SOC 4650/5650: Lab-12 - Coal Fields in Missouri and Illinois

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Directions

Using data accessed from the course data release, create the following maps describing coal geology in Missouri and Illinois. Your entire project folder system, including data and map output, should be uploaded to GitHub by **Monday, April 30th** at 4:15pm.

Part 1: Analysis Development (Review from Lectures 01 and 02)

The goal of this section is to create a self contained project directory with all of the data, map documents, results, and documentation a project needs. Make sure to include all relevant directories, a well formatted notebook, and a `README` that traces the changes you make to all of your data. You will need to create a new File Geodatabase in your `data/` directory as well.

Part 2: Merge Missouri and Illinois

We do not have a file that contains only the state boundaries for Missouri and Illinois. We'll start this lab by creating a single file that contains these data.

1. In a new map document, add the Illinois and Missouri state boundary data from `MOBoundary`.
2. Set the projected coordinate system to `USA Contiguous Albers Equal Area Conic` projected coordinate system.[1]
3. Merge these two state boundary layers into a new feature class, saving these new data to the geodatabase you created above.
4. Open the attribute table for your new layer and note how disorganized it has become. Delete the set of columns that apply only to Illinois.[2].
5. Using the Editor Toolbar[3], turn on an edit session.[4]

[1] The State Plane and UTM zones do not provide a single projection that covers both states. Using Albers is therefore a good alternative.

[2] Right click on each attribute name at the top of the attribute's column and choose Delete Field.

[3] Customize ▷ Toolbars ▷ Editor

[4] Editor ▷ Start Editing

6. Fill in the appropriate values for `PSTATENAME`, `PSTATEABBR`, and `PSTATEFIPS` for Illinois. Illinois's state `PSTATEFIPS` is '17'.
7. Save your edits[5] and end the edit session.[6]
8. Remove the individual Missouri and Illinois layers so that only the merged file remains.
9. Export the map image as a `pdf` at `300dpi`.

[5] Editor ▷ Save Edits
[6] Editor ▷ Stop Editing

Part 3: Coal Fields in Missouri and Illinois

10. In the same map document, add the data on coal fields from `USInfra/`.
11. Intersect the merged Illinois and Missouri state boundary data with the coal fields data.
12. Once again, open up the attribute table and note how it has changed (there is no need to complete any "housekeeping" this time, however).
13. Symbolize the coal fields layer using qualitative categories. The PSTATENAME variable should identify coal fields by state (though a number of attributes will do this).
14. Make sure the coal fields are symbolized in a way that makes them easy to distinguish from the states layer, and remove the national data on coal fields from your map document.
15. Export the map image as a `pdf` at `300dpi`.

Part 4: Areas Without Coal Fields in Missouri and Illinois

16. Using the same map document as the previous section, copy the layers into a new data frame.
17. Union the regional coal fields layer you created in the previous section with the data on the Illinois and Missouri state boundaries.
18. Use a query to select the observations of the field `FID_CoalFields` that are equal to `-1`.[7] If you do not have a variable with this name, select another that has `-1` values for areas with no coal. Selecting based on this attribute will show you the areas of both states that *do not* have coal fields under the surface. Your query should look like this:

[7] Go to the Definition Query tab under Layer Properties.

```
FID_CoalFields = -1
```

19. Make sure the non-coal fields data are symbolized in a way that makes them easy to distinguish from the states layer. Also remove the intersected layer created in the previous section.

20. Export the map image as a `pdf` at `300dpi`.