FR 5131 SAP Assignment

What You’ll Learn: Practice with various skills in ArcMap

Data can be found on the class web site or S:\FR5131\Semester_Assignment\SAP.

Background: Concurrent with the regular lab assignments, students enrolled in FR5131 must do one of several semester-long projects. This one has them construct and analyze historical data for the St. Anthony Park neighborhood of St. Paul. This work will be done in stages, as material is covered in lecture and lab sessions.

Part 1

- Create a workspace for this semester long project. (you may want to copy all the data on FR5131\SEMESTER_ASSIGNMENT\SAP to a jump drive or your home computer)
- Create an initial base Map (use ArcMap; refer to Lab 1 &/or Lab 2).
- Load the Historical Plat (plat_1928) of the N. St. Anthony Park neighborhood and surrounding areas.
- Save a map project file (.mxd) as you will build upon it in future assignments.
- Print a properly titled map, with a north arrow, scale bar, your name and simple description in a legend.

Part 2

- Create four polyline layers in your historical GIS workspace; 1928 roads, 1928 alleys, Trolley line, and Railroad. (refer to Lab 4)

- Open each layer and digitize the 1928 roads, alleys (alleys look like unnamed roads), trolley line (down Como Avenue) and Railroad. Don’t do too large an area; later you will clip these layers to the neighborhood boundary. N. St. Anthony Park is bounded by the city limits on the west and north, the city limits down Cleveland Ave. to Como Blvd. to Fifield St on the east, and the Railroad line in the South. You will not need any features beyond those limits.

- We provided a layer “focusblocks.shp” that identifies 4+contiguous blocks (surrounded by named streets or alleys). Load this layer, and digitize all 1928 parcels for those 4+ blocks. Digitize only the parcel boundaries into your new layer.

- Create another polygon layer, and digitize the 1928 houses and all other buildings on those blocks, “adjusting” building location as necessary so that all buildings are placed within focusblocks outer boundary (some may overlap slightly at the edge, pull them in). Add attributes for 1928 building type,
dwelling or garage, and building materials, interpreting the values to place in the attribute tables by interpreting the map. Note that red houses are “brick”, Gray houses are “stone or stucco,” yellow houses are “wooden,” garages are red, gray or yellow also but have faint “X” on the roof. (see illustration on page 6)

- For the same 4+ blocks as chosen above, digitize the all buildings for 2006, interpreting from the image “2006foc_blk.tif,” identifying buildings as houses (or any other dwellings) or garage/other non-dwellings, and name this layer something like “Current_houses.”

- Select the current parcels for this set of blocks from the 2004 Parcel/Tax records, and save them to a new layer. “Round out” the parcels that don’t appear in 2004, but are parcels in 1928. That is, there may be some “missing” parcels in the 2004 dataset, they are just empty space. Create fillers for these “phantom” parcels (likely, they’ve reverted to the City or State, and so don’t appear as parcels).

- Print a properly titled map that shows the 1928 Plat, roads, alleys, trolley and rail lines. Make sure you have a scale bar, north arrow, clear legend and your name. Try making the 1928 Plat somewhat transparent to make the digitized layers stand out.

- Print a second, properly titled with legend, scale bar and north arrow map showing two panels, one on the left with the 1928 buildings and parcels, and one on the right with the current/2004 buildings and parcels for the 4-block area.

Part 3

In this assignment, you will use 2004 Parcel/Tax records and the 1928 plat map to identify and mark (select & assign) the parcels that did not have a house appearing on the 1928 Plat, but have been built on since.

You are given a current parcel layer that shows all currently built on parcels (2004). Note: This layer in only polygons, it does not show the actual buildings. You don’t need to do anything with this layer. This layer is called 2004_Parcel.

You are also given an exact copy of 2004_Parcel titled “Layer_for_Marking_Recently_Built”. This is the layer you will be using to indicate the parcels (property) that have been built on since 1928. How you can tell if something has been built since 1928? By noticing that the polygon is blank on the 1928 Plat does not have a house on the 1928 Map. (don’t worry about garages).
For your information, I also included a current air photo. You do not need to do anything with this photo, titled Current_Air_Photo, it is provided for interest and information.

**STEPS**

- Copy all shape file layers to your USB drive, and work from this (remember, relative paths)

- Add the shapefile \\Layer_for_Marking_Recently_Built.shp

- Open Attributes of the Layer_for_Marking_Recently_Built. Add a new field called After_1928 (Use Text, 10 character length)

- Change the Layer_for_Marking_Recently_Built to just show the outline of the polygons (so you can see through the layer).

- Add or open the 1928_Plat.

- Start Editing the Layer_for_Marking_Recently_Built.

- Your job is to select the parcels THAT DO NOT HAVE A HOUSE in 1928.
- Use Select Features (you can hold the shift key down to select several parcels) or use the Selection→Interactive Selection to select a large number of adjacent parcels.

Notice the layers don’t quite line up due to registration errors and errors in the original hand drawn 1928 Plat. Make sure you mark unbuilt parcels correctly.

Note that red houses are “brick”, Gray houses are “stone or stucco” and yellow houses are “wooden”. Garages are red, gray or yellow also but have faint “X” on the roof.
Once you have selected a parcel (or a group of parcels) use the Calculate Values (see Lab 6) and assign the After_1928 field to "Yes".
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<th>ZIP</th>
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- Do the marking in stages. Don't try and mark all the unbuilt at once. If you make a mistake you with lots of records selected you will end up repeating the selection process.

- Mark a few, assign a few, mark a few assign a few; Save frequently.

- After you are have set all the unbuilt in the After_1928 field, use Select by Attributes to find the After_1928 = “Yes”. Then use the Options → SWITCH SELECTION. This will mark the remaining records. Assign these records to “No” in the After_1928 column.

- In the next assignment you will be clipping the areas outside the North Saint Anthony Park neighborhood so extend your selection well beyond the boundary streets.
• Display the “Yes” / “No field, called After_1928 on top of your 1928 Plat, Road, Alleys, Trolley, Rail lines. Use colors and/or make appropriate layers partially transparent to allow the Map to be “self-evident”.

• Here is a sample showing the lots built on between 1928 and 2004 in green. The color is just to help you understand the idea. Please choose better colors and or shading to show the increase in housing density over 76 years.
Print and submit via Moodle a properly titled map that shows the 1928 Plat, roads, alleys, trolley, rail lines, and property built on after 1928 (After_1928 = “Yes”). Make sure you have a scale bar, north arrow, clear legend and your name.

**Part 4**

1st Map to Print as PDF: Create a new polygon layer named Boundary. Digitize the boundary of N. St. Anthony Park, using the plat map and images as your guide. The boundary is defined by the city limits on the west and north, the city limits down Cleveland Ave. to Como Blvd. to Fifield St on the east, and the Railroad line in the South. You will not need any features beyond those limits.

Add the layer SAP\rams_rd.shp. This is 2004 Ramsey County Roads.

Use the boundary layer to Clip all the other layers. (See concepts in Lab 9 & 10) ArcToolbox→Analysis Tools→Extract→Clip.

For the Plat_1928 (raster) use ArcToolbox→Spatial Analyst Tools→Extraction→Extract by Mask. The mask should be your boundary layer and the Plat is your input raster. Use the Environments button at the bottom to select Raster Analysis Settings and select the cell size to be “same as plat_1928”. The result may be in Black and White.

Use Calculate Geometry to calculate the total length of the roads in N. St. Anthony Park in 1928 and 2003. (Use your clipped roads layers, total the length field for all the road segments with the sigma/statistics button). Subtract and note the difference.

Print a properly titled map (build on your Part 3 Map), that shows clipped N. St. Anthony Park Plat, roads, alleys, trolley, rail lines, boundary and properties built on after 1928. Make sure you have a scale bar, north arrow, clear legend and your name.

Add a text note to the Map explaining the difference in the overall length (not alleys) in the roads over 76 years, in kilometers. Add a text note about the change in housing density since 1928.

2nd Map to Print as PDF: Now add the data layers you created for the focus block parcels and houses for 1928 and 2008.

Add attributes for the area for the buildings layers, and the parcels layers, for both periods (4 layers total).
Use calculate geometry to calculate the area for buildings, and parcels in the respective layers.

Restrict all the parcel calculations only to the parcel area in the 4+ focus blocks, NOT the total area of the focusblocks layer (only calculate areas on parcels and buildings, omit the roads, alleys, and other non-parcel, non-building areas from calculations).

Calculate the number parcels where a building was built between 1928 and 2004 for this 4-block area.

Calculate the average parcel size in 1928 and 2004 for this 4+-block area.

Calculate the average HOUSE size in 1928 and 2008 for this 4+-block area.

Calculate the average number of buildings per parcel in this 4+-block area.

Create a two-panel layout that shows the buildings and parcels, the left for 1928, and the right for ca. 2004-2006. Place the parcels and buildings layers in each respective layout. For the 1928, place the plat image in the background, with something like 25 to 45% transparency, and for 2004-2006 place the 2006 image (2006foc_blk.tif) as background, with similar transparency to the plat.

Include the calculations for average parcel size, house size, and buildings per parcel on each panel. Include information on the number of parcels with new construction in an overall text label or comment.

For Extra Credit (5 pts). Register the Plat_1916. Use the above roads layer as the control. Notice the differences in the number of buildings as well as changes on the St. Paul Campus between 1916 and 1928. Significant home construction took place between 1916 and 1928 mostly north & east of the Street Car (trolley) line down Como Avenue.