SOC 4650/5650: Lab-03 - Dangerous Buildings in Kansas City, MO

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Directions

Using data from the `DataLibrary/CourseData/KansasCity.gdb` geodatabase and the `DataLibrary/CourseData/MOBoundary` folder, create a map of dangerous buildings in Kansas City using ArcGIS and a simple map of Missouri using `R`. Your entire project folder system, including notebook output, ArcGIS map document, and map images, should be uploaded to GitHub by Monday, February 19th at 4:15pm.

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. It also makes sure that data is stored as efficiently as possible by removing unneeded data. Make sure you delete feature classes before making a commit! Otherwise you will bloat the size of your repository with unneeded data.

1. In your course folder system, find the `Labs/Lab-03` subdirectory and add folders within it called `docs`, `data`, `maps`, and `results`.
2. Open ArcCatalog and then:
   (a) Copy and paste the geodatabase `KansasCity.gdb`[1] from the course `DataLibrary` folder into `Labs/Lab-03/data`.
   (b) In the **copy** of `KansasCity.gdb` stored in `Labs/Lab-03/data`, delete the following feature classes:[2] `KC_ASSESSING_ParcelsVacant`, all of the `PUBLICSAFTEY` parcels, and `KC_RECREATION_ParkBoundaries`.
   (c) Copy and paste the shapefile `MO_BOUNDARY_State.shp` from the course `DataLibrary` folder into `Labs/Lab-03/data`.
3. Open RStudio and then:
   (a) Add an R Project to the `Labs/Lab-03` subdirectory. Then create a new R Notebook and save it to the `docs` folder you created above. Make sure it is fully set-up following the workflow we have been using.

[1] You may have to connect your external drive to ArcGIS as we did during LP-04.

[2] *Hint:* right click on each feature class and then choose Delete.

(b) Create a new text file (File ▷ New File ▷ Text File). When you save the document, save it in `Labs/Lab-03` and name it `README.md`. In the document, use Markdown formatting to describe the contents of `Labs/Lab-03` folder: What does it contain? Why was it created? Where did the data come from?[3]

4. Open ArcGIS and then create a new, blank map document. Make sure that it is saved in the `maps` folder you created above.

[3] You can be literal here for now - "These data came from the course data release."

Part 1: Basic Maps in R

The goal of this section is to be able to produce a very simple map in `R` by importing a shapefile using `sf` and plotting it using `ggplot2`.

8. In your R Notebook, import the shapefile `MO_BOUNDARY_State.shp` from where it is saved in `Labs/Lab-03/data`.

9. Using `ggplot2`, map the state boundary data using the hex color `#5d5d5d` for both the fill and the outline. Using a `dpi` of 300, save this plot to your `results` folder.

Part 2: Kansas City Basemap

The goal of this section is to be able to create a reference map showing Kansas City Council Districts in the context of major elements of the City's human and physical geography as well as the surrounding counties.

10. In the ArcGIS map document you have already created, rename the data frame to "Basemap".[4]

11. Add the following layers to your map from `KansasCity.gdb`[5] in this order[6] and symbolize them with the listed attributes:

    (a) City Boundary - no fill, Dark Navy outline with width = 1.6

    (b) Major Bodies of Water - "Lake" pre-set symbol

    (c) Council Districts - no fill, Dark Navy outline with width = 0.8

    (d) Street Centerlines - 20% Gray color with width = 0.1

    (e) Council Districts - white fill with no outline (width = 0)

    (f) Surrounding Counties - 10% Gray fill, 60% Gray outline with width = 0.4

[4] *Hint:* Double click on the data frame and choose the General tab. The name can be edited in the Name field.

[5] Make sure to use the copy you saved in your `data` subdirectory for this specific assignment!

[6] *Hint:* Item (a) below should be the top/highest layer in the Table of Contents follow by item (b) and so on. Item (f) should be the bottom/lowest layer in the Table of Contents.

12. Label the council districts using the top council district layer using the `DISTRICT` attribute. Use Arial size 10 font and the halo mask style. Use the expression creator to add the word "District" to the label for each council district.
13. Zoom to the city boundary layer.
14. Export the map as a `pdf` file at 300 dpi.[7]

[7] *Hint:* File ▷ Export Map...

Part 3: Dangerous Buildings in Kansas City

The goal of this section is to be able to create a thematic map plotting the location of buildings determined to be structurally unstable or otherwise dangerous.

15. Add a new data frame to your map document[8] and name it "Dangerous Buildings"
16. Copy and Paste all of the layers from your "Basemap" data frame into the "Dangerous Buildings" data frame.
17. Add the dangerous buildings layer from `KansasCity.gdb`[9] to the top of your layer hierarchy. Symbolize it with the "Circle 2" pre-set symbol. Change the color to Mars Red and the size to 6.
18. Zoom to the city boundary layer.
19. Export the map as a `pdf` file at 300 dpi.

[8] *Hint:* Insert ▷ Data Frame

[9] Make sure to use the copy you saved in your `data` subdirectory for this specific assignment!