SOC 4650/5650: Lab-11 - Coal Infrastructure in Illinois and Missouri

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Directions

Using data accessed from the course data release, create the following maps describing coal mining infrastructure and geology in Missouri and Illinois. Your entire project folder system, including data and map output, should be uploaded to GitHub by **Monday, April 16th** 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.

Part 2: Coal Mines in Illinois

Missouri does not have any active coal mines but a neighboring state, Illinois, has some. This section of the lab is designed to identify all of those coal mines using their spatial location.

1. In a new map document, add data on coal mine locations from the directory `USInfra` to your map document as well as the Illinois state boundary data from `MOBoundary`.
2. Set the projected coordinate system to `USA Contiguous Albers Equal Area Conic` projected coordinate system.[1]
3. Select all coal mines in Illinois based on their spatial location and the create a new layer. .
4. Make sure the coal mines are symbolized in a way that makes them easy to distinguish from the Illinois state layer, and remove the national data from your map document.
5. Export the map image as a `pdf` at `300dpi`.

[1] The State Plane and UTM zones do not provide a single projection that covers the entire state of Illinois. Using Albers is therefore a good alternative.

Part 3: Coal Fields in Missouri

While Missouri does not have any active coal mines, there are coal fields within the state. Create a map showing only these coal fields within Missouri.

6. In a new map document, add the data on coal fields from the directory `USInfra` to your map document as well as the Missouri state boundary data from `MOBoundary`.
7. Set the projected coordinate system to `NAD 1983 UTM Zone 15N`.[2]
8. Clip the coal fields data to the Missouri state boundary.
9. Remove the original coal fields data from your map document so that only the newly created data for Missouri remains.
10. Make sure the coal fields data are symbolized in a way that makes them easy to distinguish from the Missouri state layer.
11. Export the map image as a `pdf` at `300dpi`,

[2] This UTM zone covers the majority of the state, and is therefore a permissible choice for projecting data from Missouri.

Part 4: Bituminous Coal Fields in Missouri

There are two types of coal fields in Missouri, bituminous coal (which causes high amounts of air pollution) and lignite coal (which has limited potential to create heat when burned). Bituminous coal is used in coal-fired power plants. Create a map showing bituminous coal fields in Missouri symbolized as a *single* polygon.

12. Using the same map document as the previous section, copy the layers into a new data frame.[3]
13. Execute the following query[4] on the data:

```
COALTYPE = 60
```

14. Dissolve the features that contain medium and high volatile bituminous coal into a single polygon using an attribute that each polygon has a common value for.
15. Remove the Missouri coal fields data from the previous section so that only the newly created data for bituminous coal remains.
16. Make sure the coal fields data are symbolized in a way that makes them easy to distinguish.
17. Export the map image as a `pdf` at `300dpi`.

[3] Make sure to re-set the projected coordinate system to `NAD 1983 UTM Zone 15N`!

[4] Go to Layer Properties ▷ Definition Query