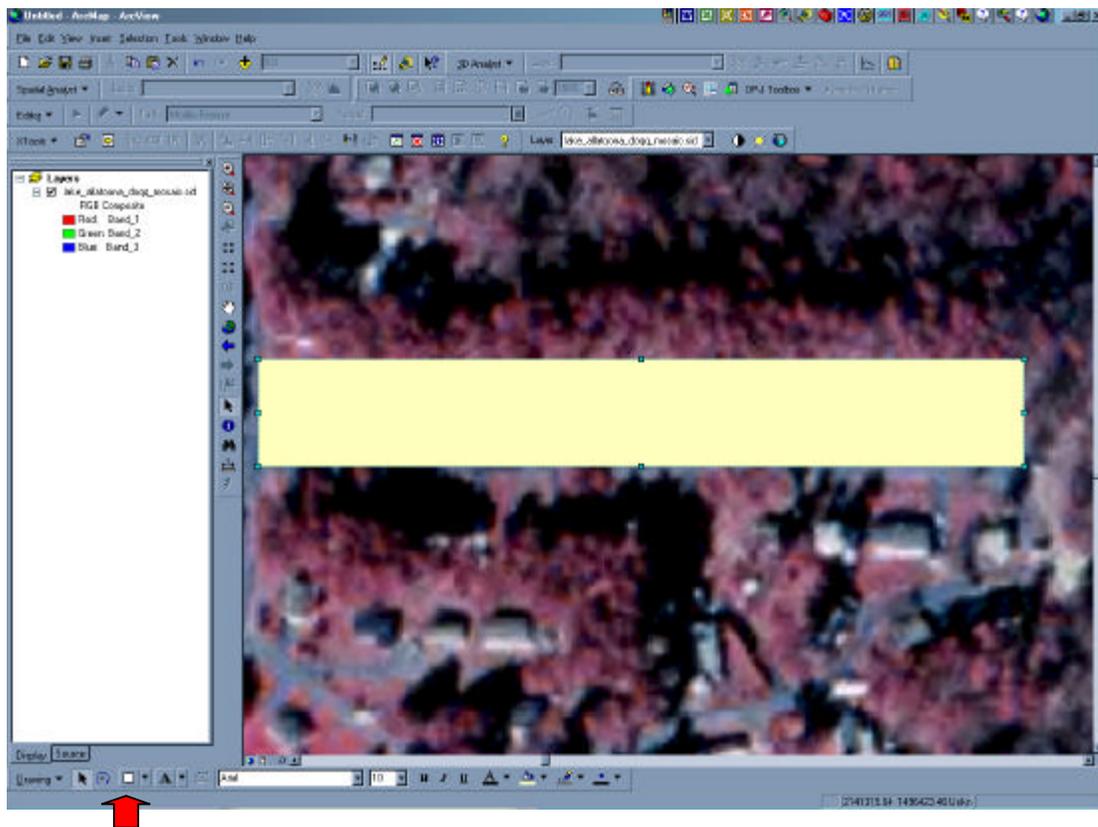
You can create the initial parcel shapefile two ways.

?? By using X-Tools.

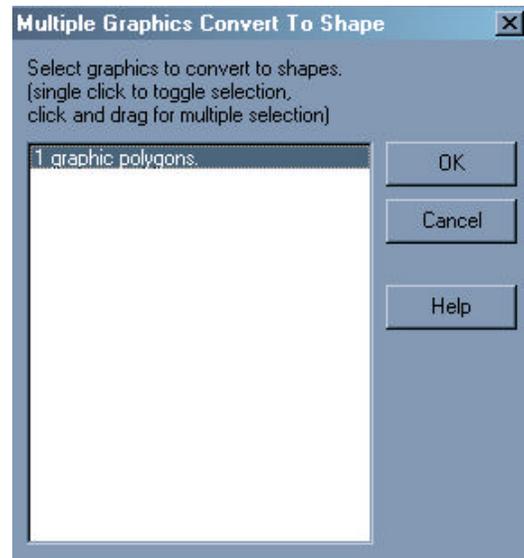
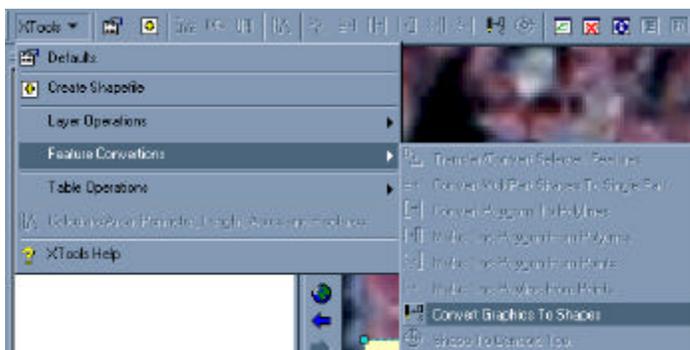
?? Or by using ArcCatalog to create a new shapefile.

### CREATE PARCEL – X-TOOLS

Zoom into desired area. Click Draw Rectangle tool or Draw Polygon tool from the Drawing Toolbar. Draw a large polygon to represent the parcel sites.



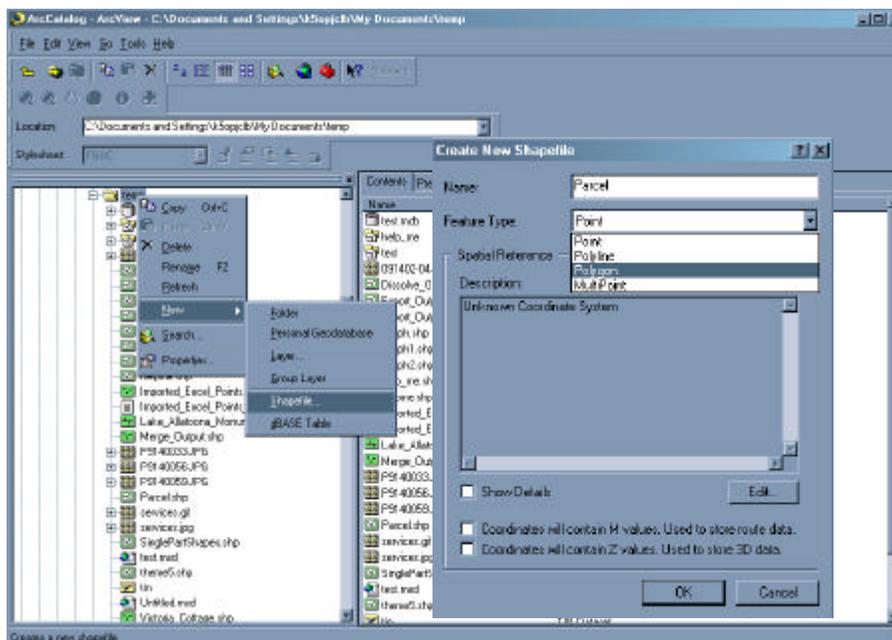
The graphic must now be made into a shapefile so that it can be edited. Click on the graphic and then on **X-Tools**. Click **Feature Conversions – Convert Graphics to Shapes**. Click on 1 graphic polygon and then click **OK**. Browse to desired location and click **OK**.



The graphic can now be deleted as a shapefile has been made to replace it. Click on graphic and hit **Delete** on the keyboard.

## CREATE PARCEL – ARCCATALOG

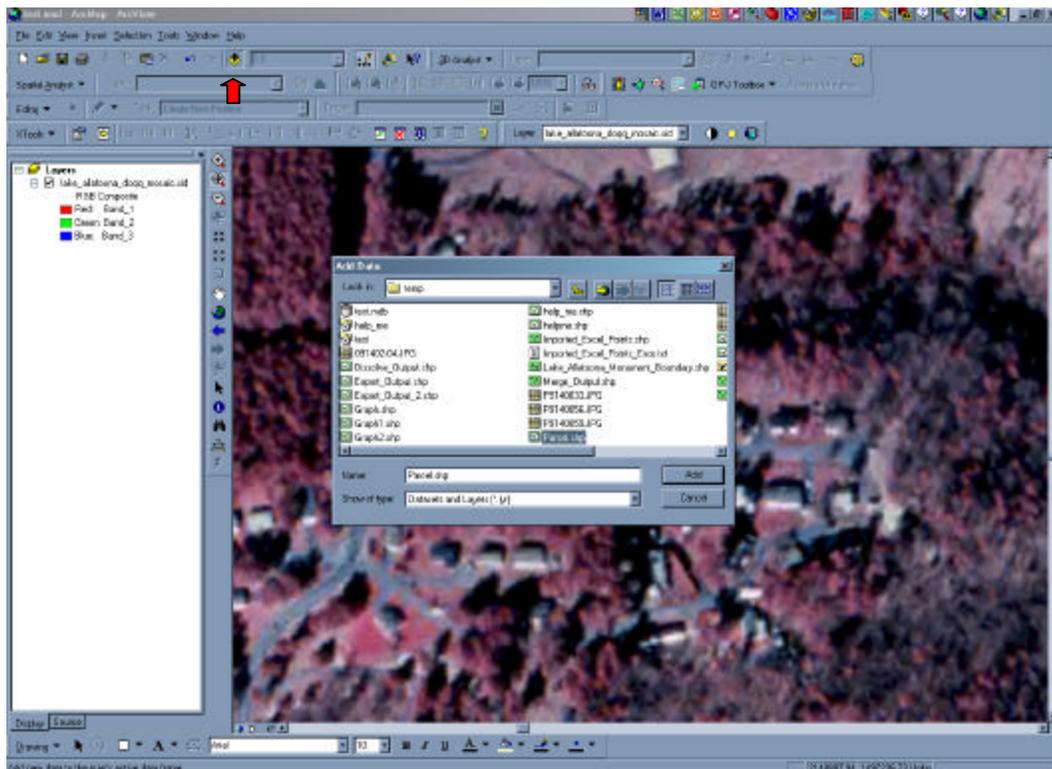
Start by opening ArcCatalog. Navigate to desired folder to hold the new Parcel shapefile. Right-click on the folder and select **New – Shapefile**. Change name of new shapefile and select the feature type: Polygon (parcels, allocation areas, etc), Polyline (boundaries, streams), or Points (monuments, signs, etc).



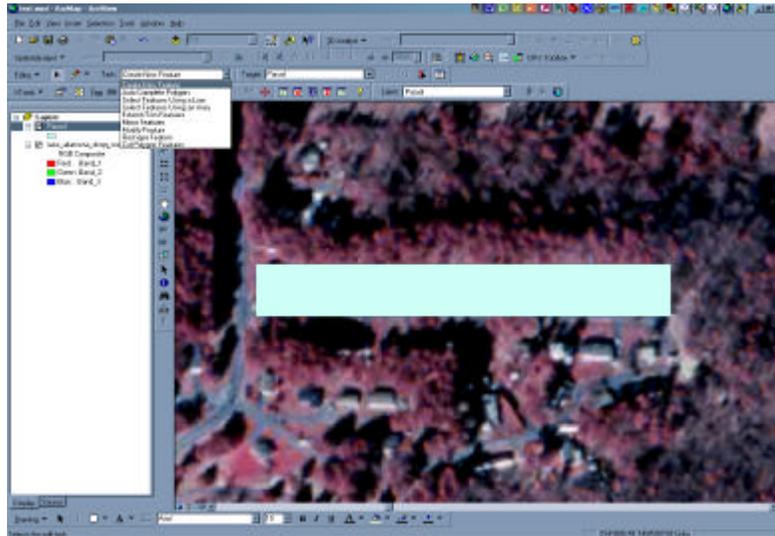
As you can see the new shapefile has been added to the folder. The Parcel layer is now ready accept polygons.

Imported_Excel_Points_Error.txt	Text File
Lake_Allatoona_Monument_Bound...	Shapefile
Merge_Output.shp	Shapefile
P9140033.JPG	Raster Dataset
P9140056.JPG	Raster Dataset
P9140059.JPG	Raster Dataset
Parcel.shp	Shapefile
services.gif	Raster Dataset
services.jpg	Raster Dataset
SinglePartShapes.shp	Shapefile
test.mxd	Map Document

You are now ready to add features to the empty Parcel polygon in ArcMap. Open ArcMap and add in the new shapefile you just created.

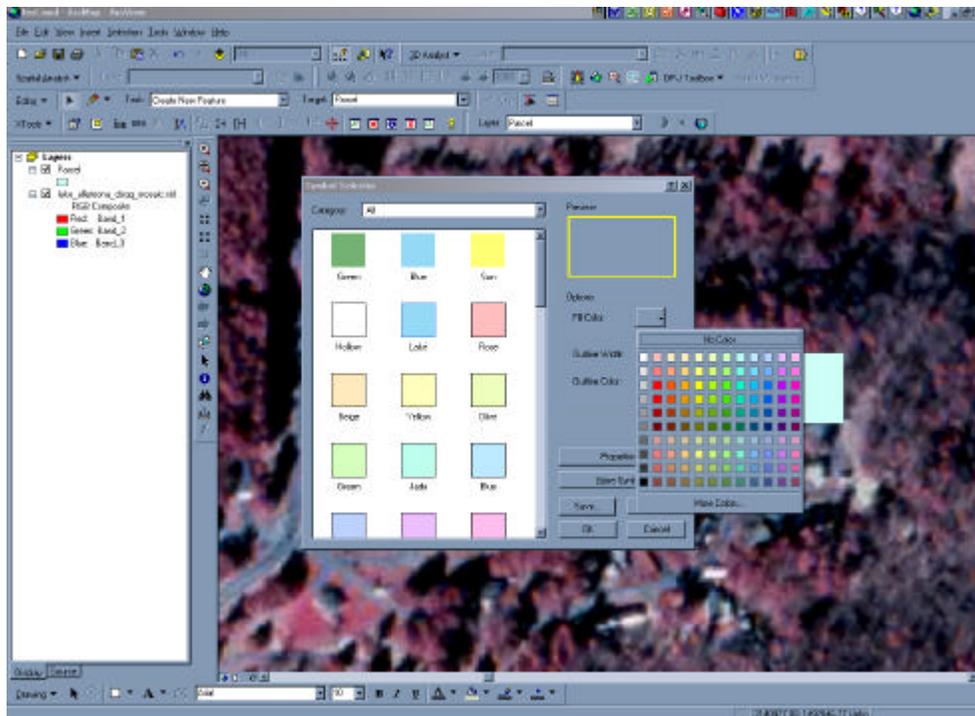


Currently the Parcel.shp does not have any features. So we must begin to create our parcel polygons. Click on **Editor – Start Editing**. Then clicking on the drop-down arrow next to Task and select **Create New Feature**. Click on the pencil tool  and draw new parcel polygon.

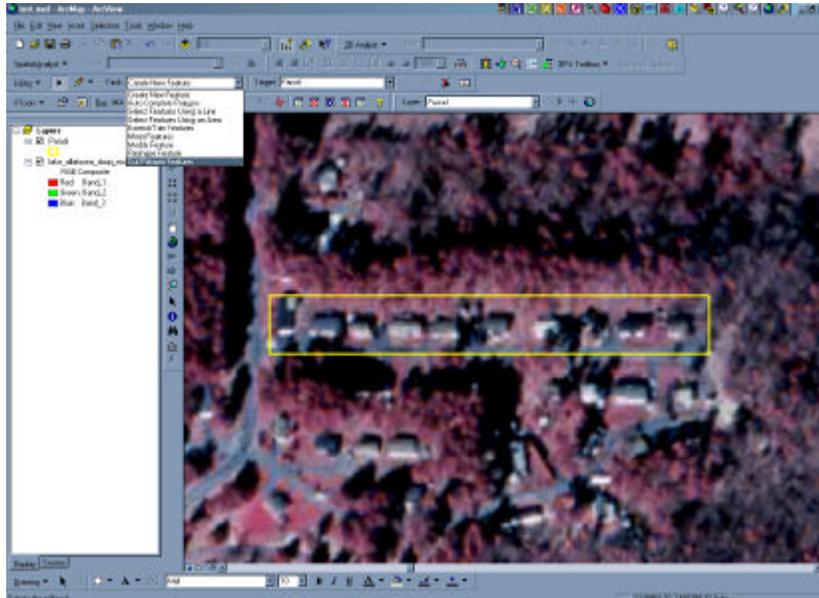


## CREATE PARCEL – SHARED BORDERS

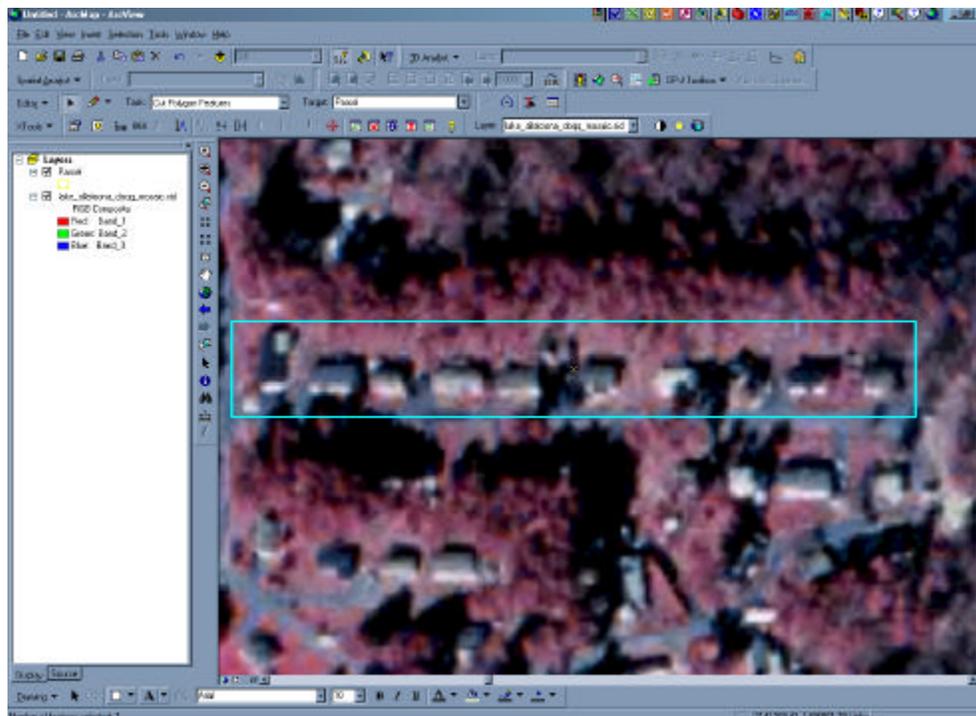
It will be easier to edit the parcel shapefile if the polygon is transparent. Double-click on the polygon below the shapefile. A Symbol Selector window will pop up. Click on **Fill Color** and change to No Color. You can change the Outline Color and make the width wider so you can see it better. When your done press **OK**.



Now we are ready to edit the shapefile. If you need to click on **Editor** and click **Start Editing**. Click on the Task drop-down arrow and chose **Cut Polygon Features**. The Cut Polygon Feature utilities preserves the spatial integrity of the parcel layer. Such as, parcels always share a boundary – there should only be one line between the parcels, not two lines resting on top of one another denotes the boundary.

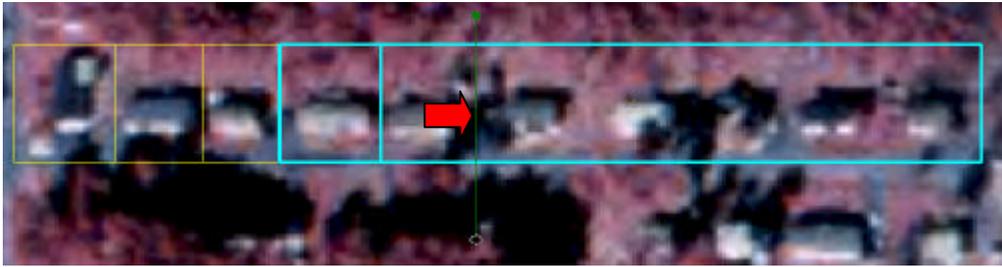


Click on the vertex tool  then on the shapefile to select it. Once it is selected you can use the **Cut Polygon Features Tool**. You can now start separating the parcels in the polygon.

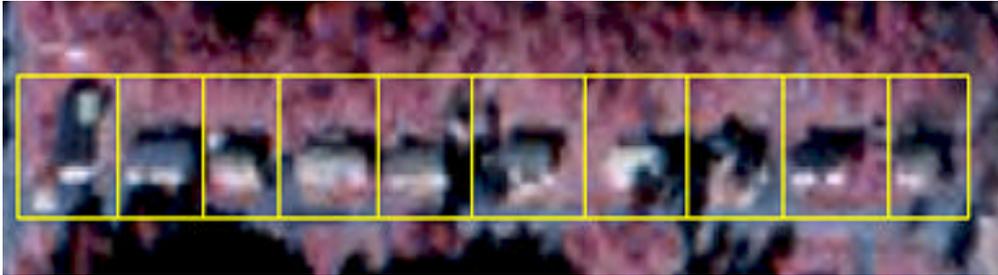


Draw a line through the polygon. Once the line is through the polygon double-click to end.

*Note: The cut line does not have to start on the polygon, it will automatically be clipped off. If you make a mistake either right-click and click delete sketch or hit the undo button.*



Continue drawing lines through polygon until all the parcels have been drawn.



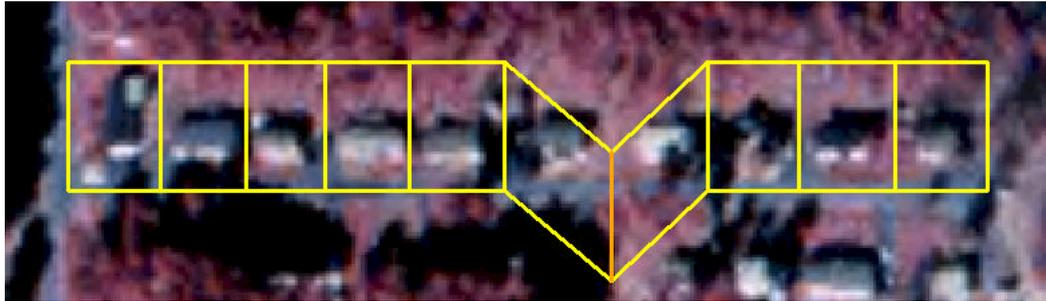
### **EDITING PARCEL/ALLOCATION POLYGONS (SHARED BORDERS)**

If later you find that the borders of one of the parcels needs to be moved a few feet there is an easy solution. Click on the **Shared Edit** tool.  Now click on the border to be moved and slide it in the desired direction.

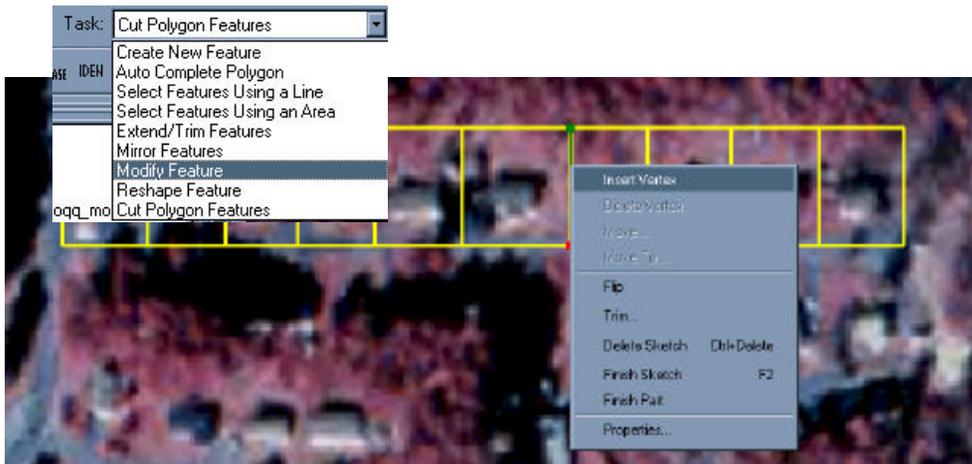


The shared border can move up and down, left and right.



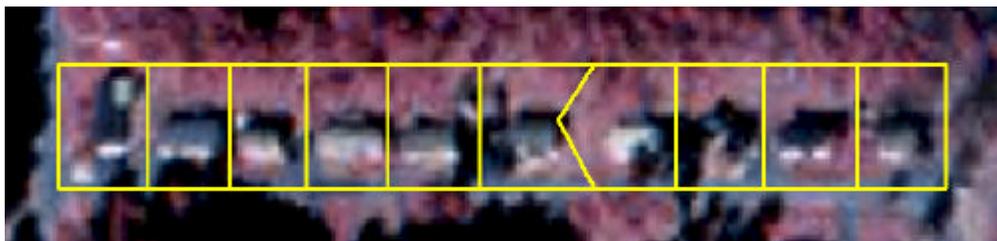


New vertices can also be added to change the shape of the parcel. To do so click on Task and change to **Modify Feature**. Then right-click on the shared border and chose **Insert Vertex**.



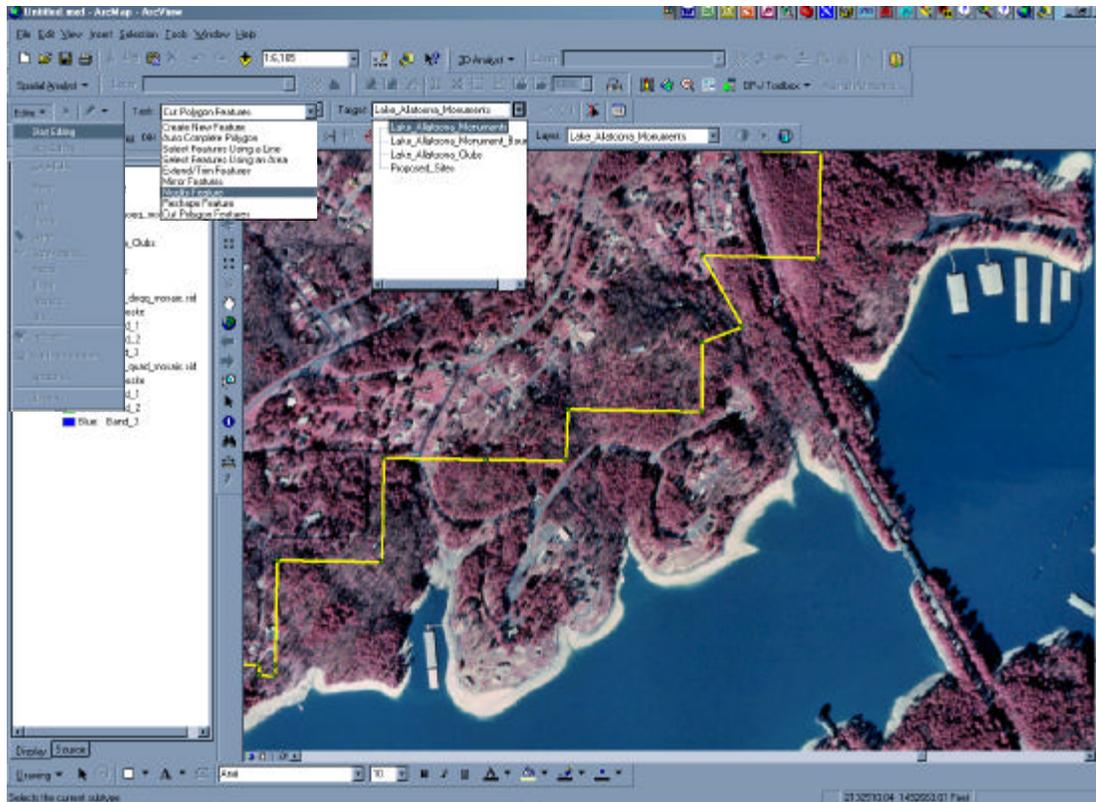
Click on the new vertex point and move in any direction. Once the vertex is where you want it click off the border.

*Note: You can add as many new vertices as you need to accurately modify the parcel border.*

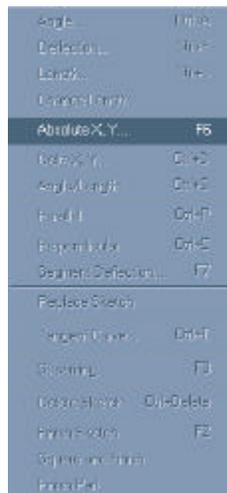


## ADDING MONUMENTS/POINTS USING ABSOLUTE XY

The option is mostly used when you have one or two new monuments/points to add to a shapefile. First click on **Editing – Start Editing**. Then click **Create New Feature**. And finally change the Target field to contain the desired shapefile.



Select the pencil tool.  Right-click on the layout and chose **Absolute X,Y**. A dialog box will pop up with areas to type in the new XY coordinates. Type in the coordinates and press Enter. You have now created a new monument/point.

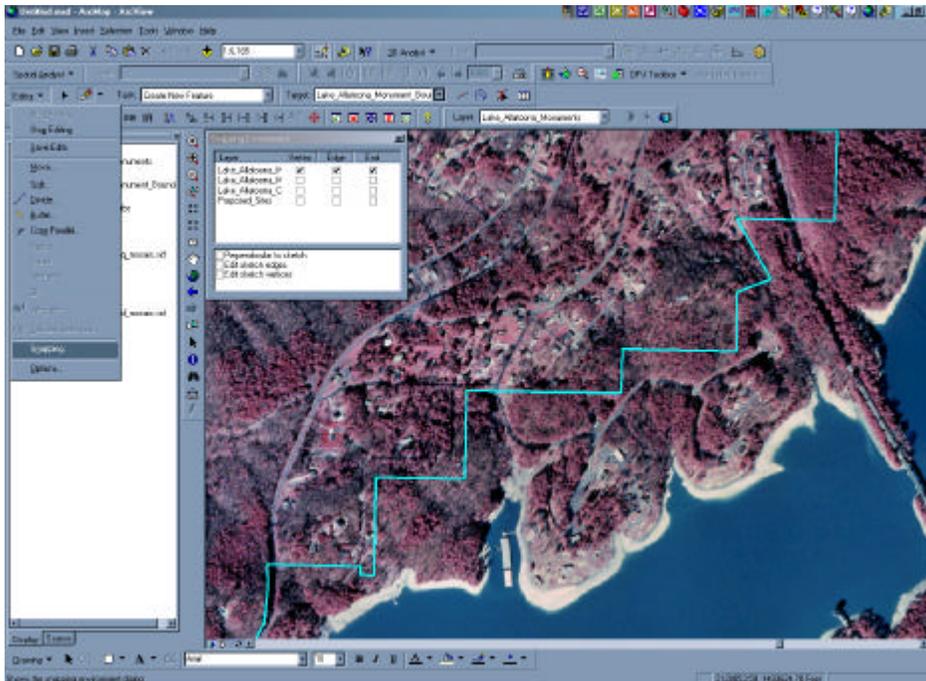


## USING AZIMUTH/DISTANCE TOOL

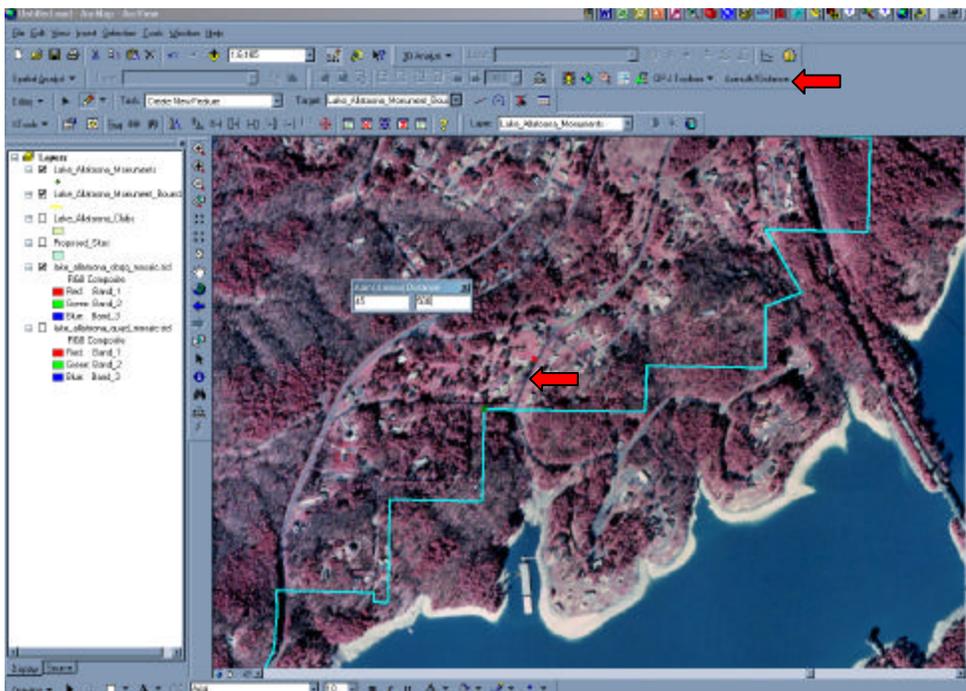
The Azimuth/Distance tool is a great tool if you know the direction and distance of line or point location. If the exact XY coordinates are not known, but a description of the

location exists, such as “45° from a known monument point and 500 feet out” the Azimuth/Distance tool can be used. This tool resides in the OPJ-Toolbox.

First click on **Editor – Start Editing**. Make sure the desired shapefile is selected in the Target layer. From this point you can either **Create a New Shapefile** or **Modify the Existing Shapefile**. In our case we are going to modify an existing shapefile. Select the shapefile to be modified. This would also be a good time to set your snapping properties. Click on **Editor – Snapping** and then chose the shapefile you want to be able to snap to.



Click on the starting point of the new shapefile with the pencil tool  and then on **Azimuth/Distance Tool**. Type in the direction in the first box and the distance in the second and then press **Enter**.



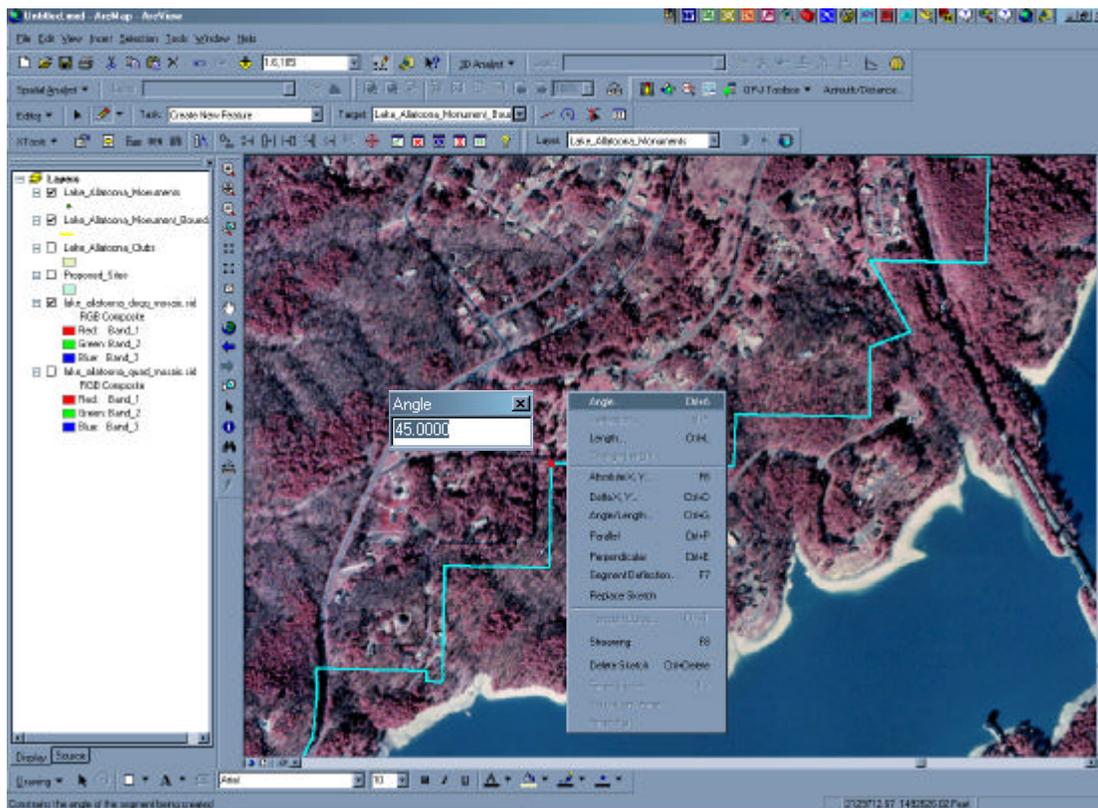
In this example several more monuments/points can be created and linked back to the boundary so that they are now included in the boundary line.

## MISC. TOOLS

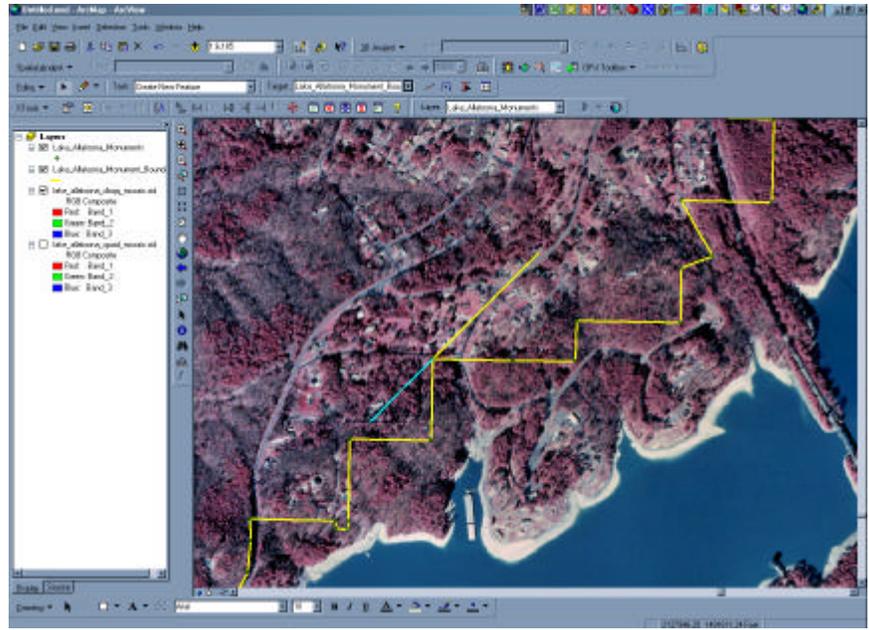
*Note: To use all these tools you must have started editing and have selected the desired shapefile to be edited.*

### ANGLE TOOL

The Angle tool can be used when you know the direction of the new monument/point to be added but you don't know the distance. In this case we are again editing the monument boundary. Select a monument as a starting point and then right-click. Chose **Angle** and type in desired direction and hit **Enter**.



Once the angle has been determined, the line extending from the point will only move along that angle, but the distance can still be decided. As you can see below, the line has distance flexibility but not direction.



**LENGTH TOOL**

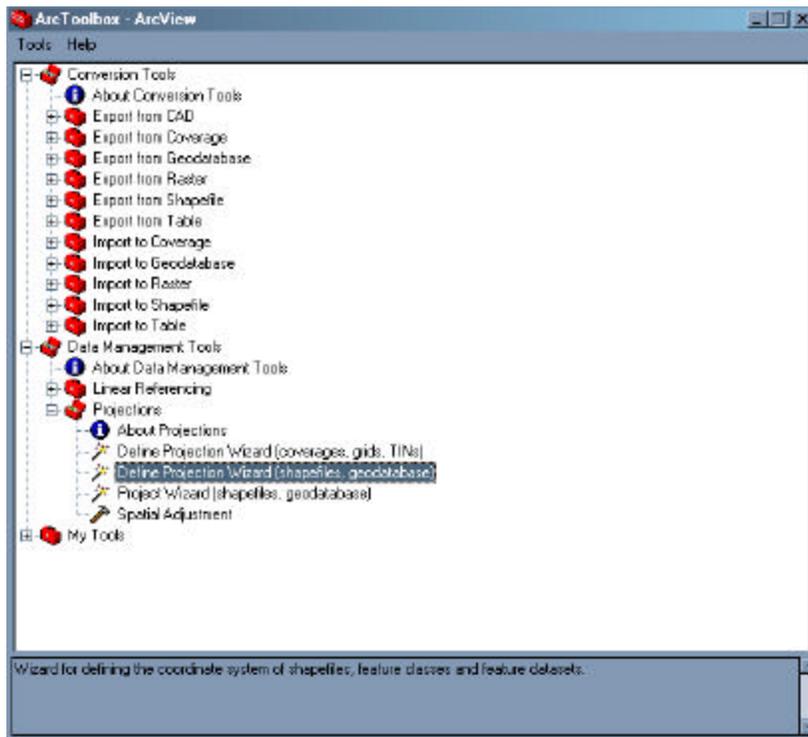
With the Length tool we are given the option to provide the distance of the line. This tool allows us to specify this distance of a line and still have the flexibility to angle the line in any direction. Once the line has a starting point and the length is set the line can be moved 360°. This is useful when you know the distance of the new line but not the angle to set it. For this tool after selecting the line right-click and chose **Length**, type desired length and press **Enter**.



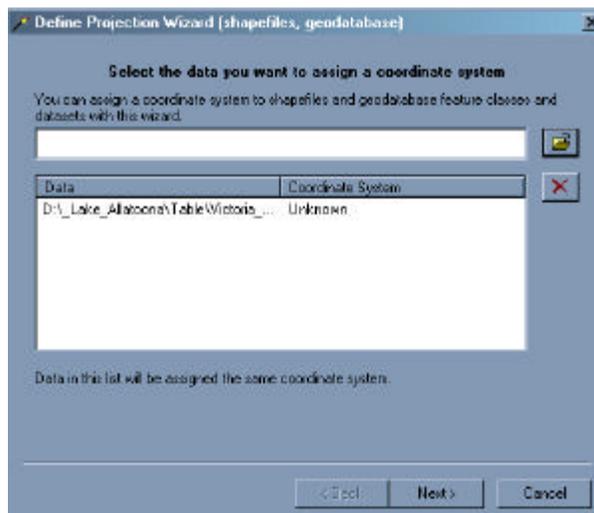
## DEFINE PROJECTION WIZARD

Map projections are attempts to portray the surface of the earth, or a portion of the earth, on a flat surface. Defining the projection is a vital first step in creating a GIS. Each dataset acquired for a GIS has a projection. Defining the projection allows ArcGIS to know the coordinate or projection system used for that data layer. If the projection for a dataset is unknown, it makes it very difficult to massage other datasets so each is overlain properly. Check the associate metadata to determine the dataset's projection information.

To define the layer's projection open ArcToolbox. Browse to **Data Management Tools**. Click to open the folder up. From there you see **Projections**. Click on this folder to open.



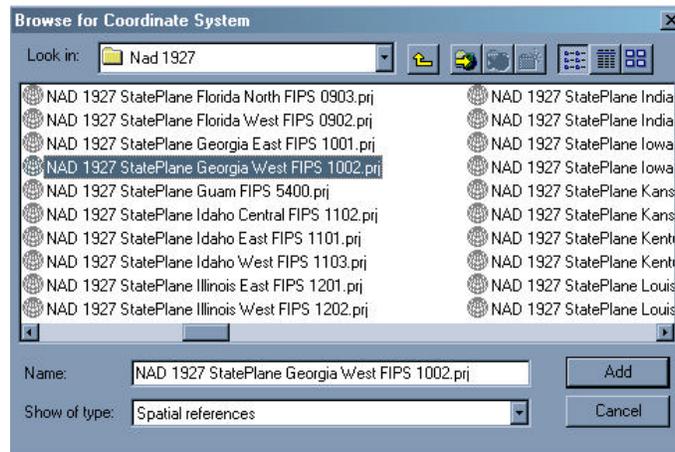
Now double-click on Define Projection Wizard (shapefiles, geodatabase). Browse to your undefined shapefile.



As you can see the coordinate system for this shapefile is considered undefined. Click **Next – Select Coordinate System**.

*Note: If you are unsure what coordinate system the data was collected in you may have to try various projections before you find the right one. Take care in this step. If you define the incorrect projection the dataset will never overlay properly.*

Click **Select**. Click on the desired projection and click **Add**.

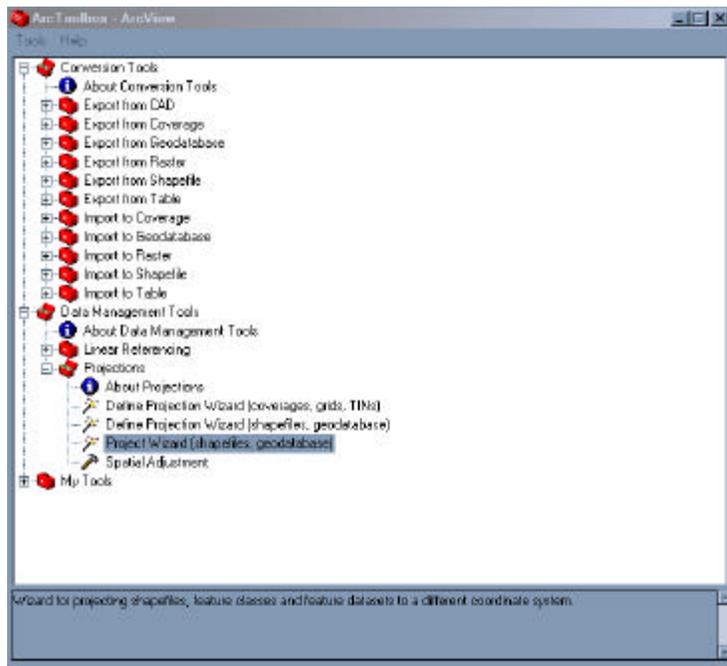


Click **OK – Next** and then **Finish**. Your shapefile has now been defined.

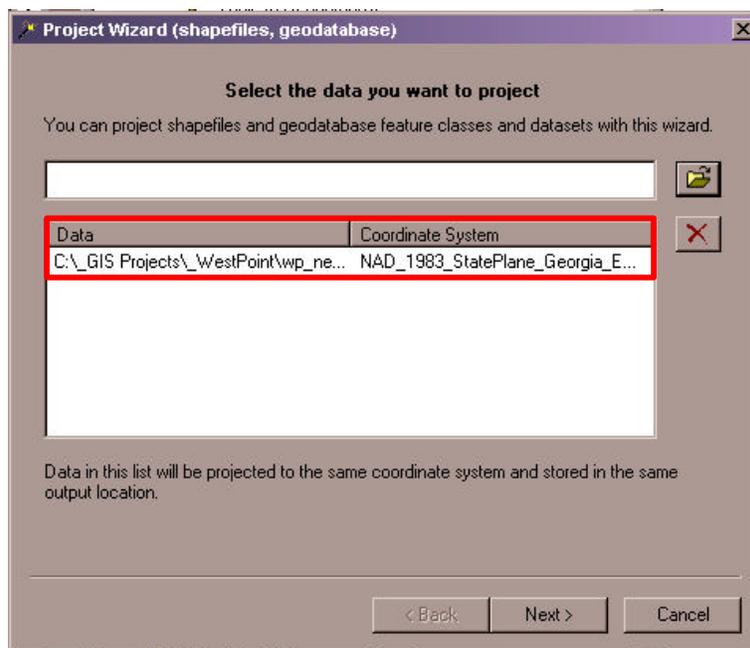
*Note: Defining a projection does not transform the data in a different projection; it simply lets ArcGIS know **the original projection**. The projection **MUST** be defined if that layer needs to be reprojected into another coordinate or projection system.*

## Project Wizard

Before starting Project Wizard your projection for your shapefile must be defined. If it is not please go back to the Define Projection Wizard. Open up ArcToolbox. At the bottom you see **Data Management Tools**. Click on it to open the folder up. From there you see **Projections**. Click on this folder to open it. Then click on Project Wizard (shapefiles, geodatabase).



Browse to the shapefile to be projected.



Be sure that the proper coordinate system is defined – see red outline. Click Next.

When using the Projection Wizard, a new shapefile is created with the new projection. The next screen requires information for the output location for the newly projected shapefile. Navigate to the desired directory and type in the name of the new shapefile. Click **Save – Next**.

Click **Select Coordinate System – Select**. This is the coordinate/projection system of the desired projection. From here navigate to the correct projection, click OK then Next.

At the next step you must set the transformation. Click on **Set Transformation**. If you are transferring between 2 different datums, such as NAD27 and NAD83. Click **OK – Next – Next – Finish**. You should now have a correctly projected shapefile.