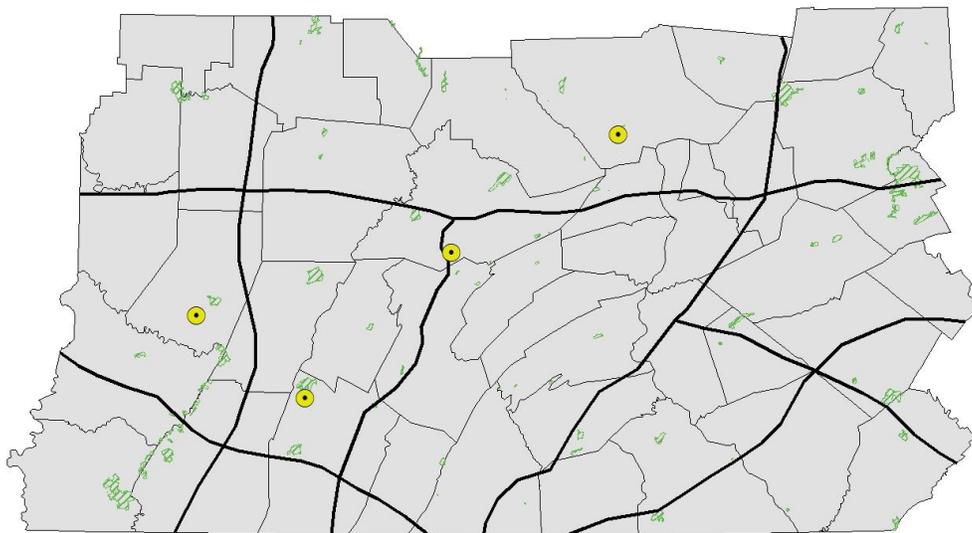


Decision Support with a GIS – Queries

The purpose of this lesson was to get an idea of not only the basic applications available to use such as ArcCatalog and ArcToolbox but to start using ArcMap to aid in real world decision making situations.

The task was to find an ideal city to construct a new Ice cream store based on the owner's preferred surroundings. With the data provided it was possible to narrow down the possibilities by selecting cities with various queries such as having 500 nearby farms for milk, 25000 able workers aged 18-64, and for the shop to be within 20 miles of an interstate for business purposes. The owner also wanted the new location to be in an area with a low crime index (of below 0.02), have a recreational area within 10 miles, and for the city to have a university or college nearby without having more than a population density of 150 people per square mile.

This task was best completed by loading up all the necessary data and then performing a series of selections and exports to finally arrive at final possibilities. Using the county data it was easy to combine the Farm, Population and Workforce requirements in a single selection command. These cities were then exported as their own data layer for further querying. From here it was then possible to further select from within cities based on their location, or distance from other features. After the final selection and coloring scheme applied the following map was generated and then exported to share with others for even more decision making, by perhaps the owner this time.



Map 1 : The Final 4 Cities meeting the original location criteria shown as yellow points.

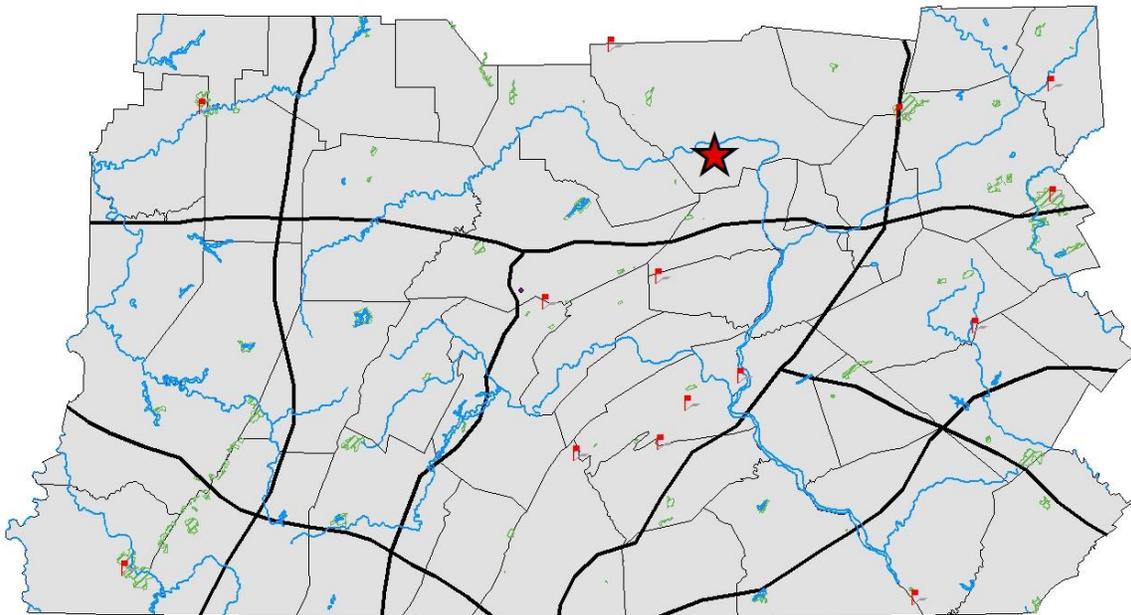
POI: Interstates, Recreational Areas.

Additionally, the owner was also considering other requirements to further then final location down to as few points as possible, or ideally one. Additional layers with landmark and hydrology data was acquired to use to find cities from the first final selection that also are within 10 miles from a river or lake and within 40 miles of a landmark.

This was accomplished by selecting from the 4 cities above in Map 1 that were within distance of the new data of interest. Specifically a query of Selecting features from Candidatecities.shp that were within a distance of 40 miles of features in the landmarks shapefile. This brought the selection down to 2 cities.

From these we want then find out which of these are then within 10 miles from a river or lake. That may sound easy, but the Hydrology data layer contains 'features' that would be measured to be within distance of that aren't actually a lake or a river, such as a reservoir. I went ahead and pulled just the lakes and rivers out of the hydrology data by an attribute selection query of the hydrology data layer: "FEATURE" = 'Lake' OR "FEATURE" = 'River'

This Data was exported as a new hydrology data layer more relevant to our needs. It was then possible to perform a selection by location of the two cities left that were within 10 miles from the new hydrology data layer. Generating the following final Selection in Map 2.



Map 2: Final Location determined by all location constraints shown as the red star.
New POIs: Landmarks, Rivers and Lakes.

Final Thoughts:

These steps could have been performed in various orders to come to the same result. For example, I could have slimmed down the hydrology data and then performed a selection query based on the two distances. I could have even saved a step by using the select from within current selection to avoid having to export my selection as a new layer. It may have been possible to arrive at the final result without exporting along the way at all but this was good practice for doing procedural work in steps in case of an error or change down the road. This could have all been done manually as well but would require many time consuming calculations and measurements! This lesson goes to show how powerful ArcGIS is when dealing with spatial data of all types.