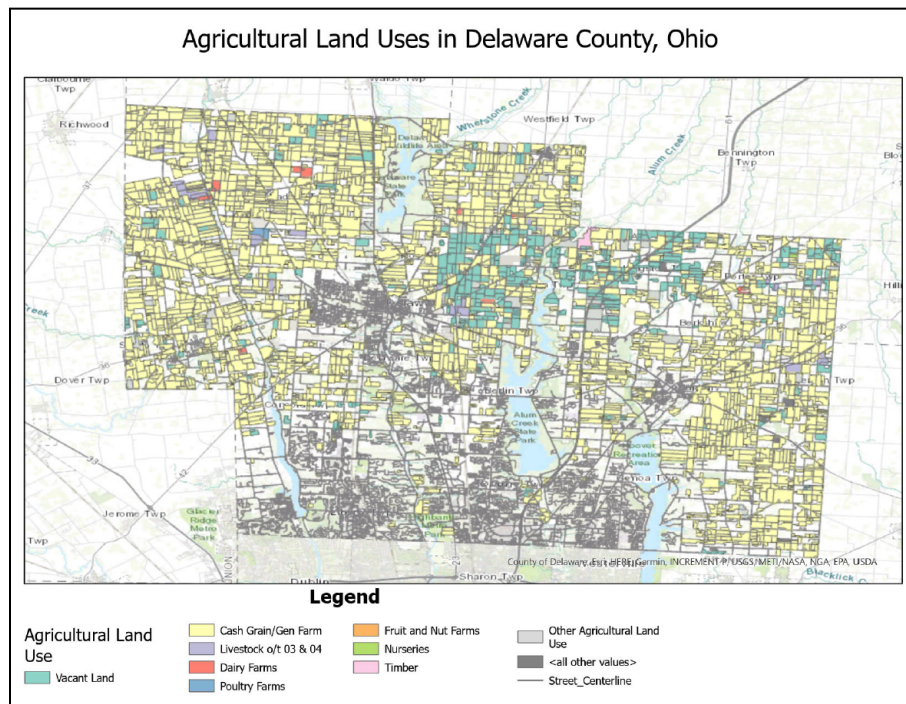
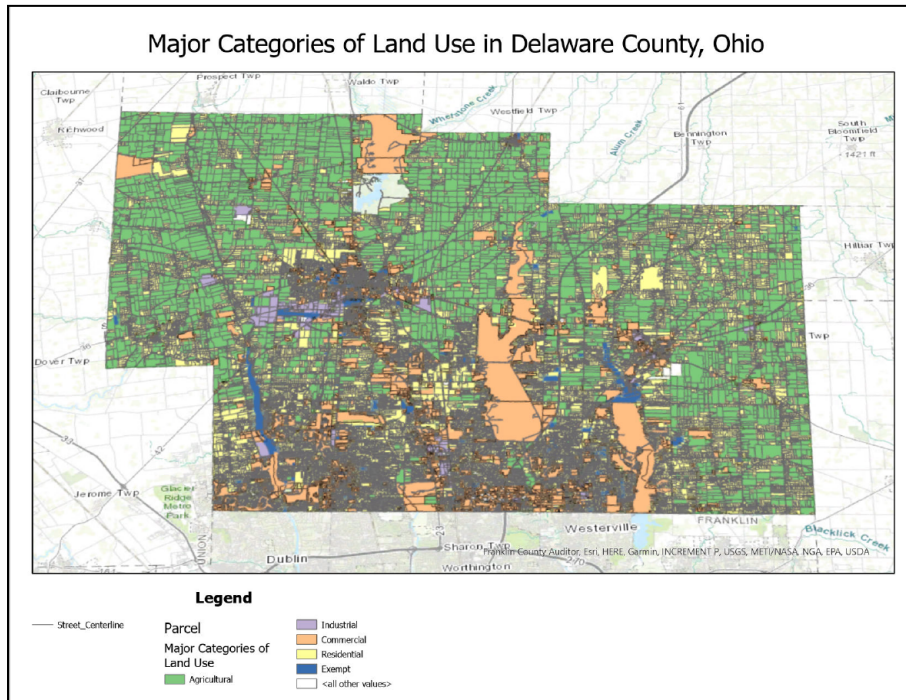


1. **Selecting and Classifying Land Uses:** Create a map that shows the 6 different major categories of land uses (agricultural, mineral, commercial, residential, residential, exempt). These land use codes are in the Parcels data (the class column). Select one of the categories, and create a second map showing all the sub-classifications in that category. Refer to the *Delaware County Land Use Codes* (below) for category and subcategory information. Symbolize each category with an appropriate color. Add appropriate additional data (such as road centerlines) for reference and make your map look decent. (approx. 1 page description + 2 maps)



The first map above, “Major Categories of Land Use in Delaware County, Ohio”, shows the 6 major categories of land use from the Parcel data. To make create this map, I downloaded the Parcel shapefile from the Delaware GIS Hub Online. After downloading it, I extracted the files to my flash drive. I then made a new project in ArcGIS Pro and added a folder connection to the folder on my flash drive with the shapefile. I then dropped the shapefile onto the map.

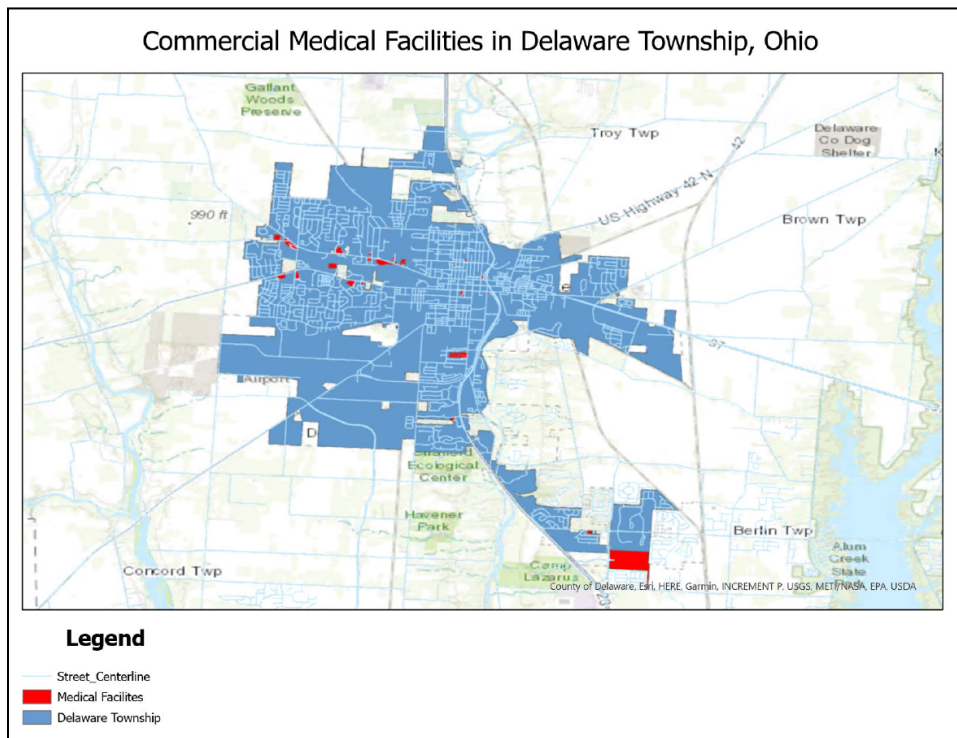
After the shapefile was added, I opened the attribute table from the Parcel layer and examined the “class” column, where the land use codes were contained. I then closed the attribute table and opened the symbology pane for the layer. I chose a Unique Value Symbology for the layer as I would be combining multiple land use codes into categories. I then selected “class” in the field drop-down as what I wanted to symbolize. A message then automatically popped up and asked me something along the lines of whether I wanted to symbolize all values separately, I selected no and the computer grouped all features with the same values by the same color/symbology. Obviously, this was still far more values than I wanted. So, I selected each of the codes from each group of land use and grouped them together. This left me with classes that contained features that accurately represented what was meant to be contained in each kind of land use.

I then changed the colors in symbologies. Originally, they had different pale pastel colors representing each class which I thought was hard to tell apart. I chose these colors because they were different enough to be able to distinctly tell apart on the map and the colors accurately represented land use categories. For example, I wanted agricultural land use to be some type of green, etc. The specific name of this color scheme was “Accent.” I then changed the labels of each class to its appropriate land use categories and downloaded the street centerline layer and added it to the map as a reference point. Finally, I then created a new layout with the map, which is what is pictured above.

I followed a similar process for symbolizing a single land use category. I chose to do Agricultural Land Use because I think it would impactful to track problems like agricultural runoff or see where goods are sourced from. I created a new map in my project. I then right-clicked the parcel layer on the original map, moved down to the data button, and selected export features from the option. A tab then popped up to build a definition query. I made a query to include all the values I selected and then selected those parcel codes that were a part of the Agricultural Land Use category. This created a new layer with just those features, which I pasted into the new map I had previously created.

I then renamed this layer “Agricultural Land Use” and opened the symbology pane for this layer. I selected unique value and class again. However, this time I didn’t have to group any values. I simply changed the labels to match those on the Delaware County Land Use Codes chart. I then changed the colors. I decided to keep the pastels this time because there were far more different attributes to symbolize and I found too many bold colors were hard to look at and see patterns within the map. Finally, I again added the street centerline layer as a geographic reference point for this map. After this, I finally created another layout with the map, which appears as the second map you see above.

2. **Making New Shape Files from Existing Shape Files:** Choose two Delaware data shapefiles, select a relevant subset of the data on those shapefiles, and create new shapefiles of the subset of data. For example, you could select all wetlands and soils within a particular township or all wetlands and soils of a particular type in the entire county. Create a map using your new shapefiles, add appropriate additional data (roads, etc.), and describe how what you did could actually be useful. (approx. 1 page description + map).



I chose to map medical facilities in Delaware Township for my shapefiles question. To do this, I first downloaded two shapefiles from the Delaware Data GIS Hub. These were the Parcel data and the Township data. I extracted the files onto my flash drive, created a new project in ArcGIS Pro, and then made a folder connection to the location of the files on my flash drive. I then dropped these shapefiles into the map from the catalog pane.

After this, I had all the townships in Delaware and all the Parcels in Delaware depicted on my screen so, I needed to create new shapefiles with the subsets I wanted on them. I started with the Township Layer. I right-clicked and selected "Data" and "Export Features" from the drop-down. I then created a definition query to export selected features. This was similar to what I did for the second part of the last question. I chose "Name" from the fields to select from and within that chose to only export the features with the name "Delaware Township." I ran the query and it created a new shape file with just Delaware Township on it. I then deleted the old Township layer.

I followed the same process for my Parcel layer. I right-clicked and selected "Data" and "Export Features" again. This time when it came to building the query I selected class for the field, which is the data that contains all the parcel codes. I then had to consult the Delaware County Land Use Codes chart to find which codes had medical facilities. The two I found were

both in the commercial land use codes. They were 412 (nursing homes and hospitals) and 442 (med clinics and offices). After I found these, I built the query so that only features with these class codes as values would be exported. This gave me a new shapefile with just the medical facilities on it and I deleted the original Parcel layer.

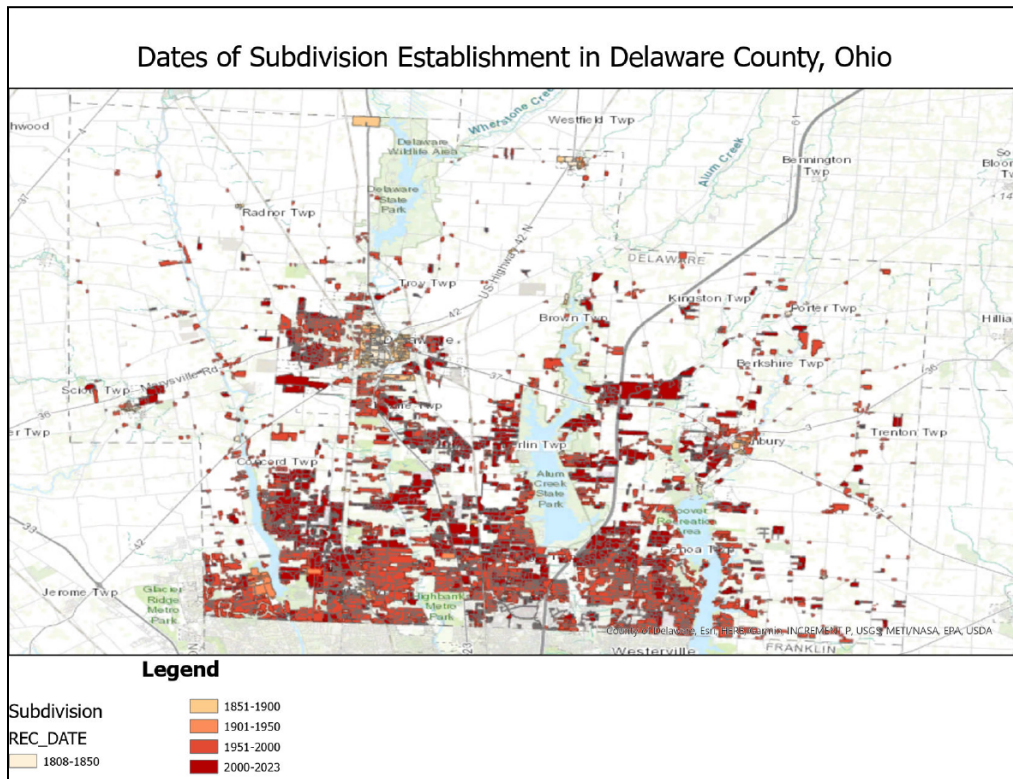
I renamed my new layers “Delaware Township” and “Health Facilities.” Then, I moved on to symbolize them. I choose a bright red to symbolize the medical facilities since red is commonly a color associated with hospitals and medicine, etc. I wanted the Delaware Township layer to be something that would make the red pop since the medical facilities are the main focus of my map and I wanted the township to act more as a boundary. Thus, I chose a medium blue color. I also chose to add the street centerlines for reference points to provide geographical context to the map. I made these a much lighter blue so they stood out from the township layer but still allowed the viewer to focus on the red medical facilities. I finally created a new layout with my map, which is presented above.

There are many ways this map can be useful. Here are a few:

1. **Emergency Services:** This map could be useful to emergency responders to help locate the closest medical center to take a patient to in a time of crisis or just general transport. The centerline layer could help these responders devise the easiest way to travel there as well.
2. **General Public:** The same goes for the general public of Delaware Township. They could use this map to see where the closest medical facility is if they need to utilize one or perhaps they want to select a nursing home or clinic close to home for convenience purposes. The centerline layer will provide them with reference to where they are, help them decide which may be the closest in proximity, and devise how to get there.
3. **Accessibility:** This map can help show which areas of Delaware Township lack medical access more than others. For example, most of the facilities seem to be concentrated toward the center of the map, which means it may take longer for these people to access a medical facility. This could be used to decide to open up practices in these underserved communities or possibly put an ambulance dispatch there to make travel to the facilities quicker. This could potentially increase medical access and outcomes for these individuals.

Surely, there are many more potential uses for knowing the locations of medical facilities in the township, but these three alone can showcase how useful maps like this can be.

5. **Mapping Change:** Review ch. 7 from Mitchell (“Mapping Change”) and create a time-change map of subdivisions in Delaware Co. View the subdivision file (in Delaware Data) and look at the table: there is temporal information here: the date that the subdivision was established (in a peculiar format). Create a graduated color map of subdivisions based on this temporal data. Classify the data so it makes some sense (1850-1900, 1900-1930, etc.) and choose an appropriate color. (1 page description + 1 map)



For my final application, I chose mapping change. To begin, I downloaded and extracted the subdivision shapefile from the Delaware GIS Data Hub onto my flash drive. Then, I created a new project in ArcGIS Pro and created a folder connection to the folder with the data on my flash drive. I then dropped the Subdivision shapefile onto the map, creating the Subdivision layer.

The first thing I did after creating this layer, was right-click on it in the contents pane and open the attribute table. I then found the column with the date the subdivision was established in it. It was called “REC_DATE” and had the dates listed in a year month day format such as YYYYMMDD. This was vital information for my later symbolization of the layer.

With this information, I could finally begin making the time-change map. So, I closed the attribute table and right clicked on the subdivision layer in the contents pane, and opened the symbology pane. Originally, the map’s symbology was single symbol, so I clicked the drop-down and changed it to graduated colors.

Next, I had to pick a classification scheme. Originally, it was set to natural breaks and was starting with the year set to 0, but one of the things I had done in the attribute table was sort by descending and ascending to find the earliest and most recent subdivision additions. The earliest was 1808311. So, I knew if I wanted an accurate representation, I would have to do a

manual intervals and create my own bounds that made sense for the data set. So, I selected manual interval and 5 classes from the drop-down menu. This allowed me to make most of the classes for about 50 years, with the exceptions of the first and the last. The breaks I used are as follows:

1808-1850 (18080311 - 18501231)
1851-1900 (18510101 - 19001231)
1901-1950 (19010101 - 19501231)
1951-2000 (19510101 - 20001231)
2001-2023 (20010101 - 20230208)

To do this I replaced the current numbers in the upper limit, with the upper limit in the bounds I have listed and highlighted in yellow above. These limits allowed the groups to contain features with the dates from the first day of the starting year to the last day of the ending year. I then changed the labels of each of these groups to the dates I have highlighted in pink above. After this was complete I had my new classification with the correct values and labels and I had to pick a color scheme. I chose the red graduated colors for this map because I felt as if it made the subdivisions most visible against the blue/green/white base map.

I tested including the road centerline layer on this map, but I felt as though it obscured some of the smaller subdivisions and you couldn't see the colors properly. Additionally, I felt the base map provided enough geographic reference for this map. Finally, I created a new layout with the map in my project, which is the layout depicted above.

Based on the presentation of this map we can see that it is highly concentrated with the colors of 1951-2000 and 2000-2023. This pattern tells us that subdivision establishment has seen an uptake in recent years, whereas it wasn't happening as frequently in years before. Time change maps can be very useful in visualizing differences and patterns of increased or decreased change over time, just like this map did.