Challenge 1: Data Characteristics and Querying

Overview

You will be asked to answer a variety of questions relating to West Virginia using GIS data and a variety of spatial analysis tasks. For each question, answer it and provide a short description of how it was answered.

Here I will provide a description of the data layers made available. You will be able to answer these questions using just these data layers. You will not need to find or use additional layers. The data have been provided in the **Data_for_Project** folder.

Vector Layers:

airport_locations: point locations of mapped airports in the state
hospitals: point locations of mapped hospitals in the state
interstates: line features representing the major interstates in the state (not all roads)
major_rivers: line features representing large rivers in the state (not all rivers or streams)
public_land: extent of public (state and federal) land in the state
counties_detailed: polygon features representing West Virginia county boundaries
geology: polygon features representing bedrock geology in the state
lakes: polygons features representing major lakes in the state (does not include small water bodies)

Raster Layers:

nlcd_2011: categorical raster land cover layer from the 2011 National Land Cover Database (NLCD)
wv_elev: continuous raster of elevation measurements as a digital elevation model (DEM) in meters

Question 1. How many hospitals are included in the **hospitals** layer?

Question 2. Using the "MILES" field in the **Interstates** layer, what is the total length in miles of interstates recorded in the state?

Question 3. Using the "LENGTH" field in the **major_rivers** layer, what is the total length in kilometers of rivers recorded in the state? Note that the "LENGTH" field is in meters.

Question 4. What is the cell size with units of the **ncld_2011** layer?

Question 5. What is the projected coordinate system of the **ncld_2011** layer?

Question 6. What is the pixel depth (bit type) of the **ncld_2011** layer?

Question 7. What is the pixel depth (bit type) of the **wv_elev** layer?

Question 8. How many polygons in the geology layer have a "TYPE" of dolostone?

Question 9. How many polygons in the geology layer have a "CLASS" of metamorphic?

Question 10. How many polygons in the geology layer have a "PERIOD" of Ordovician?

Question 11. How many counties (**counties_detailed**) contain some mapped public land (**public_land**)?

Question 12. How many counties (**counties_detailed**) contain at least one airport (**airport_locations**) and intersect a mapped lake (**lakes**)?

Question 13. How many counties (**counties_detailed**) are within 10 miles of an interstate (**interstates**)?

Question 14. How many counties (**counties_detailed**) contain mapped dolostone (from the **geology** layer)?

Question 15. How many counties (**counties_detailed**) intersect Interstate 79 (from the **Interstates** layer)?

Question 16. How many counties (**counties_detailed**) do **not** contain an airport (**airport_locations**)?

Question 17. How many counties (**counties_detailed**) intersect a lake (**lake**) that is larger than 2 square miles ("SQMILES" field)?