

Assignment #7 Capturing Vector Data

For this assignment, you will be updating a vector land use layer to match a raster land use dataset. You will use the Editor Toolbar to update the vector layer, manipulate the attributes to match the raster layer, and use several of the Editor menu tools, such as Merge and Clip.

You will submit the completed vector layer as your assignment. **I expect the following:**

- One vector polygon land use layer in a Geodatabase
- For each polygon feature, an appropriate “TYPE02” attribute (no “null”s)
- No gaps or slivers
- All significant features in the raster land use layer mapped in the vector layer
 - Rule of thumb: If it’s ~5 pixels in size, you can ignore it.

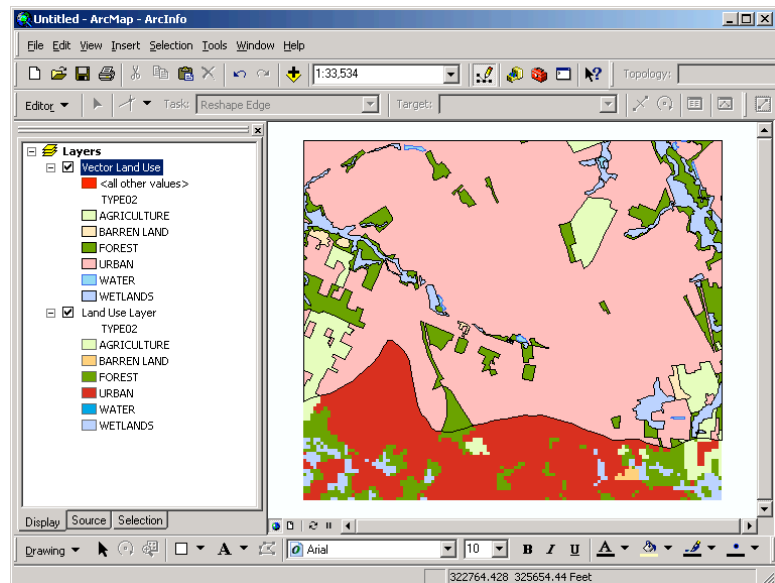
Points **will be deducted** for not completing the above objectives. I will not take off for line work, provided you do not create gaps and slivers.

Preparing Heads-Up Digitizing

Open ArcMap. Add the two layer files provided to you. The layer files (Vector Land Use.lyr and Land Use Layer.lyr) are ArcMap Layer Files that act as pointers to your GIS data. These files do not store geometry or attributes; your raster data is in landuses.img and your vector data is stored in the rowan.mdb geodatabase. The layer files provide you with symbology and classification information, in this case, the land use types and appropriate colors.

After adding the layers, ArcMap should look similar to the image below. Notice how the vector land use layer is incomplete, allowing the raster layer below it to show.

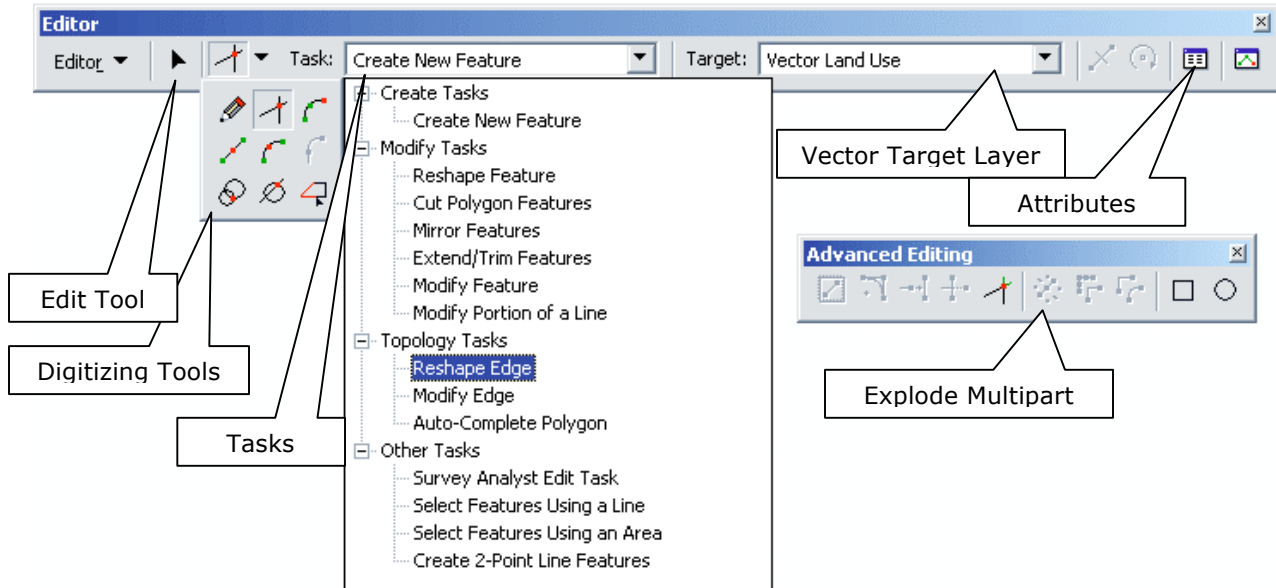
Choose the Identify tool and click on one of the green “FOREST” polygons. What happens? Open the vector layer’s attribute table. How many records are there? This seems small because the “separate” polygons of the land use layers are stored in one record each. ArcGIS, by default, creates “multipart” polygons when geoprocessing. In dissolving this land use layer, it clumped all the polygons for a land use type into one record. In some cases this is helpful, but for our purposes it is not. We want each polygon to have its own record, making them “singlepart” features.



You will now need to bring up two toolbars, the Editor Toolbar and the Advanced Editing Toolbar.

The Editor and Advanced Editing Toolbars

The Editor Toolbar contains the majority of the tools you will need to perform heads-up digitizing.



You will use the Edit Tool to select and modify vector points, lines, and polygons.

You will use Digitizing Tool to add new features to the map. You'll be using the Sketch (Pencil) tool for this assignment.

You will choose from your tasks the function you would like ArcMap to perform.


The Attributes button will open a window similar to the Identify Results window, however the new window will only show features you have selected and will allow you to make modifications to the attributes of the selected features.

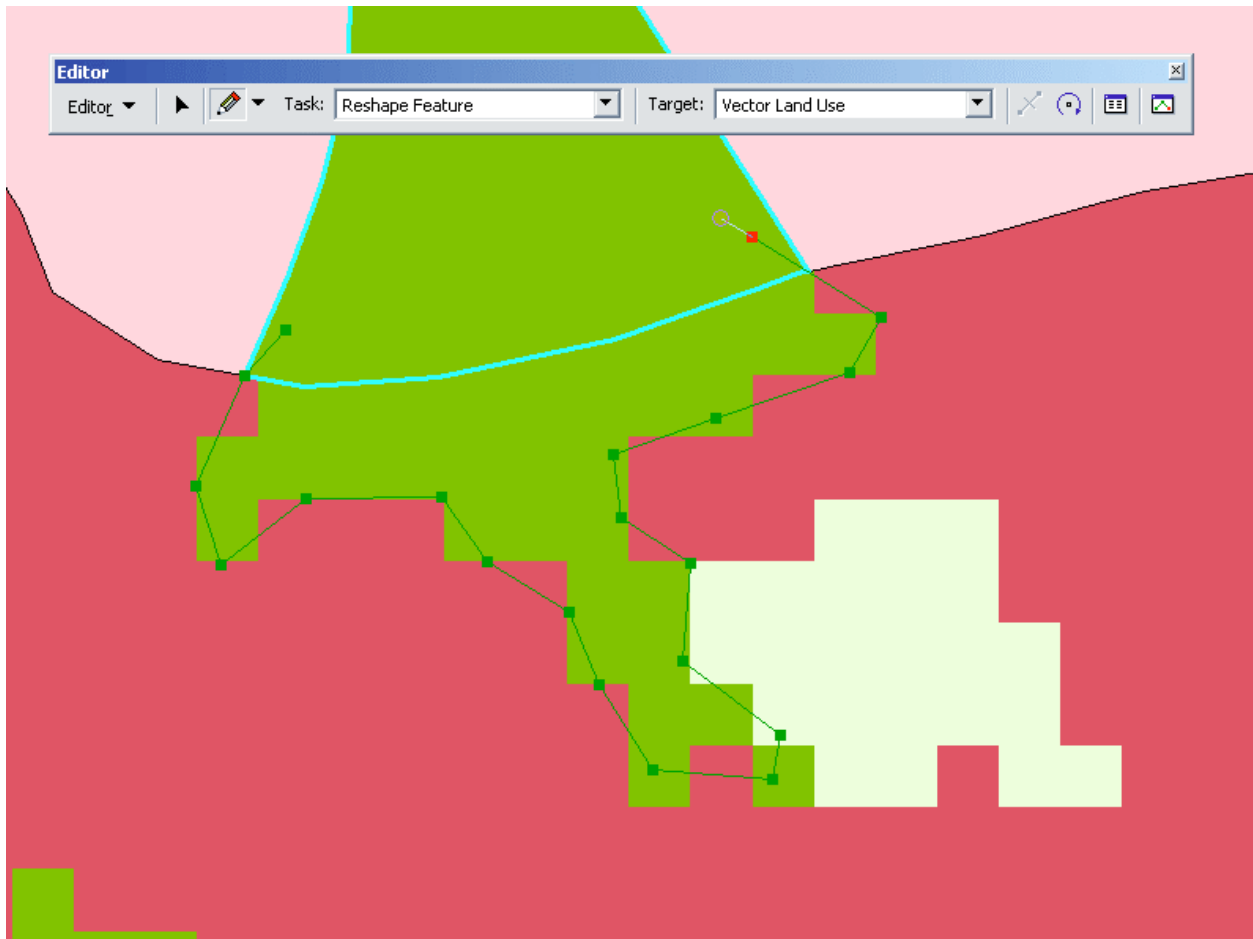
There are several useful tools available to you on the Advanced Editing toolbar. We will just be using the Explode Multipart tool for this assignment. To use the tool, select a multipart feature, then click the button. It will break the multipart feature into multiple singlepart features.

First Task – Reshaping a Polygon

Choose Reshape Feature from the Editing Toolbar Tasks. You must now select a feature to reshape. We will reshape the green “FOREST” polygon in the lower middle section of our land use layer.

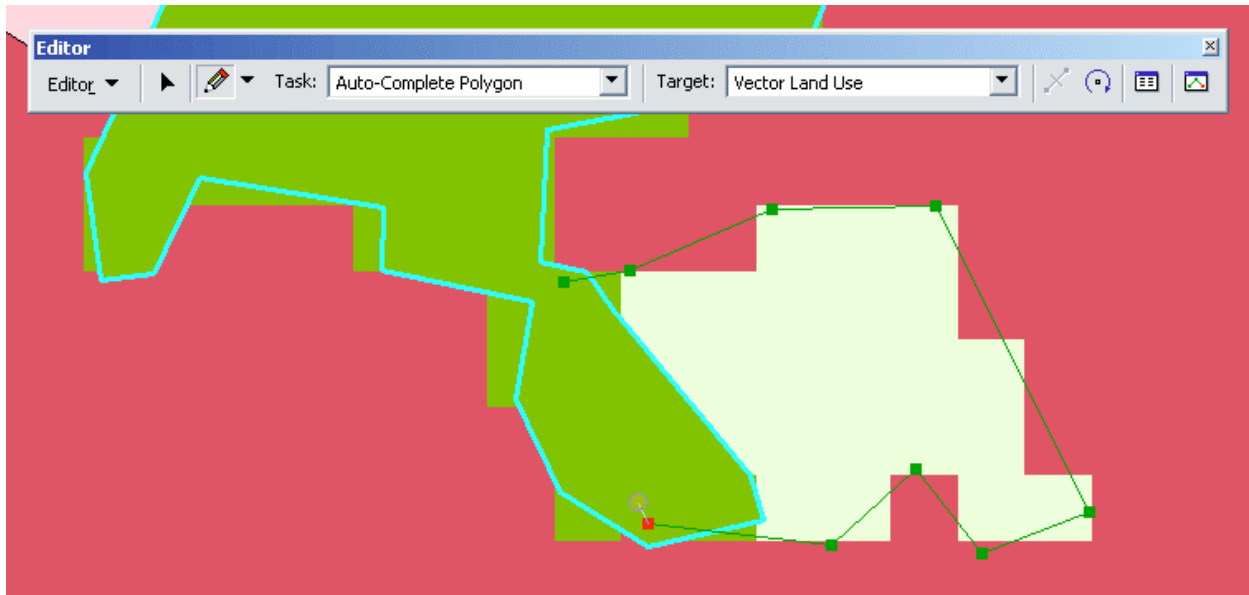
Select the polygon you want to reshape using the Edit Tool . Selected features appear in cyan.

You can only reshape one feature at a time. With the feature selected, choose the Sketch Tool  and draw a new boundary for the feature. You want to start your sketch inside the selected feature, cross the cyan line, sketch the new feature boundary, and finally cross the cyan line again, ending inside the selected polygon. See below for an example of how this looks.

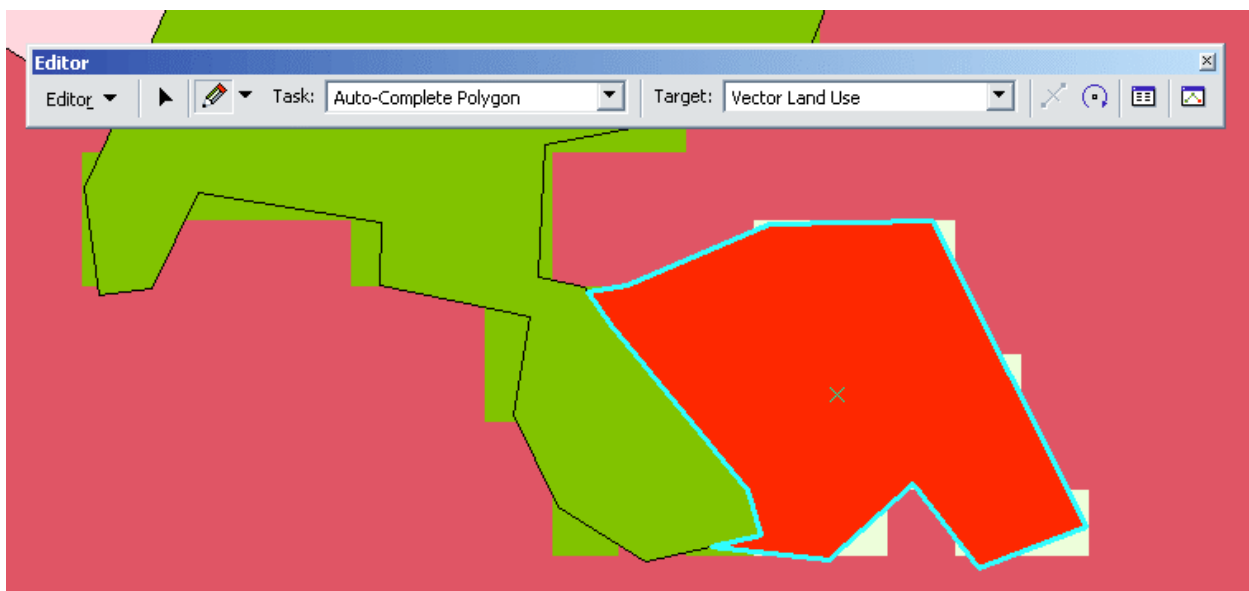


Once your selected feature is reshaped, we will continue editing the land use layer by creating a new polygon using our reshaped edge.

We will now create a vector polygon for agricultural raster polygon (seen above in pale green) adjacent to our modified edge. Change your Task to “Auto-Complete Polygon” and sketch in the boundary of the agricultural polygon **starting inside** your recently modified forest polygon. Do not sketch in the common edge! ArcGIS will calculate that edge for you. Remember to cross your forest polygon twice – GIS needs to know where to start and end the common edge.



Sketching the new feature in...

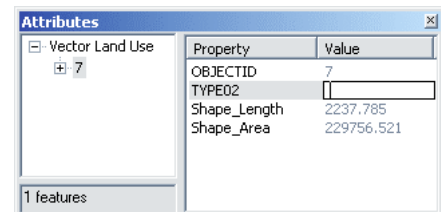


Feature created with no gaps or slivers.

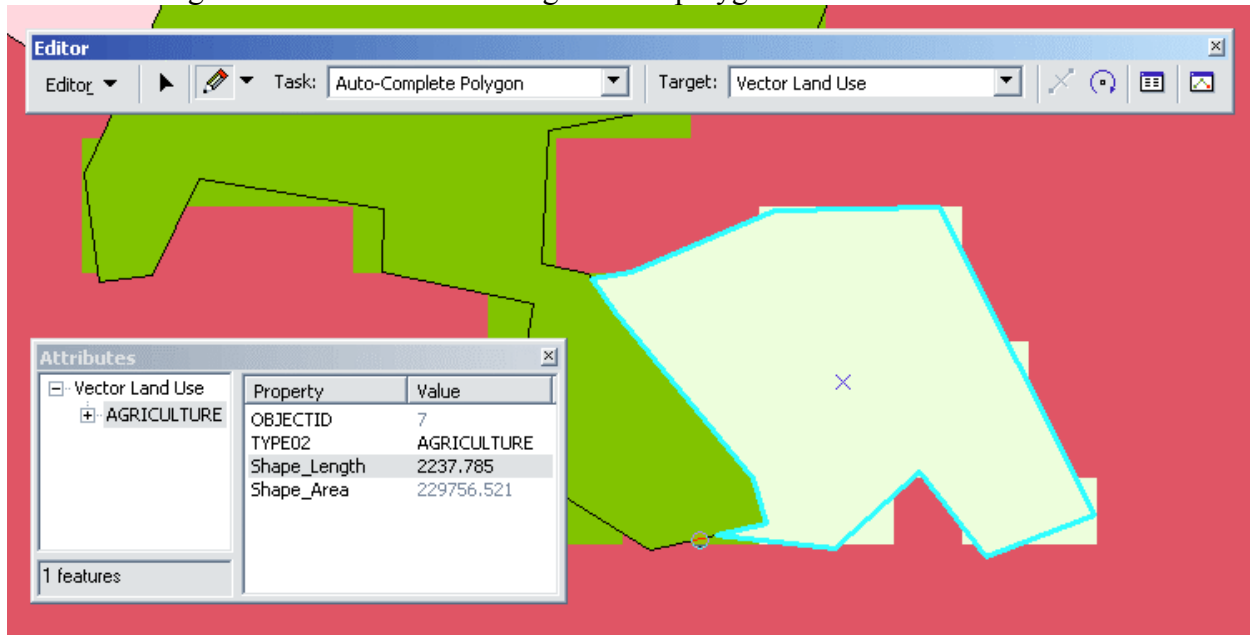
The polygon should now be bright red. This is because the feature currently has no value in the field (“TYPE02”) we are using to thematically color our land use layer. Changing this to “AGRICULTURE” will prompt ArcGIS to draw the new polygon feature like the rest of the agriculture vector polygons.

Modifying Attributes

Click the Attributes button to open the Attributes window. Editable features you select will be present in the Attributes window. Unlike the Identify Results window, you can change the values of your data in this window.



With your new polygon selected, change its attributes to “AGRICULTURE” – its appearance will now change to match the rest of the agriculture polygons.



Vector layer now matches your raster layer in appearance.

Modifying Layer Transparency


Open the Vector Land Use Properties by right clicking on the layer in the Table of Contents and choosing “Properties...”

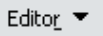
In the Layer Properties window, choose the Display tab. Under the Display tab, locate the Transparency options. Set the transparency of your vector layer to 40% transparent. Click OK.

Autocompleting the URBAN polygon

You should now create a new polygon that covers the remainder of the raster layer. Set your task to “Auto-Complete Polygon” and start your sketch inside your vector layer, placing points at the lower corners of the raster layer, and then ending inside your vector layer again. This will create a rectangular polygon covering the rest of the raster layer. Set this new polygon’s attribute to “URBAN”.

Merging Polygons

You should now have two urban polygons in your dataset that share a common border. We want only one polygon for each contiguous land use area. To merge the two urban polygons together, select both with the Edit Tool.  Make sure you only have the two polygons you want to merge selected.

Under the Editor Menu (to open, click on the  button) you will see a menu item titled “Merge...” Click Merge to merge the two polygons into one. Before merging, ArcGIS will ask you to choose which input polygon’s set of attributes the merged polygon should inherit. In this case, both are “URBAN”, so it should not matter.

Punching Holes in Polygons, or How I Learned to Stop Worrying and Love the Clip

Now that we have an “URBAN” polygon covering the rest of the land uses in the raster layer, how will we create the rest of the land use polygons without leaving any overlapping areas? How do we cut up the vector layer to make sure there are no gaps or slivers?

Create a new polygon (task: “Create New Feature”) for one of the forest or wetlands raster polygons. Make sure you set the appropriate attributes for the new vector polygon.

Keep the new vector polygon selected. In the Editor Menu, choose “Clip...” Clip will be grayed out if you do not have features in an editable layer selected. You will be using your new polygon to act as the clipping feature, discarding areas from any other polygon in your vector layer that intersect or overlap with this feature. Clip works like a cookie-cutter, punching a hole or cutting away parts of overlapping features.

Complete your vector land use layer by drawing overlapping polygons and clipping away the overlap. Your end result should be a seamless vector land use layer that closely matches the raster layer. Be sure to save your edits often. Submit your *rowan.mdb* Personal Geodatabase as your assignment.

For More Help

- [Adding the Editor Toolbars](#)
- [The Digitizing Tools](#)
- [Common Polygon Editing Tasks](#)
- [Creating Polygons and Lines](#)
- [Merging and Separating Features](#)
- [Reshaping Polygons](#)
- All else fails, ask for help!