

Project 5: Digitizing

Photo interp and data creation

Due: Oct 6

Sometimes the data you want just doesn't exist, and it's necessary to create your own. Using MnGeo's composite imagery for reference, we will digitize features for this in-class project to produce new layers, stored as Feature Classes (FC) in a Geodatabase (GDB). To standardize the spatial reference, we will use a Feature Dataset (FD).

For this assignment you will digitize one PLSS Section in MN of your choice. You should be somewhat familiar with the area so that id of features is easier. The area must have point, line, and polygon features, as follows:

1. Points: at least 10, can be cities, towns, landmarks, favorite places, your house (or others you know), etc
2. Lines: at least 10, can be major highways, roads, trails, rivers, streams, fence lines, power lines, railroad tracks, etc. Digitize complete features, not just part of a road or river, etc.
3. Polygons: landcover – this will entirely blanket your 1mi x 1mi section. The cover classes are your choice, but there must be at least four (4), and they must be appropriate for the land cover in your section.

Set up study area

1. Download & extract the data folder to your C workspace. Start ArcMap, examine data in ArcCatalog
2. MNGeo's web mapping service will provide the air photo. Drag this imagery into your map. Use the link http://www.mngeo.state.mn.us/chouse/wms/composite_image.html if you need to re-connect.
3. Add the reference layers- address any spatial reference issues
4. Set symbology so you can identify each reference layer atop the air photo.
5. Locate & delimit the study area:
 - a. Zoom to the general area you want to digitize
 - b. Go to the properties of the PLSS layer and set labeling to display the TWP-RGE-SEC
 - c. Zoom in to the specific 1-mile square section you have chosen
 - d. Select and export this section to delineate the study area, named by its TWP-RGE-SEC

Build the geodatabase

6. From ArcMap, expand the ArcCatalog sidebar → find your digitizing project folder → right click, select New > File Geodatabase (GDB).
 - a. Name is as your first name and the 1st letter of your last name (e.g. samj.gdb)
 - b. Save your map in new the GDB
 - c. Make it the default GDB
7. Right click on the GDB → select New > Feature Dataset (FD)
 - a. Give the FD a descriptive name (e.g. hometown) & Click Next
 - b. Select the correct horizontal projection (NAD_1983_UTM_Zone_15N), Click Next
 - c. Accept the default settings for vertical projection & XY tolerance, Click Finish
 - d. *The feature dataset restricts spatial reference to ensure all layers are the same*
8. Right click on the FD and select New > Feature Class (FC)
 - a. Name it **POINTS**, Alias **POI** (points of interest) & select Point Features as the Type, Click Next
 - b. Click Next on the Database Configuration window to accept the default setting
 - a. Under Field Name, create a field called **Name**
 - b. Under Field Type, select Text from the dropdown menu
 - c. Under Field Properties, set Length to 40
 - d. *This creates an attribute to store the names of the point features you will digitize*

9. Right click on the FD again and select New > Feature Class
 - a. Name it **LINES**, Alias **Lines**, Feature Type = Line
 - b. Click Next to accept the default Database Configuration setting
 - e. Under Field Name, again create a field called **Name**,
 - f. Field Type = Text
 - g. Length = 40
 - h. Create another field called **Type** to store group descriptions (river, stream, trail, State HWY, etc.)
 - i. You will be able to symbolize based on this attribute, as we will with landcover

10. Right click on the FD & select New > Feature Class for a 3rd time
 - a. Name it **POLYGON**, Alias **Landcover**, Feature Type = Polygon
 - j. Create a field called **coverttype**:
 - i. Type = text,
 - ii. Length = 20, Click Finish
 - k. Now, right-click on the **Landcover** feature class, select Properties, go to the Subtypes tab
 - l. Click Domains (button near bottom)
 - m. In the empty cell under Domain Name type **CTYPE**
 - n. Tab over to the cell under Description and type **land cover classes**
 - o. Under Domain Properties
 - i. set Field Type = Text
 - ii. Domain Type = Coded Values
 - p. Spend some time looking at the feature in your section to identify the landcover types
 - q. Under Coded Values & Description, enter the following AS APPROPRIATE FOR YOUR SECTION- modify to include those you actually have, add if needed.
 - i. Code 1= urban,
 - ii. Code 2 = residential,
 - iii. Code 3 = wetland,
 - iv. Code 4 = water,
 - v. Code 5 = forest
 - vi. Code 6 = agriculture,
 - vii. Code 7 = barren
 - viii. Code 8 = ??? whatever you need we haven't already created
 - ix. When finished, Click Apply, OK
 - r. Go to the Fields tab, in the top section under Field Name click **coverttype**
 - s. Under Field Properties, click the cell next to Domain and select **CTYPE**, Click Apply, OK
 - t. *This creates a dropdown menu in the coverttype attribute to select land cover classes*

11. Import the study area section (*the shapefile we exported at the beginning*) to the new GDB
 - a. Right click on the FD > select Import > Feature Class (single)
 - b. Select the section shapefile, under Output Feature Class name it **studyarea**

Now you are ready to digitize

Refer to online imagery (Google maps) to confirm your interpretation of unfamiliar features, road names, etc.

1. Right click on the POI feature class and select Edit Features > Start editing

2. In the Editor toolbar, click the Create Features icon
 - a. *This opens a sidebar menu to select the layer and construction tool for editing*

3. In the Create Features menu, click on POI
 - a. Select Point (bottom of the window) under Construction Tools

4. Hover over the point feature you want to create, left click once, and a blue highlighted point will be placed on the map

5. Open the POI attribute table, click in the Name field, and give the new feature a name
 - a. You can leave the attribute table open while editing to save clicks
6. After you've created a few point features, click Editor > Save Edits & close the POI attribute table
NOTE: edits are saved independent of the map – save edits often!
7. To digitize Lines- click on that layer in the Create Features sidebar,
 - a. Select the Line Construction Tool
 - b. Go to Editor > Snapping > Snapping Toolbar & set up your snapping options to ensure that line segments connect to each other and don't overrun the section boundary
 - c. Hover over each icon for a description, and select Edge Snapping
 - d. *You may need to turn down the pixel Tolerance (under Snapping > Options) if your lines are "grabbing" other features too readily*
 - e. Use Google Maps to confirm road names and complete the attribute table
8. Digitizing Landcover involves setting up symbology first, so you can see through your new features
 - a. Under the Symbology tab, select Categories, and map the features by **covertype**
 - i. Select distinct colors for each covertype class
 - ii. This time, leave "*all other values*" checked and give it a color that will alert you to complete the attribute values
 - iii. Set the display to ~60% transparent
 - b. In the Create Features sidebar, click Landcover to select it for editing, then
 - i. Select the Polygon construction tool
 - c. Create a feature, starting with one of the largest in your section & being sure to "snap" to the edges of the section boundary (Adjust Snapping as necessary)
 - d. After you have created the first feature, switch your tool to Auto Complete Polygon
 - i. *This will ensure you don't have gaps or overlapping polygons*
 - e. Click inside the first polygon you created, digitize the outline of the new adjoining polygon feature, when finished hover over the inside of the starting polygon and double click to finish the "sketch" of the new polygon- the shared boundary will automatically draw
 - f. Do this for all subsequent polygon features, clicking within any completed polygon as the starting and ending points
9. When you have finished digitizing all features, use the imported section FC (**studyarea**) to set data frame clipping and hide the rest of the air photo layer (*Data frame properties > Clip to shape*)

Deliverable

- A single layout of your mapped area constructed as follows:
 - All 10 POI's, labeled and appropriately symbolized
 - Annotate labels to fix overlaps
 - All 10 lines, labeled and appropriately symbolized
 - Again, annotate labels as necessary to fix overlaps
 - All Landcover symbolized uniquely and transparent enough to see air the photo beneath
 - An inset reference map showing your section within its county in MN

Note: The data source for this map will be MNGeo as reference photo, with FC layers created by author
 Include all the usual required map elements & apply your best cartography
 Export to pdf and upload to D2L