Environmental Justice Data Exploration

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Introduction

This quarto document explores environmental justice issues in NorthEast Los Angeles (NELA), specifically Eagle Rock, Highland Park, Glassell Park, Cypress Park, Atwater Village, Montecito Heights, Lincoln Heights, El Sereno, and Mount Washington. There is some dispute about the official Los Angeles neighborhoods that make up NELA, so Matsuoka & Urquiza's NELA definition was utilized for this analysis (2021). NELA is an interesting case study to analyze as it is ethnically diverse and can act as a representation for what may be occuring across the United States.

Adding the necessary libraries:

```
library(tidyverse)
library(sf)
library(here)
library(tmap)
```

Import data

```
# Read in geodatabase of EJScreen data at the Census Block Group level
ejscreen <- sf::st_read(here::here("data",
                                   "ejscreen",

"EJSCREEN_2023_BG_StatePct_with_AS_CNMI_GU_VI.gdb"))

# Read in Los Angeles neighnorhood shape file
la_neighborhood <- sf::st_read(here::here("LA_Times_Neighborhood_Boundaries-
shp",
                                          "8494cd42-db48-4af1-a215-
a2c8f61e96a22020328-1-621do0.x5yiu.shp"))
```

Subset Data

Changing column names to lower_snake

```
ejscreen <- janitor::clean_names(ejscreen)
```

Filter for Los Angeles County

```
los_angeles <- ejscreen |>
  filter(cnty_name == "Los Angeles County")
```

Filter for NELA neighborhoods

```
la_neighborhood <- la_neighborhood |>
  filter(name == "Eagle Rock" |
           name == "Highland Park" |
```

```
            name == "Mount Washington" |
            name == "Glassell Park" |
            name == "Cypress Park"|
            name == "Montecito Heights"|
            name == "Atwater Village"|
            name == "Lincoln Heights"|
            name == "El Sereno"  )
```

Data Manipulation

Changing the measure from 0-1 to 0-100

```
los_angeles <- los_angeles |>
  mutate(poc_ile = (peopcolorpct * 100))
```

CRS Match

Check the CRS of the different layers that will be utilized to create maps.

Note: The outputs are hidden as they are cumbersome to read.

```
st_crs(la_neighborhood)

st_crs(los_angeles)
```

The CRS do not match for the two dataframes. Change the CRS of the la_neighborhood to the CRS of the environmental justice data since WGS 84 Pseudo-Mercator presents accurate representations of 2-D maps.

```
# Set the CRS to that of the environmental justice data
la_neighborhood <- st_transform(la_neighborhood, crs = st_crs(los_angeles))
```

Check if the CRS match

```
# Set the CRS to equal each other in a boolean to make sure they are the same
if (st_crs(los_angeles)==st_crs(la_neighborhood)){
  print("it's a match!")
}else {
   warning("still not a match")
}

[1] "it's a match!"
```

Visualize Data

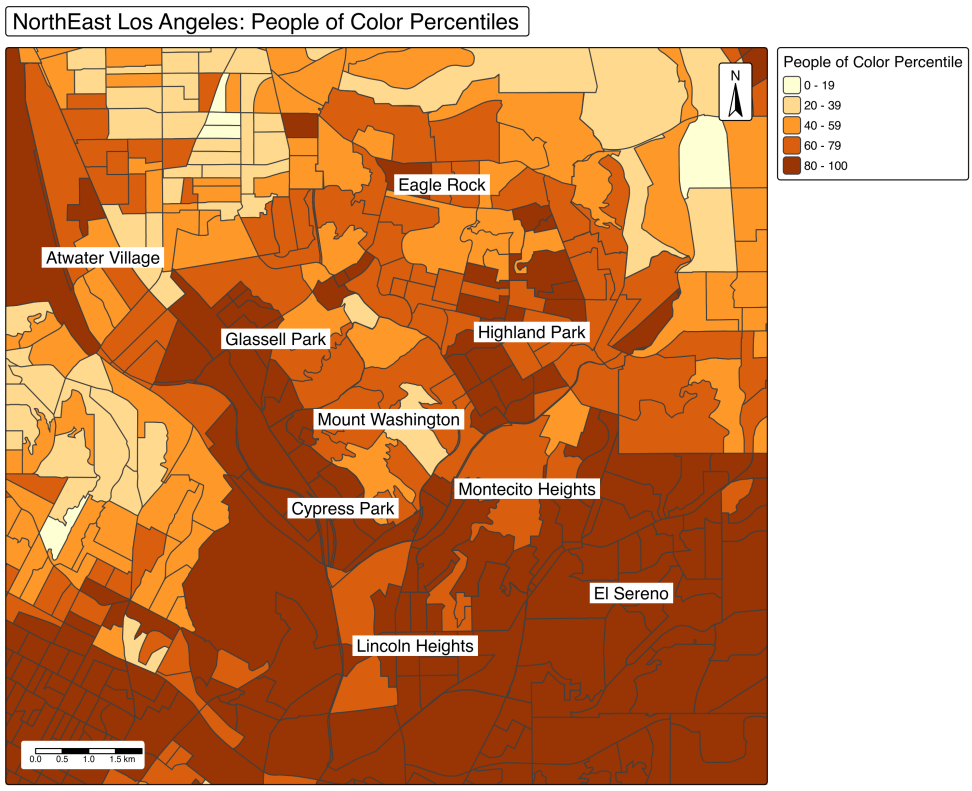
Map: People of Color Percentile in NorthEast Los Angeles

```
 poc_percentiles <- tm_shape(los_angeles)+
  tm_polygons(fill = "poc_ile",
              fill.scale = tm_scale(values = "brewer.YlOrBr"),
              fill.legend = tm_legend(title = "People of Color Percentile"))
```

```
+
tm_shape(la_neighborhood, is.main = TRUE) + # is.main to set the size of map
  tm_borders() + # Use tm_borders so the layer under is visible
  tm_text("name", # Name helps distinguish what part of LA is being mapped
          shadow = TRUE,
          bgcol = "white") +
  tm_title(text = "NorthEast Los Angeles: People of Color Percentiles",
           frame = TRUE)+
  tm_compass(position = c("right", "top"),
             bg = TRUE,
             bg.color = "white",
             frame = TRUE)+
  tm_scale_bar(position = c("left", "bottom"),
               bg = TRUE,
               bg.col = "white")

# Save map and define the size
tmap_save(poc_percentiles,
          here::here("maps", "poc_percentiles.png"),
          height = 8,
          width = 14)

# Show map in the quarto doc
print(poc_percentiles)
```

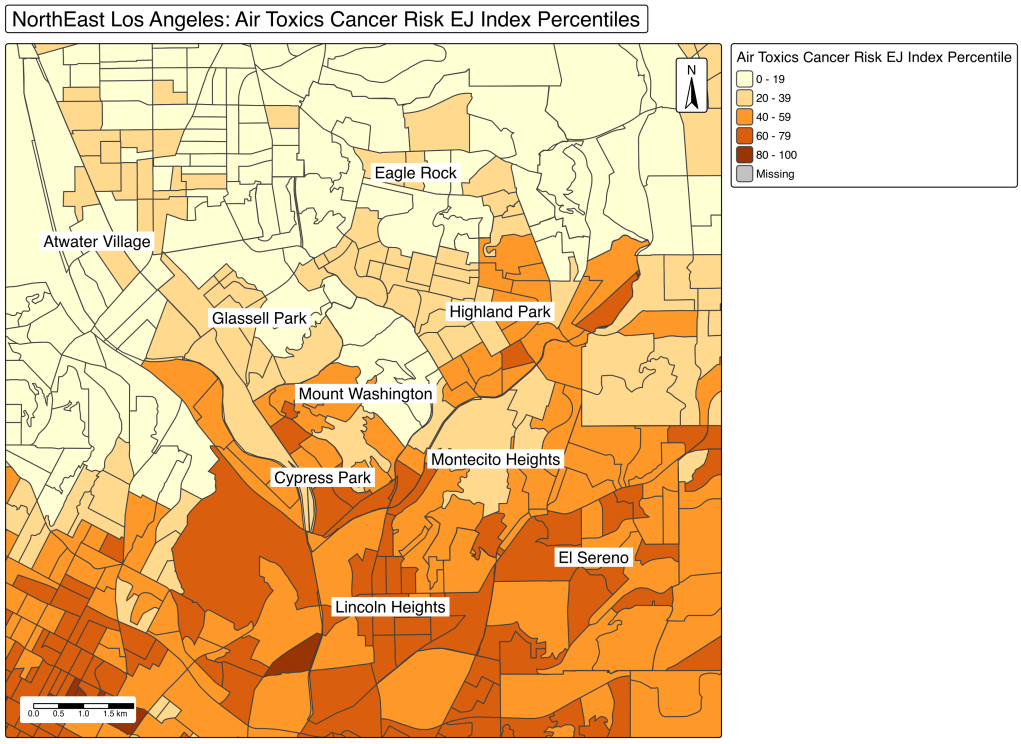


Map: Air Toxics Cancer Risk Percentile, an Environmental Justice (EJ) Index in NorthEast Los Angeles

```
air_cancer_risk <- tm_shape(los_angeles)+
  tm_polygons(fill = "d2_cancer",
              fill.scale = tm_scale(values = "brewer.YlOrBr"),
              fill.legend = tm_legend(title = "Air Toxics Cancer Risk EJ
Index Percentile")) +
tm_shape(la_neighborhood, is.main = TRUE) + #is.main to set the size of the
map
  tm_borders() + # Use tm_borders so the layer under is visible
  tm_text("name", # Name helps distinguish what part of LA is being mapped
          shadow = TRUE,
          bgcol = "white") +
  tm_title(text = "NorthEast Los Angeles: Air Toxics Cancer Risk EJ Index
Percentiles",
           frame = TRUE)+
  tm_compass(position = c("right", "top"),
             bg = TRUE,
             bg.color = "white",
             frame = TRUE) +
  tm_scale_bar(position = c("left", "bottom"),
               bg = TRUE,
               bg.col = "white")

# Save map and define the size
tmap_save(air_cancer_risk,
          here::here("maps", "air_cancer_risk.png"),
          height = 8,
          width = 14)

# Show map in the quarto doc
print(air_cancer_risk)
```



Map Interpretation

The first graph above shows the percentile of people of color for each Census block. The second graph shows the percentile of air toxics cancer risk environmental justice index. The opacity of the orange darkens as the percentiles increase. The air toxics cancer risk environmental justice index is based on the estimated risk of inhaling carcinogens in the ambient air. There is an apparent correlation showing that the higher the percentile of people of color that live in an area, the more likely a community is to have a higher percentile for air toxics cancer risk environmental justice index. In other words, people of color are exposed to cancer risks from their ambient environment at a higher rate.

Though disheartening, the finding that people of color live where environmental pollution health risks are greater raises awareness of the issue and is the first step to making policy change that can help offset injust risks. Air toxics is just one of the many environmental justice indices. Further analysis of the distribution of risks ranging from toxic wastewater discharge to lead paint in homes can help show accumulated environmental risks for people of color and shows the immediate need for intervention to reduce negative outcomes for marginalized communities.

References

- LA Times. (2016). LA Times Neighborhood Boundaries. Retrieved from URL
- Matsuoka, Martha & Urquiza, John. (2021). Building community knowledge, resilience and resistance through research. GeoJournal. 87. 10.1007/s10708-021-10422-5.
- United States Environmental Protection Agency. 2015. EJSCREEN. Retrieved: October 2, 2025, from www.epa.gov/ejscreen
- U.S. Environmental Protection Agency (EPA), 2023. EJScreen Technical Documentation.