



GE110 Fall 2008 - Lab 3

October 16, 2008

GPS & Data Manipulation

Working with Data in ArcGIS

Data Entry - Getting coordinates and attributes into our GIS

Field Measurement

- ✓ GPS
- ✓ Coordinate
Surveying

Satellite and Aerial Imagery

- ✓ Image Data
- ✓ Spatial Data in
GIS

Hardcopy Maps

Manual Digitizing Process from Digital Image

Downloading GPS Waypoints Using Mapsource

- ✓ Connect GPS receiver to the computer using the GPS PC interface connector
- ✓ Turn on the GPS receiver
- ✓ Open Mapsource.
- ✓ Select correct coordinate settings in Mapsource by:
 - Main menu select Edit > Preferences; Position tab
 - Position format Lat/Lon (hddd.ddddd)
 - Datum=NAD27CONUS
- ✓ Main menu > Transfer > Receive from device > Receive.
 - Make sure that only the waypoints are checked. Select find if your GPS was not automatically detected.
- ✓ Save Mapsource file (.gdb) in case you need to change datum or projection for the GPS points at a later time.
 - Main menu > File > Save > Save "file_name.gdb" in your student folder.
- ✓ Export to text (tab delimited) file.
 - Main menu > File > Export as text (tab delimited) > Save "file_name.txt" in your student folder.

Using Excel to prepare the GPS points for Import into Arcview

- ✓ Open Microsoft Office Excel
- ✓ Main menu > File > Open > Browse to student folder > Select "file_name.txt"
- ✓ Select delimited text > Next > check Tab and Space > Finish
- ✓ Save file as .xls in case you need to repeat steps at a later time
- ✓ Delete the first three rows (Grid row, Datum row, and blank row)
- ✓ Delete the blank row between the field headers and the waypoints.
- ✓ Delete unnecessary columns
- ✓ Add/change the field headers for "Latitude" (Y or Lat), "Longitude" (X or Long), and Elevation (Z)

- ✓ Delete N, W, and m (or ft) in coordinate and elevation fields.
- Highlight the latitude, longitude, and elevation columns. Main Menu > Edit > Find; Replace tab.
- Find “N”, Replace with “ ” (blank)
- Find “W”, Replace with “-” (minus sign)
- Find “m” (or “ft” if elevation is in feet), Replace with “ ” (blank)
- At this point, your waypoint file should look similar to below

Name	Lat	Lon	Elevation
1	34.69581	-115.846	2300
2	34.70578	-115.833	2491
3	34.70557	-115.833	2489
4	34.70521	-115.833	2483

- ✓ Save file as a Text (MS-DOS) (.txt).
- ✓ Optional: Save as .xls file using a different file name then before (i.e. file_name_clean.xls)
- ✓ Exit out of Excel

NOTE:
You can not import the .txt file into ArcMap with the file open in Excel

Adding XY Events

- ✓ Open your class project in ArcMap – Lab_3_Pasadena.mxd
- ✓ Add X Y data from text file
 - Main Menu > Tools > Add X Y Data
 - Browse to folder > Select "file_name.txt" file
 - Under Define Spatial Reference of Input Coordinates. Edit > Select > Geographic Coordinate System > North America > North American Datum 1927.prj > OK

Optional:
Remove X Y
Events

Right-click on
event layer >
Remove

- ✓ Export XY points (events) to Shapefile
 - Right-click on waypoint event layer. Data > Export Data > check Use Same Coordinate System as Data Frame. This saves your shapefile in the same coordinate system as your ArcMap project (UTM Zone 11 NAD27). Save the waypoint.shp file in your student folder. Choose to add the exported data to the map as a layer.
- ✓ Add UTM coordinates to the attribute table
 - Right-click on the waypoint shapefile > Open Attribute Table
 - Select the Options button > Add XY & Populate. This will add the Northings and Eastings fields and calculate the projected value

Creating a New Shapefile (Points, Polylines, and Polygons)

- ✓ Open ArcCatalog
- ✓ Navigate to - D:\GE110\Lab_3\Shapefiles
- ✓ Create three new shapfiles
- ✓ Right-click on the folder and select New > Shapefile.
- ✓ The Create New Shapefile dialog box opens.
 - Name the shapefile and select the feature type (Point, Poly, and Polygon) from the drop-down menu.
 - Set the Spatial Reference (Projection/Datum) by clicking the Edit button. Choose Import > navigate to D:\GE110\Lab_3\DEM\tien_shan_cl > click on the dataset > click the Add button > click OK in the Spatial Reference Properties dialog box > click OK

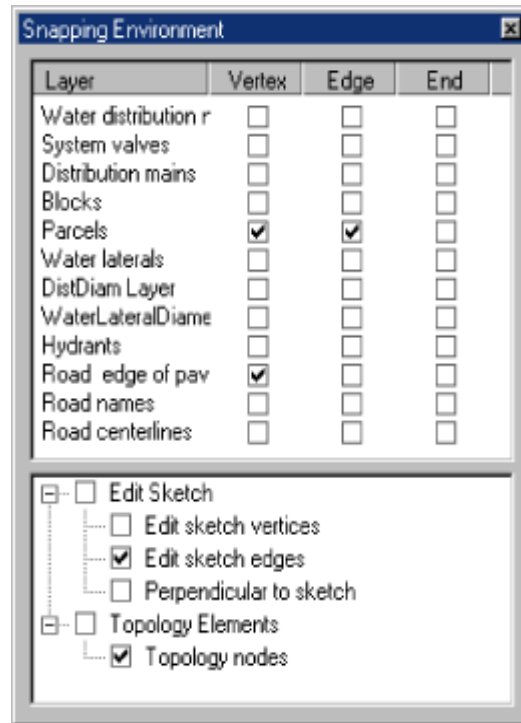
Add the New Shapefiles to the ArcMap Project

- ✓ Open D:\GE110\Lab_3\Lab_3_Digitizing.mxd
- ✓ Add the Point, Line, and Polygon shapefiles to the project

Setting Snap Environment

The snapping environment can help establish exact locations in relation to other features. The snapping environment makes this type of task accurate and easy.

Setting the snapping environment involves setting a snapping tolerance, snapping properties, and a snapping priority.



✓ The **snapping tolerance**

- ◇ The snapping tolerance is the distance within which the pointer or a feature is snapped to another location
- ◇ Set on the General tab of the Editing Options dialog box Editor menu > Options

✓ The **snapping properties and priority**

- ◇ You can choose the part of the feature, vertex, edge, or endpoint to which you want your new feature to snap
- ◇ Set on the Snapping Environment dialog box Editor menu > Snapping

Topology:
Now is the time to be watching your topology. As you digitize lines or polygons make sure there is a node or vertex any place that lines will cross.

Digitizing Features

▽ Edit Point Shapefile

✓ Create a new point

- ◇ Editor Toolbar > Task: Create New Feature; Target: point shapefile
- ◇ Choose the Sketch Tool (Pencil) from the tool palette
- ◇ Click once to enter a point on your map.

✓ Edit a point

- ◇ Editor Toolbar > Task: Modify Feature; Target: point shapefile
- ◇ Choose the Edit Tool (Arrow) on the Editor Toolbar.
- ◇ Click on the point to modify. The point is now highlighted.
- ◇ Hit the delete key to delete the point
- ◇ Drag the point to a new location

✓ Move a point to an X,Y location

- ◇ Editor Toolbar > Task: Modify Feature; Target: point shapefile
- ◇ Double-click the point you want to move.
- ◇ Right-click on the point and select Move To...
- ◇ Type the new coordinates in the dialog box.
- ◇ Click anywhere on the map to complete move.

▽ Edit Polyline Shapefile

✓ Create a new polyline

- ◇ Editor Toolbar > Task: Create New Feature; Target: polyline shapefile
- ◇ Choose the Sketch Tool (Pencil) from the tool palette
- ◇ Click once to start the polyline; click once to add each vertex; double-click to finish the polyline.

✓ Edit a polyline

- ◇ Editor Toolbar > Task: Modify Feature; Target: polyline shapefile
- ◇ Choose the Edit Tool (Arrow) on the Editor Toolbar.
- ◇ Click on the line to modify. The line is now highlighted with the vertices shown.
- ◇ Hit the delete key to delete the line.
- ◇ Click and drag a vertex to a new location to move a vertex.
- ◇ Right-click on the line to add a vertex.
- ◇ Mouse-over and right-click on a vertex to delete the vertex.
- ◇ Click somewhere on the map (not on the line) to deselect the line

✓ Flip a polyline

- ◇ Editor Toolbar > Task: Modify Feature; Target: polyline shapefile
- ◇ Choose the Edit Tool (Arrow) on the Editor Toolbar.
- ◇ Click on the line to modify. The line is now highlighted with the vertices shown.
- ◇ Right-click on the line and select Flip.
- ◇ Click somewhere on the map (not on the line) to deselect the line.

Topology:

Use your trace tools to help maintain topology between polygons

▽ Edit Polygon Shapefiles

✓ Create a new polygon

◇ Single Polygon

1. Editor Toolbar > Task: Create New Feature; Target: polygon shapefile
2. Choose the Sketch Tool (Pencil) from the tool palette
3. Click once to start the polygon; click once to add each vertex; double-click to finish the polygon.

◇ Auto-Complete Polygons

1. Editor Toolbar > Task: Auto-Complete Polygon; Target: polygon shapefile
2. Choose the Sketch Tool (Pencil) from the tool palette
3. Click inside or on the boundary of the existing polygon to start the new polygon; click once to add each vertex; double-click inside or on the boundary of an existing polygon to finish the polygon.

◇ Clipped polygon (donut)

1. Editor Toolbar > Task: Create New Feature; Target: polygon shapefile
2. Click once to start the polygon; click once to add each vertex; double-click to finish the polygon.
3. Sketch another polygon inside the polygon you just created. The inside polygon should now be highlighted.
4. Editor Tool drop-down menu > Clip. The Clip dialog box opens > Choose discard the area that intersects > Hit the delete key. The inside polygon should now be removed.

◇ Polygon within a polygon

1. Editor Toolbar > Task: Create New Feature; Target: polygon shapefile
2. Click once to start the polygon; click once to add each vertex; double-click to finish the polygon.
3. Sketch another polygon inside the polygon you just created. The inside polygon should now be highlighted.
4. Editor Tool drop-down menu > Clip. The Clip dialog box opens > Choose Select Discard the area that intersects. The two polygons are now two separate polygons.

To Turn In:

1. A .pdf of your map document – Note: it does not need to be from a layout