

SOC 4650/5650: PS-07 - Active Well Heads in Missouri

Christopher Prener, Ph.D.

Spring 2018

Directions

Using data accessed from the lecture-11 repository, create a map illustrating the density of active wellheads by county in Missouri. Your entire project folder system, including data and notebook output, should be uploaded to GitHub by **Monday, April 9th** 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, code, 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: Data Preparation

The goal of this section is to create two shapefiles of projected data in R that are ready to be mapped in ArcMap.

1. For the wellhead data:

- (a) Combine the three shapefiles of Missouri oil and gas wellheads so that you have one single data frame.
- (b) Clean the data by subsetting both columns, so that you only have the `apiNum`, wellhead operator, type, status, longitude, latitude, and year. Further clean it by subsetting observations so that you only have *active* wellheads.
- (c) Perform both a duplicate observation and missing data analysis, and report your results. Remove any observations that are "true" (i.e. "full") duplicates using the `dplyr::distinct()` function (see Lecture 05).
- (d) Project that data using the given `x, y` coordinates, and check the projection using `leaflet`.

- (e) Export the data using the NAD1983 geographic coordinate system.
2. For the county data:
- (a) Import the counties data from the lecture-11 repository and combine them.
 - (b) Calculate the square miles of each county (remember that the area will be given as character data - they will need to be converted to numeric and then calculated from the square meters).
 - (c) Export the data using the NAD1983 geographic coordinate system.

Part 3: Mapping Stroke Rates for the Contiguous United States

The goal of this section is produce a properly normalized map of the *density* of wellheads per square mile in each county. This will necessitate completing a spatial join of the data before creating your map layout. Your map layout should be exported as a pdf file at 300dpi. Make sure your README.md file contains a written description of the results - focus on describing the spatial distribution of wellheads in Missouri.