Identifying Hazardous Waste concentration in Low income communites in Plumas County

EDS 223 - Homework 1

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This projects goal is to identify the relationship between Hazardous Waste and Low income communities in Plumas County using data from the US Environmental Protection Agency's EJScreen mapping tool.

1. Load Packages

```
# First library required packages
library(tidyverse)
library(sf)
library(here)
library(sf) # for vector data (more soon!)
library(stars) # for raster data (more soon!)
library(tmap) # for static and interactive maps
```

2. 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_CNM
```

3. Selecting County in CA

```r
# filter to California
california <- ejscreen %>%
  dplyr::filter(ST_ABBREV == "CA")

# filter to Plumas County
plumas <- ejscreen %>%
  dplyr::filter(CNTY_NAME %in% c("Plumas County"))

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

5. Visualize data using the tmap Package

Map 1: Percentage of low income people

```r
map1 <- tm_shape(plumas) +
  tm_graticules() +
  # Add Percentage of low income people shape
  tm_polygons(
    fill = "LOWINCPCT",
    fill.legend = tm_legend(title = "Ratio of Low Income People"),
    col = "gray70") +
  # Compass and Scale bar
  tm_compass(position = tm_pos_in("right", "top")) +
  tm_scalebar(position = tm_pos_in("center", "top")) +
  # Title
  tm_title(
    text = "Map 1: Low Income People in Plumas County",
    size = 1.1
  )
```

Map 2: Proximity to Hazardous Waste

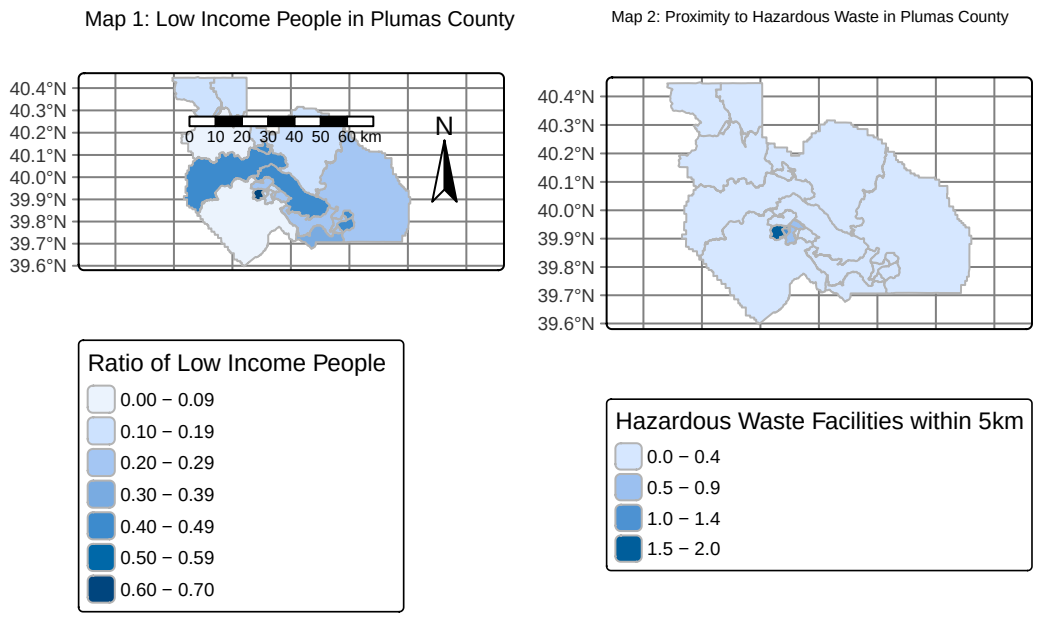
```r
# Add proximity to hazardous waste shape
map2 <- tm_shape(plumas) +
  tm_graticules() +
  tm_polygons(
  fill = "PTSDF",
```

```
  fill.legend = tm_legend(title = "Hazardous Waste Facilities within 5km"),
  col = "gray70") +
# Title
tm_title(
    text = "Map 2: Proximity to Hazardous Waste in Plumas County",
    size = 1.2
  )
```

6. Side by Side map comparison

```
tmap_arrange(map1, map2, ncol = 2)
```

```
[plot mode] fit legend/component: Some legend items or map compoments do not
fit well, and are therefore rescaled.
i Set the tmap option `component.autoscale = FALSE` to disable rescaling.
[plot mode] fit legend/component: Some legend items or map compoments do not
fit well, and are therefore rescaled.
i Set the tmap option `component.autoscale = FALSE` to disable rescaling.
```



7. Map Interpretation

This side by side comparison of Plumas county shows the relationship between low income and hazardous waste. The dark blue area in the middle of both maps represents the town of Quincy, an area that much of the county industry, waste management and as shown, low income population are located in.

Residents of low-income areas such as Quincy, suffer a greater burden of hazardous waste and pollution. Much of the time industry and waste management facilities choose undesirable sites in communities with lesser resources to mount an effective challenge. The lack of political influence and financial resources make low income areas vulnerable, ultimately leading to the environmental injustice of, in this case, unfair proximity to hazardous waste.

While Plumas county contains other areas with large populations of low income people, Quincy is the only area where low income is the majority, as well as where people are living the closest to hazardous waste.

Data Citation

United States Environmental Protection Agency. 2015. EJSCREEN. Retrieved: 10/5/2025, from data file given by EDS 223 instructors.