Lab#6: Editing Shapefiles With ArcMap

In this lab, you will

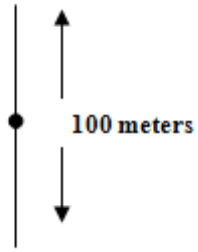
- create a point layer from a text file, then join a table to your point attribute table

Plots_UTM_nad83

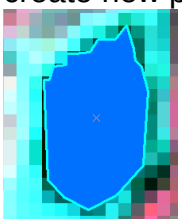
PlotID	LONGITUDE	LATITUDE	Veg_Name	UTM_X	UTM_Y	SITE	DATE_	OBSERVERS	SLOPE	ASPECT	NOTES
1	-148.285966	64.73989	Quaking Aspen	438,772.4	7,180,087.8	1	6/21/2006	RL/DV/DW	0	flat	MPOTR, bigger spuce, top of hill
2	-148.298883	64.730196	Birch-White Spruc	438,135.3	7,179,020.1	2	7/12/2006	DW	5	SW	White Spruce Plantation
3	-148.30279	64.742159	Alder-Birch	437,976.6	7,180,356.9	3	6/21/2006	RL/DV/DW	20	SE	dense BEPA, similar to site 4
4	-148.305985	64.742243	Paper Birch	437,824.7	7,180,369.5	4	6/21/2006	RL/DV/DW	20	SE	dense BEPA, really buggy!
5	-148.280018	64.741113	Black Spruce	439,058.3	7,180,218.3	5	6/21/2006	RL/DV/DW	0	flat	lots of little spruce, burnt snags

- create hyperlinks from features to files or web sites

- create a 100 meter lines centered on plot locations



- create new polygon layer of ponds



- create polygons with interior islands or “donut holes”

Step 1) Download and unzip data file. You can download the data file ***lab6_editing.zip*** from the data folder of the nrm338 website:

http://dverbyla.net/nrm338/data/

Download and unzip to your c:\nrm338\ folder.

Creating a Point Event Layer

Start with the text file of five plot locations in GCS, NAD83. The vegetation type of each plot is information also in the text file.

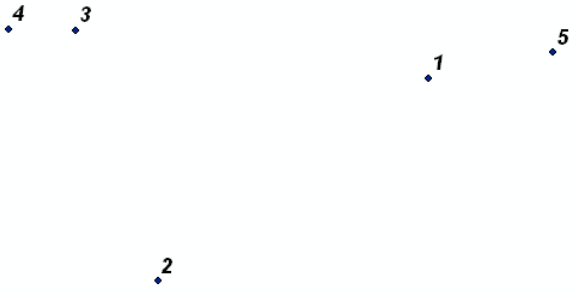
Step 1) Add your text file in ArcMap.

Table

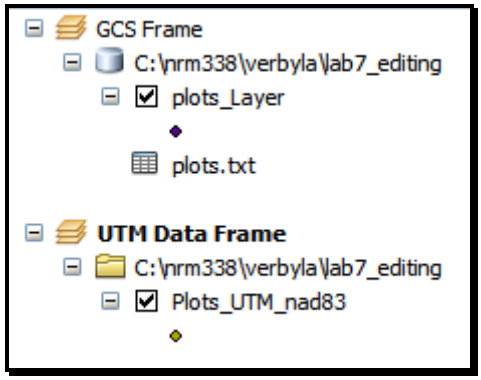
plots.txt

id	X	Y	Veg_Name
1	-148.285966	64.73989	Quaking Aspen
2	-148.298883	64.730196	Birch-White Spruce
3	-148.30279	64.742159	Alder-Birch
4	-148.305985	64.742243	Paper Birch
5	-148.280018	64.741113	Black Spruce

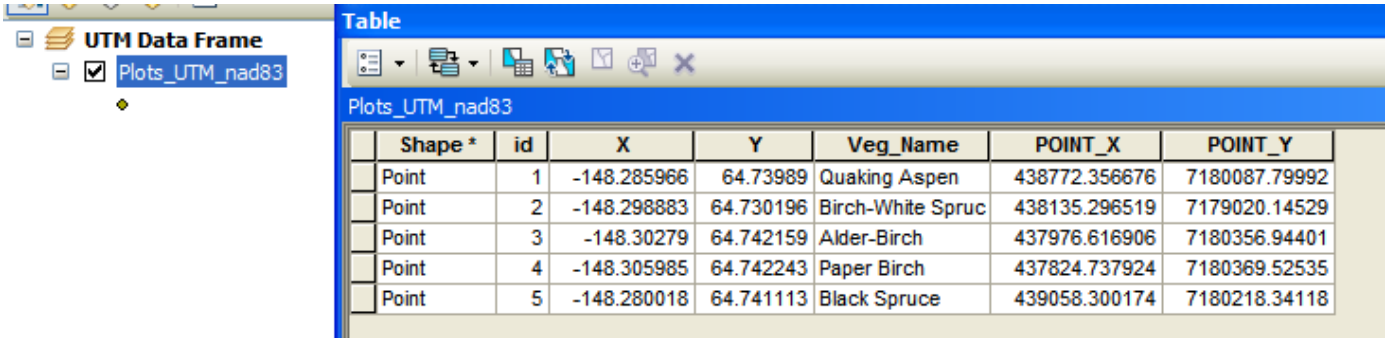
Step 2) Create a X,Y point event layer. The coordinates of each plot were recorded in geographic, NAD83, so specify your input coordinates when you create your point event layer using the ***Make X Y Event Layer*** tool. Label your points using the id field.



Step 3) Project to GIS planar (meters) coordinate system. In this example, the plots were located using GPS in geographic NAD83, and all our GIS layers of the study area are in UTM, NAD83. So use the ***Project tool*** to project to UTM NAD83…

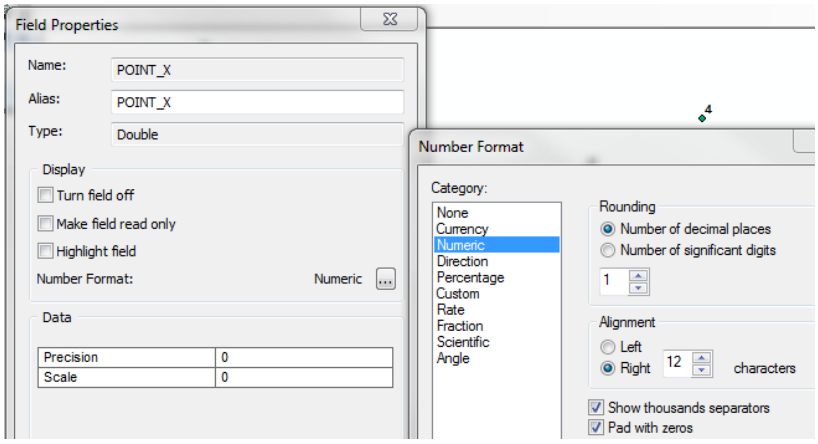


Step 4) Add the UTM X,Y coordinate to the point attribute table. The longitude and latitude of each plot was automatically added to the attribute table when you created your point X,Y event layer from the text file. Use the ***Add XY*** tool now to add the UTM coordinates to the table.



Shape *	id	X	Y	Veg_Name	POINT_X	POINT_Y
Point	1	-148.285966	64.73989	Quaking Aspen	438772.356676	7180087.79992
Point	2	-148.298883	64.730196	Birch-White Spruc	438135.296519	7179020.14529
Point	3	-148.30279	64.742159	Alder-Birch	437976.616906	7180356.94401
Point	4	-148.305985	64.742243	Paper Birch	437824.737924	7180369.52535
Point	5	-148.280018	64.741113	Black Spruce	439058.300174	7180218.34118

The UTM zone is from -144 to -150, so at -147 (central meridian) the UTM X would be 500,000 meters..we are left of that location, so our UTM X coordinates should be less than 500,000 meters.



Plots_UTM_nad83

PlotID	LONGITUDE	LATITUDE	Veg_Name	UTM_X	UTM_Y
1	-148.285966	64.73989	Quaking Aspen	438,772.4	7,180,087.8
2	-148.298883	64.730196	Birch-White Spruc	438,135.3	7,179,020.1
3	-148.30279	64.742159	Alder-Birch	437,976.6	7,180,356.9
4	-148.305985	64.742243	Paper Birch	437,824.7	7,180,369.5
5	-148.280018	64.741113	Black Spruce	439,058.3	7,180,218.3

Step 5) Join plot information table to the point attribute table. Add the table ***plots_info.dbf*** to your Arcmap data frame.

plots_info

SITE	DATE_	OBSERVERS	SLOPE	ASPECT	NOTES
1	6/21/2006	RL/DV/DW	0	flat	MPOTR, bigger spuce, top of hill
2	7/12/2006	DW	5	SW	White Spruce Plantation
3	6/21/2006	RL/DV/DW	20	SE	dense BEPA, similar to site 4
4	6/21/2006	RL/DV/DW	20	SE	dense BEPA, really buggy!
5	6/21/2006	RL/DV/DW	0	flat	lots of little spruce, burnt snags

0 (0 out of 5 Selected)

plots_info

PlotsUTM_NAD83

Shape *	id	X	Y	Veg_Name	POINT_X	POINT_Y
Point	1	-148.285966	64.73989	Quaking Aspen	438772.356676	7180087.79992
Point	2	-148.298883	64.730196	Birch-White Spruce	438135.296519	7179020.14529
Point	3	-148.30279	64.742159	Alder-Birch	437976.616906	7180356.94401
Point	4	-148.305985	64.742243	Paper Birch	437824.737924	7180369.52535
Point	5	-148.280018	64.741113	Black Spruce	439058.300174	7180218.34118

Notice that there is a field that you can use to join the tables together: id and Site…

Use the **Join Field** tool to join your plots_info table to your point attribute table.

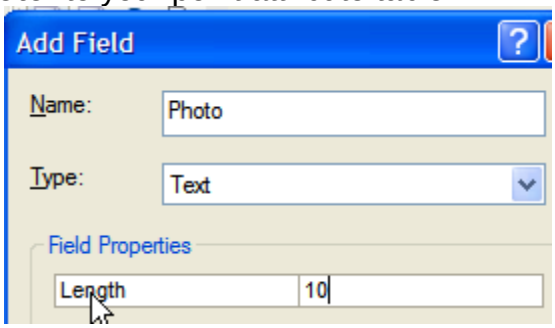
PLOTS_UTM

Shape *	id	X	Y	Veg_Name	POINT_X	POINT_Y	DATE_	OBSERVERS	SLOPE	ASPECT	NOTES
Point	1	-148.28	64.73	Quaking Aspen	438772.356676	7180087.79992	6/21/2006	RL/DV/DW	0	flat	MPOTR, bigger spuce, top of hill
Point	2	-148.29	64.73	Birch-White Spruce	438135.296519	7179020.14529	7/12/2006	DW	5	SW	White Spruce Plantation
Point	3	-148.30	64.74	Alder-Birch	437976.616906	7180356.94401	6/21/2006	RL/DV/DW	20	SE	dense BEPA, similar to site 4
Point	4	-148.30	64.74	Paper Birch	437824.737924	7180369.52535	6/21/2006	RL/DV/DW	20	SE	dense BEPA, really buggy!
Point	5	-148.28	64.74	Black Spruce	439058.300174	7180218.34118	6/21/2006	RL/DV/DW	0	flat	lots of little spruce, burnt snags

Creating Feature Hyperlinks

A hyperlink is a link to a file, website, or visual basic macro program that occurs when you click on a feature (point, line or polygon). You will create a hyperlink to display a digital photo taken from each plot location.

Step 1) Create a field that points to the linked location. This is a text field that contains the URL of a website to link to, or the path and filename of a document on your computer. Open your Plots_UTM point attribute table add a 10-character ***text field*** called ***Photo*** to your point attribute table.

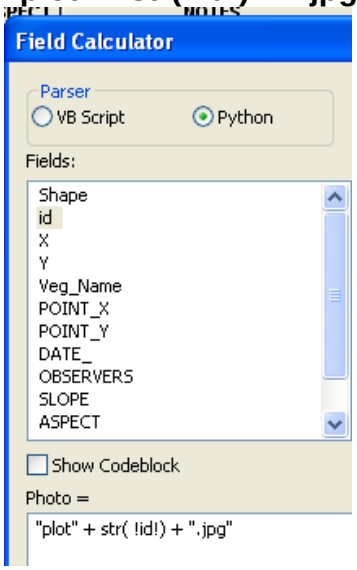


OPE	ASPECT	NOTES	Photo
0	flat	MPOTR, bigger spuce, top of hill	
5	SW	White Spruce Plantation	
20	SE	dense BEPA, similar to site 4	
20	SE	dense BEPA, really buggy!	
0	flat	lots of little spruce, burnt snags	

Step 2) Fill in digital photo file names. Next, use the field calculator to compute a vale "plot" in the Photo field.

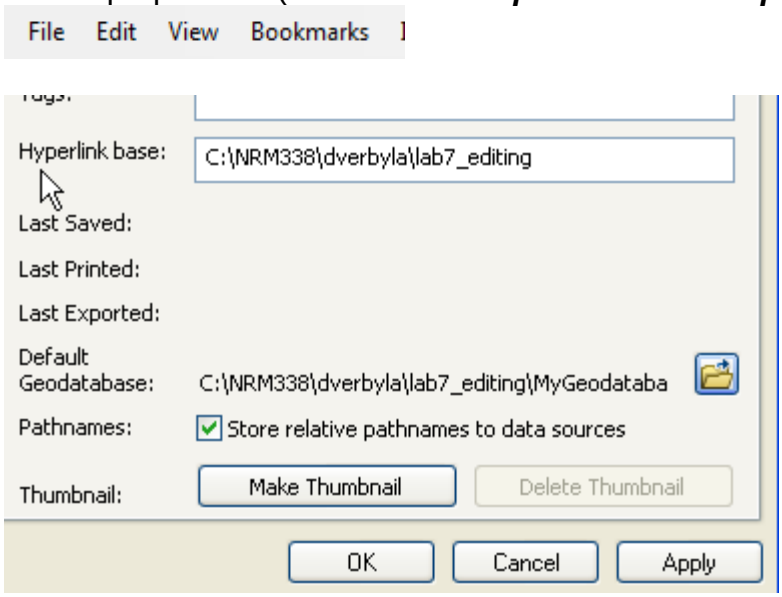
Photo
plot
plot
plot
plot
plot

Then use the field calculator with the Python language to compute **"plot" + str(!id!) + ".jpg"**

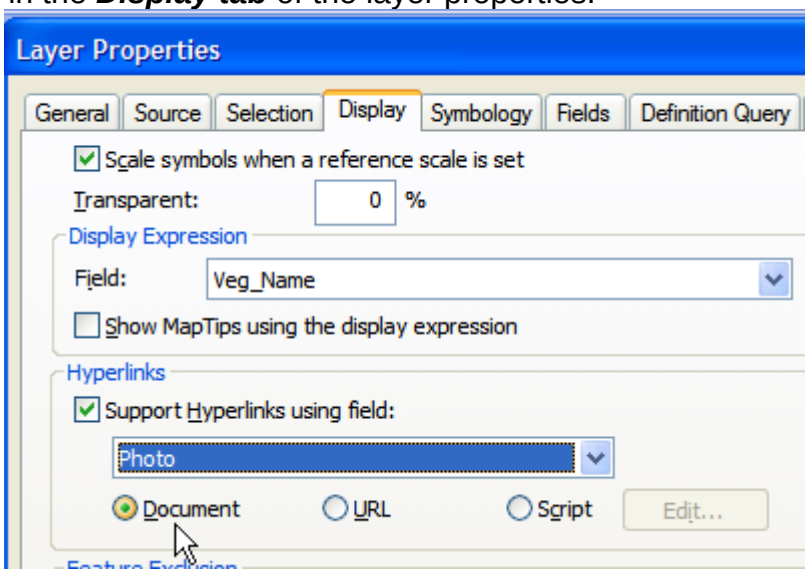


S	Photo
uce, top of hill	plot1.jpg
tation	plot2.jpg
ar to site 4	plot3.jpg
y buggy!	plot4.jpg
, burnt snags	plot5.jpg

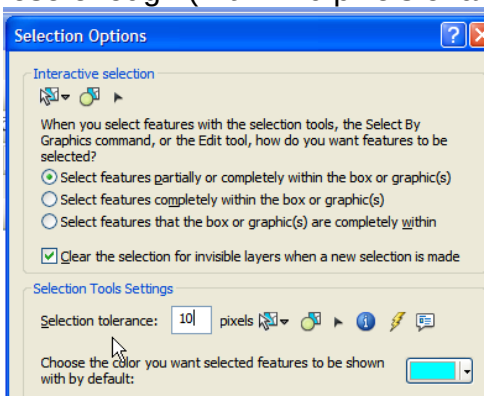
Step 3) Specify your path to photo files. The next step is to specify where your digital photo files are located on the computer. Copy and paste the path to your map document properties. (***File menu→Map Document Properties…)***



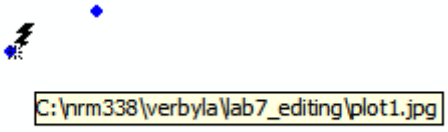
Step 4) Specify you hyperlinks. Your text field will contain the link, and whether the link is to a file (document), website (URL), or visual basic program (macro). Hypelinks are set in the ***Display tab*** of the layer properties.



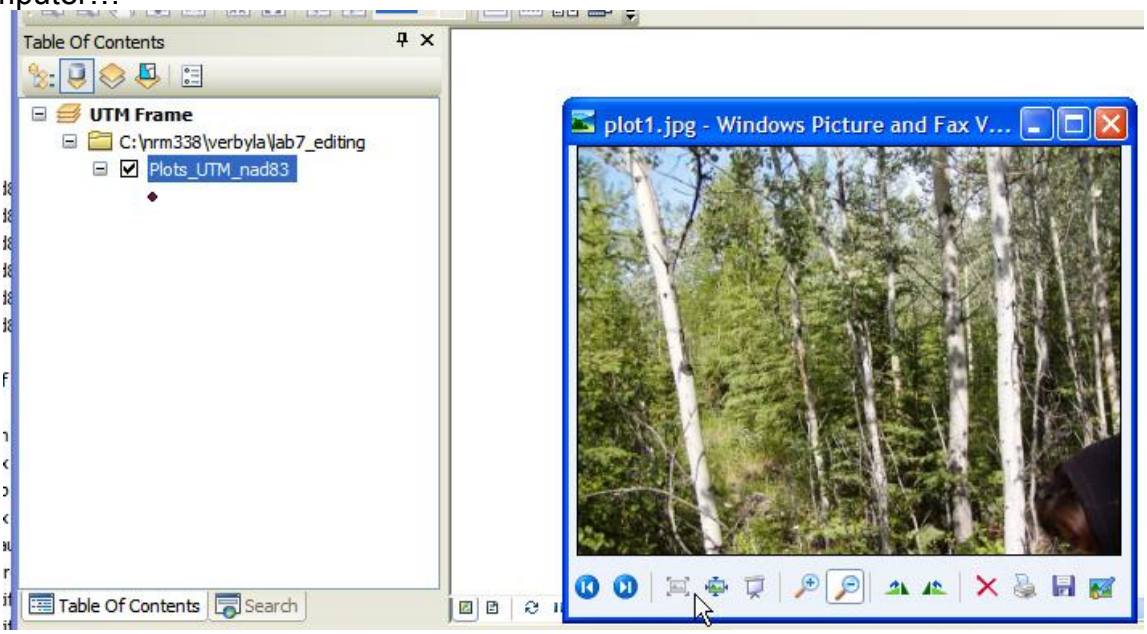
Step 4) Use hyperlink tool. The hyperlink tool is a lightning icon. Specify how close is close enough (within 10 pixels of a target point).



When the tip of the lightning bolt is within 10 pixels of a hyperlinked feature, the link will appear…

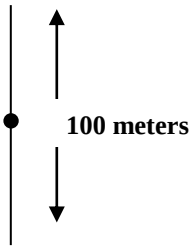


A map tip pops up showing you the path and file name for this point's hyperlink… the photo is displayed using the default photo viewer program installed on your computer…



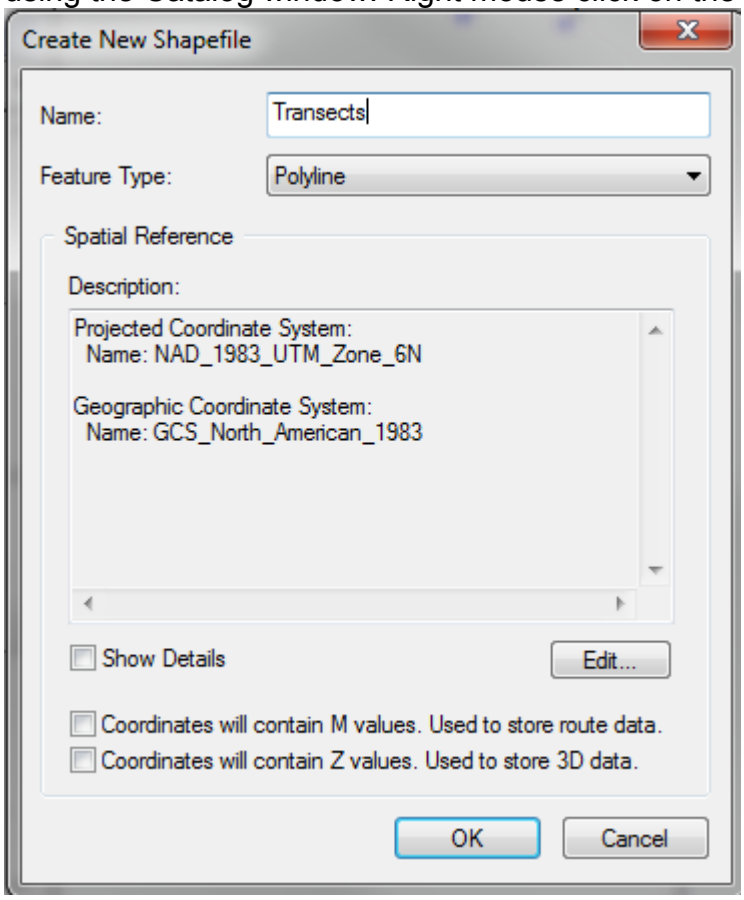
Creating North-South Transect Lines

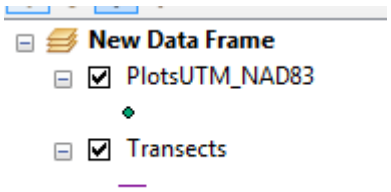
At each plot, vegetation was sampled along a transect line 50 meters south and 50 meters north of the point location.



You will create a polyline layer by creating the north and south end points of each transect.

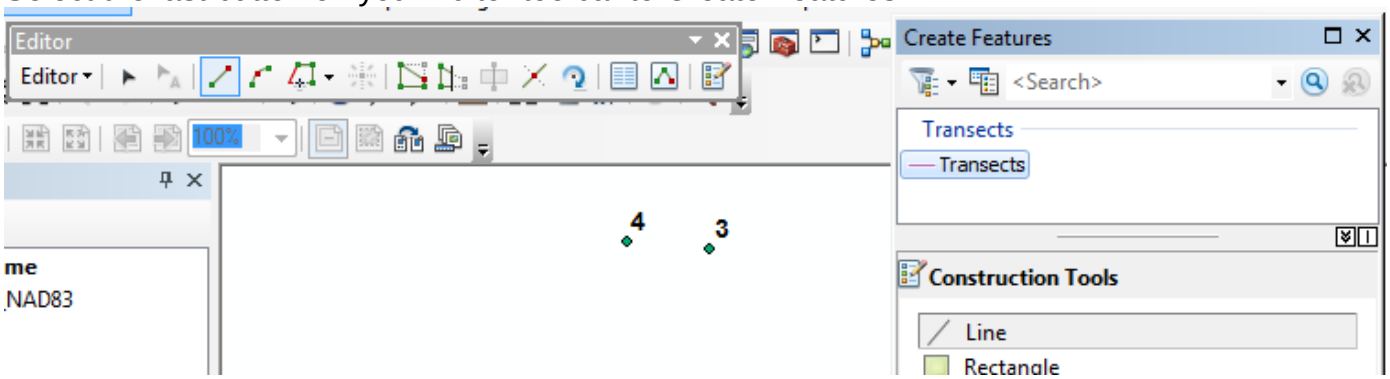
Step 1) Create new line shapefile. Create a line shapefile in the same folder as your points using the Catalog window: Right mouse click on the folder, select New…. Shapefile



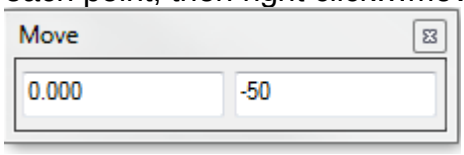


Right mouse click on the line layer, Edit Features…Start Editing

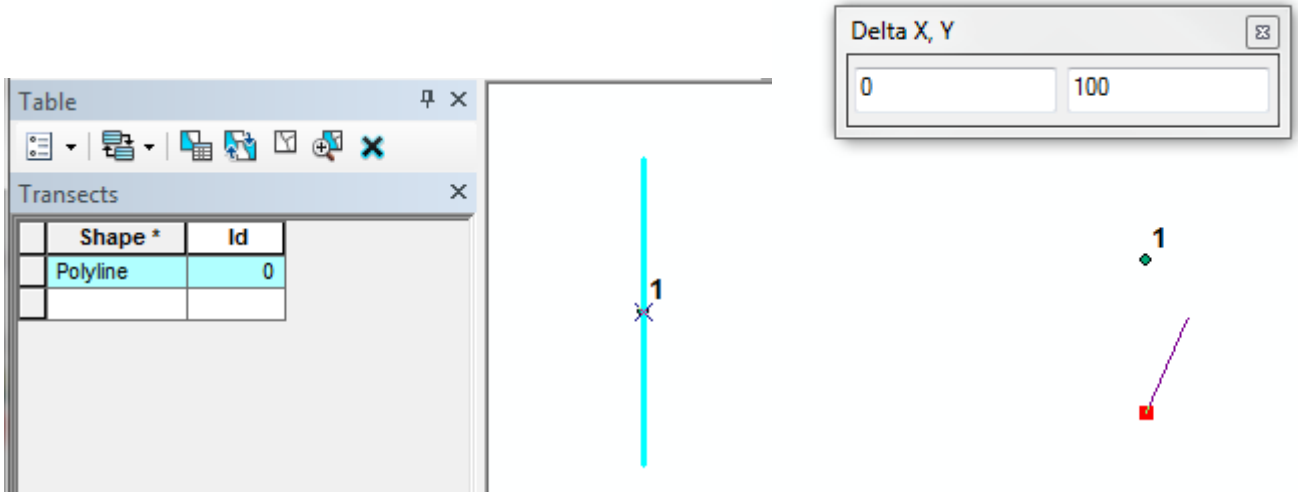
Select the last button on your Editor toolbar to Create Features:



To create each south-north transect line you will snap a beginning vertex (left mouse-click) to each point, then right click…move that vertex 50 meters south,



then create the ending vertex 100 meters north. Right mouse click…Delta X,Y



Then right mouse click…Finish Sketch

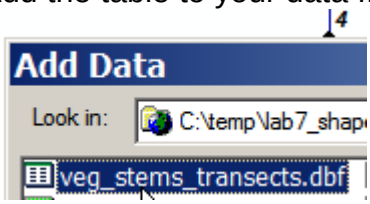
Repeat the process creating a total of 5 transect lines. Save your edits!

Step 2) Calculate the length of each transect line. Add a double precision field and calculate the length of each line in meters..

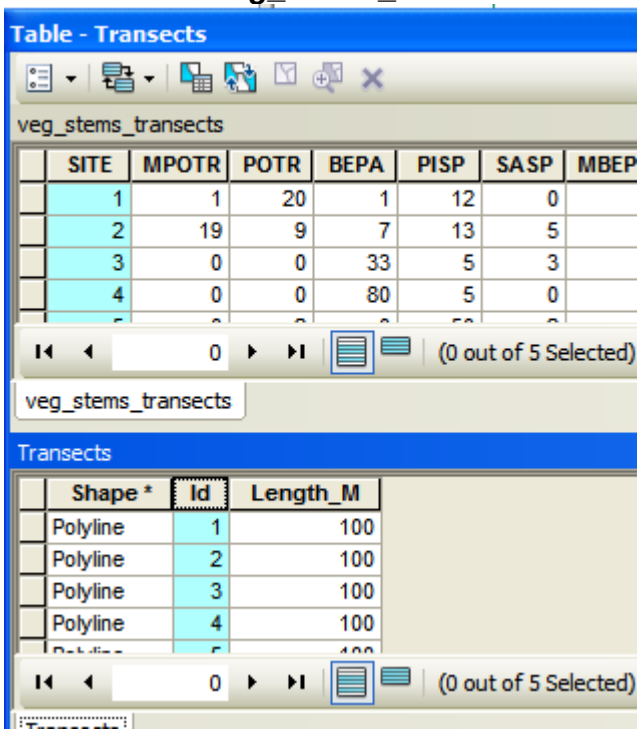
Transects

FID	Shape *	Id	Length_M
0	Polyline	1	100
1	Polyline	2	100
2	Polyline	3	100
3	Polyline	4	100
4	Polyline	5	100

Step 3) Join vegetation information to line attribute table.
Add the table to your data frame:



Join the table ***veg_stems_transects.dbf*** to your transect lines… use the ***Join Field*** tool.



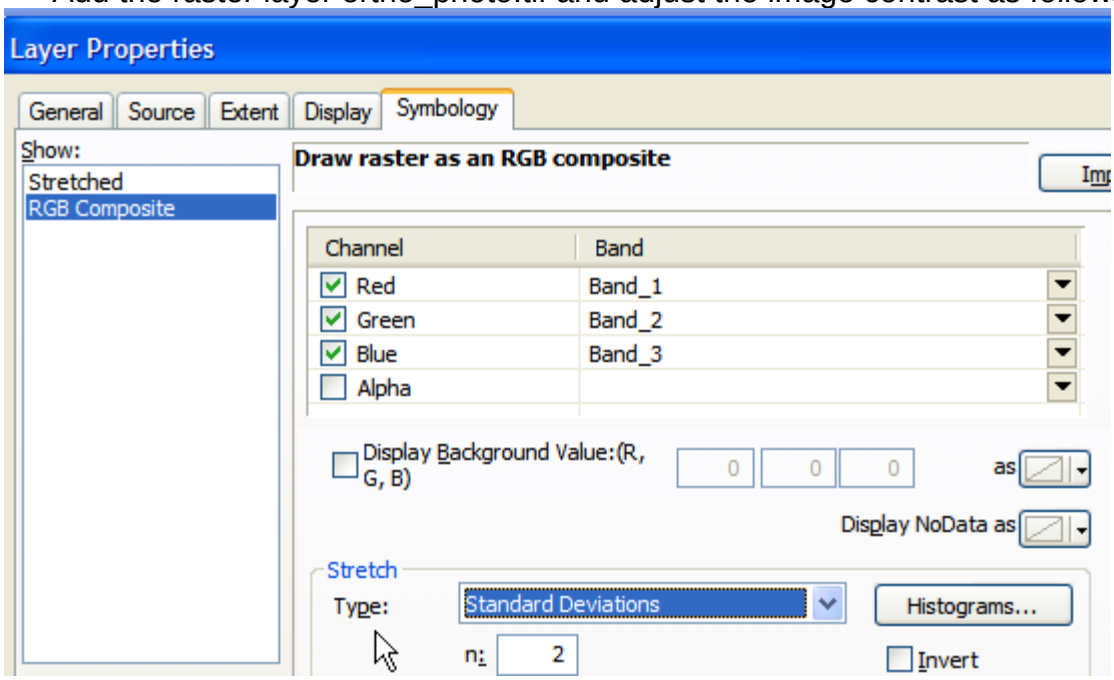
After joining ….

Transects

Shape *	Id	Length_M	SITE	MPOTR	POTR	BEPA	PISF
Polyline	1	100	1	1	20	1	1
Polyline	2	100	2	19	9	7	1
Polyline	3	100	3	0	0	33	
Polyline	4	100	4	0	0	80	
Polyline	5	100	5	0	2	0	5

Creating Ponds Polygons

Add the raster layer ortho_photo.tif and adjust the image contrast as follows:

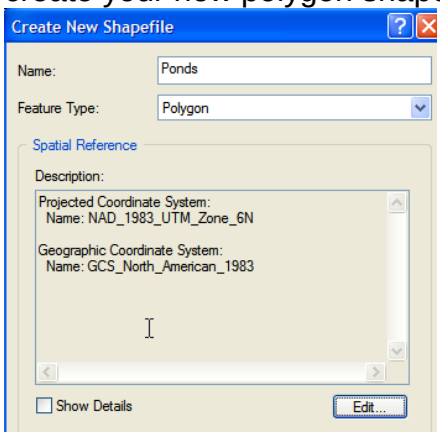


The 2 standard deviation contrast stretch improves the contrast of the displayed image by maximizing screen brightness to darknes for pixels within the mean +/- 2 standard deviations.

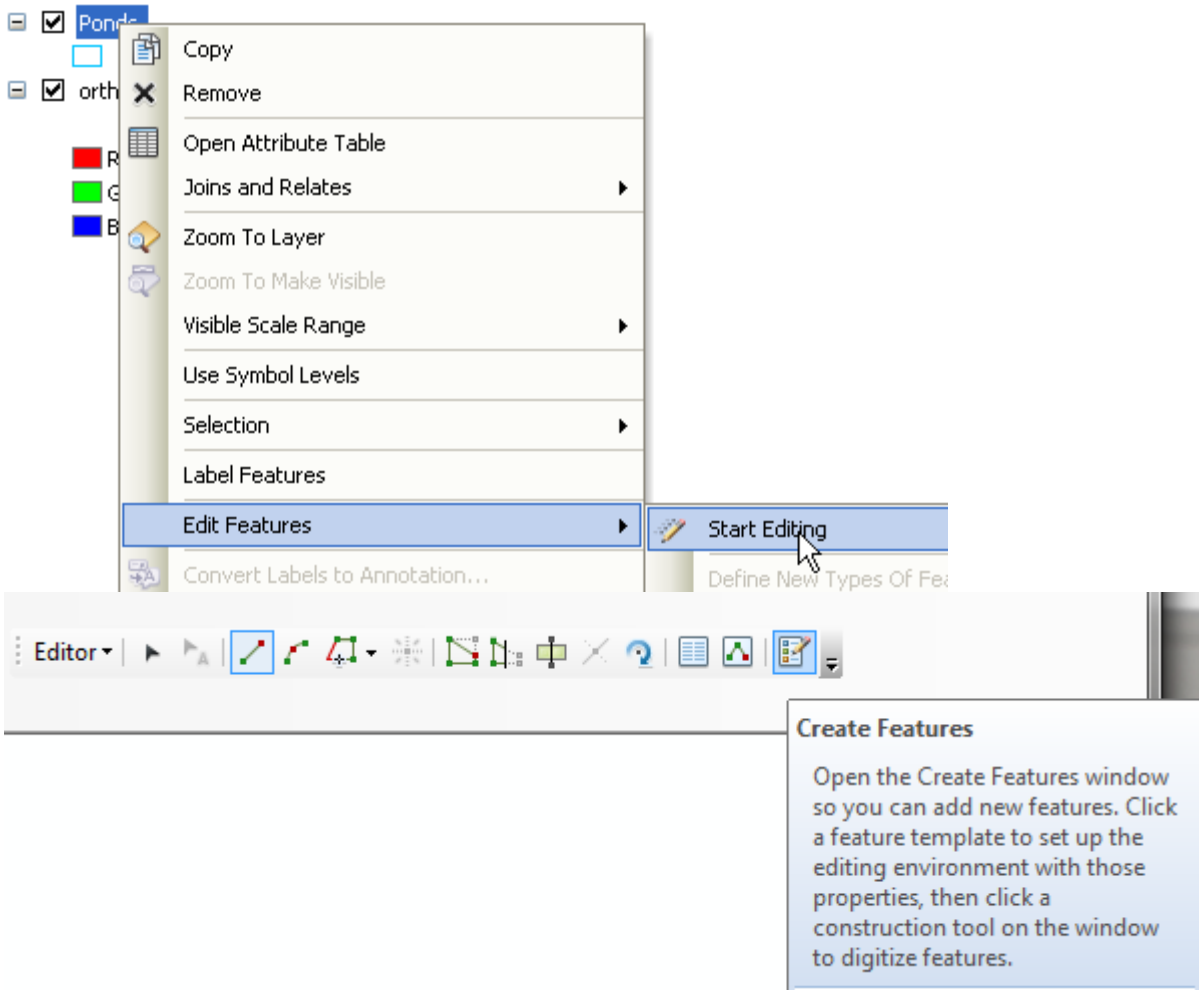
this band combination simulates a color infrared photograph.

Your next task is to create polygon features representing each pond on the ortho photo.

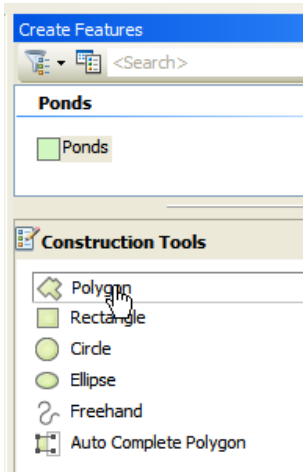
Step 1) Create an empty polygon layer. Use your catalog window to create a new polygon shappefile…Import the coordinate system from your ortho_photo.tif when you create your new polygon shapefile..



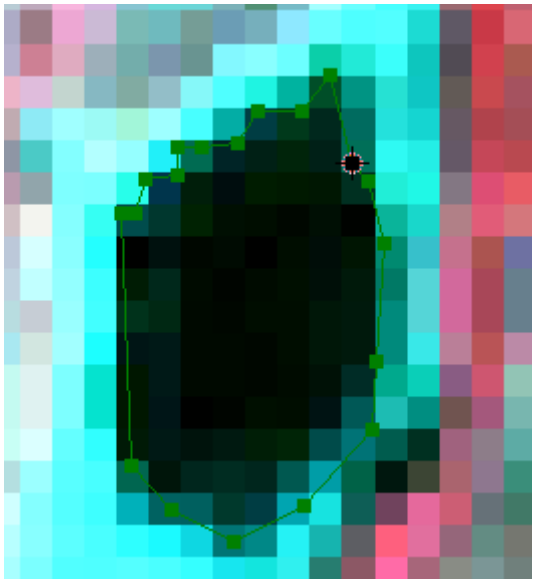
Step 2) Create pond polygon features. Use the Editor to add the ponds feature class to your Arcmap data frame and use the sketch tool to create pond polygons after zooming in on each pond on the ortho photo.



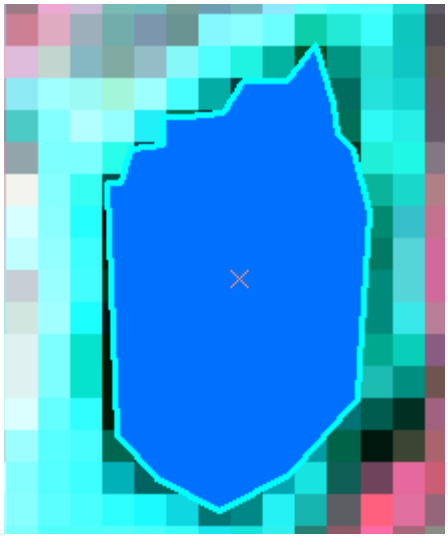
Select the construction tool to use



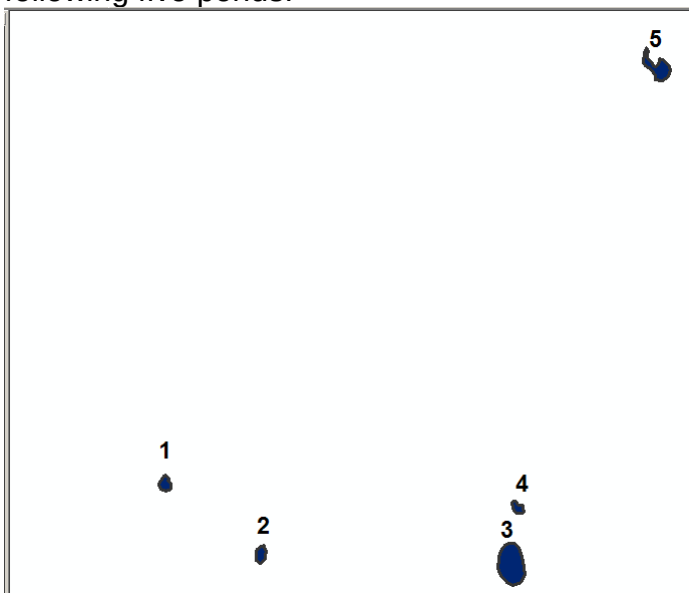
left mouse click to add vertices



double-click or
right –mouse Finish Sketch to close polygon



Save your edits after creating each pond polygon! Assign an ID of 1 through 5 for each of the following five ponds:



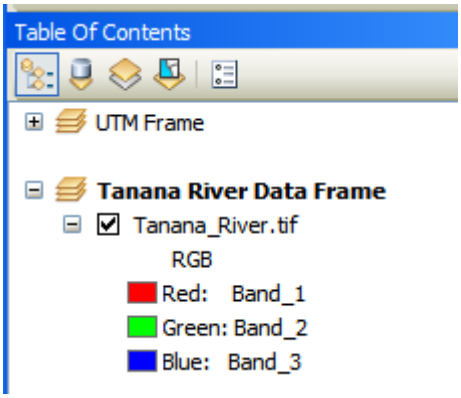
Step 3) Compute area and perimeter of each pond feature..
Your perimeter and area will be different because there is no exactly correct pond shoreline from the imagery.

Id	Perimeter_M	Area_M2
1	144.99	1400.81
2	152.69	1395.06
3	357.42	8939.82
4	130.42	1031.8
5	356.6	3822.53

Shape *	Id	PerimeterM	AreaM2
Polygon	1	143.9	1,354.8
Polygon	2	158.4	1,628.0
Polygon	3	364.8	9,007.6
Polygon	4	135.5	1,264.3
Polygon	5	338.2	4,343.7

Creating Polygons With "Donut Holes"

Sometimes polygons have islands or holes that are within the boundary of the polygon. Create a **new data frame** and name it Tanana River. Add the raster *Tanana_River.tif* to your data frame.

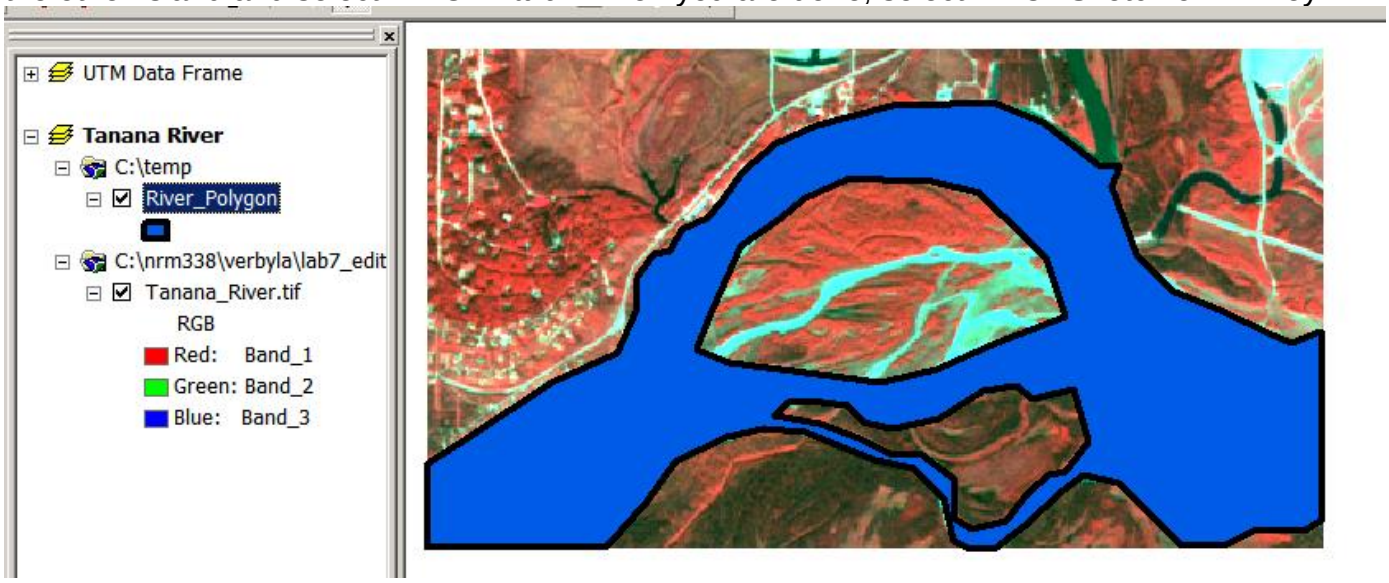


You want to create a polygon of the Tanana River, excluding islands that are in the river.

Step 1) Create empty polygon layer. This polygon layer should be assigned the same coordinate system as your raster image.

Step 2) Create a polygon of the external river shoreline. Use the editor to create a polygon of the external shoreline, then right mouse click and ***select finish part***.

Then create polygons around the large island and select ***Finish Part***. Repeat the process for the other island and select ***Finish Part***. When you are done, select Finish Sketch or ***F2*** key.



Notice from the attribute table that there is one record for one river polygon: