Map making Practice (EDS223-HW1)

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0.1 Exploring environmental (in)justice

Air quality plays a crucial role in human health and often reflects patterns of environmental injustice, especially in communities exposed to high levels of airborne toxins. In this activity, we will explore air toxic cancer risk and the distribution of air toxins across Los Angeles County.

Objective: Practice using `tmap` package to create two maps that communicant an environmental justice issue in California and Los Angeles County.

0.1.0.1 Load packages and read in geodatabase

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

```
# 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"))
```

```
Reading layer `EJSCREEN_StatePctiles_with_AS_CNMI_GU_VI' from data source
  `C:\Users\Donaji\Documents\MEDS\EDS-223\HomeWork\EDS223-HW1\data\ejscreen\EJSCREEN_2023_BG_S
  using driver `OpenFileGDB'
Simple feature collection with 243021 features and 223 fields
```

```
Geometry type: MULTIPOLYGON
Dimension:     XY
Bounding box:  xmin: -19951910 ymin: -1617130 xmax: 16259830 ymax: 11554350
Projected CRS: WGS 84 / Pseudo-Mercator
```

```r
# filter to a state you are interested in
california <- ejscreen %>%
  dplyr::filter(ST_ABBREV == "CA")

# filter to a county you are interested in
Los_Angeles <- ejscreen %>%
  dplyr::filter(CNTY_NAME %in% c("Los Angeles County"))

# find the average values for all variables within counties
california_counties <- aggregate(
  california, by = list(california$CNTY_NAME), FUN = mean)
```

0.1.1 Visualize data

0.2 Map one displays the precentile for Toxic Release to Air EJ Index in LA County.

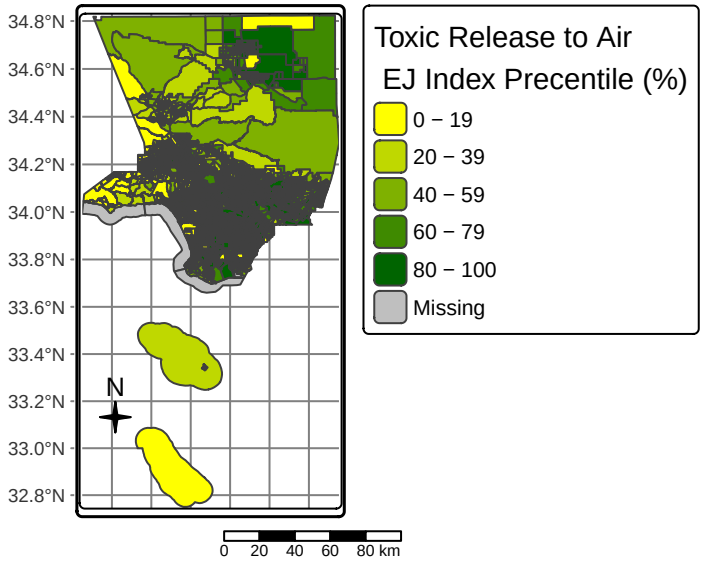
```r
# Map one
tm_shape(Los_Angeles) +
  tm_graticules() +
  tm_polygons("P_D2_RSEI_AIR",
              fill.legend = tm_legend("Toxic Release to Air\n EJ Index Precentile (%)"),
              fill.scale = tm_scale(values = c("yellow", "darkgreen"))) +

tm_compass(type = "4star", size = 1, position = c(-0, 0.3)) +

tm_scalebar(position = c(0.5,0)) +

tm_title("Precentile of Toxic Release across LA county", size = 1) +
  tm_layout(component.autoscale = FALSE, frame.double_line = TRUE)
```

Precentile of Toxic Release across LA county



Map two: Looks at the precential for Air toxic cancer risk

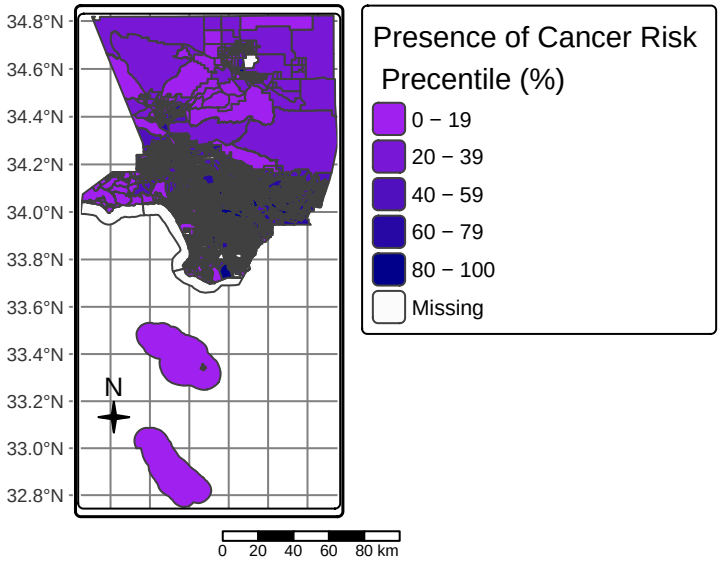
```
# Map 2
tmap_mode("plot") +
tm_shape(Los_Angeles) +
  tm_graticules() +
  tm_polygons(fill = "P_D2_CANCER",
              fill.scale = tm_scale(values = c("purple", "darkblue")),
              fill.legend = tm_legend(title = "Presence of Cancer Risk \n Precentile (%)")) +

tm_compass(type = "4star", size = 1, position = c(-0, 0.3)) +

tm_scalebar(position = c(0.5,0)) +

tm_title("Where the Air is Most Toxic: Cancer Risk Across LA County", size = 1) +
  tm_layout(component.autoscale = FALSE, frame.double_line = TRUE)
```

ere the Air is Most Toxic: Cancer Risk Across LA County



0.2.1 Data Citations

United States Environmental Protection Agency. 2015. EJSCREEN. Retrieved: October, 06, 2025, from HERE