Reading Spatial Data in R

HES 505 Fall 2024: Session 4

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Objectives

1. Revisit the components of spatial data
2. Describe some of the key considerations for thinking about spatial data
3. Introduce the two primary R packages for spatial workflows
4. Learn to read and explore spatial objects in R

Questions from Monday

- Why do we need a projection for calculations on a computer?
- What does it mean that a raster's geometry is implicit?

Reviewing Spatial Data

Let's Kahoot!

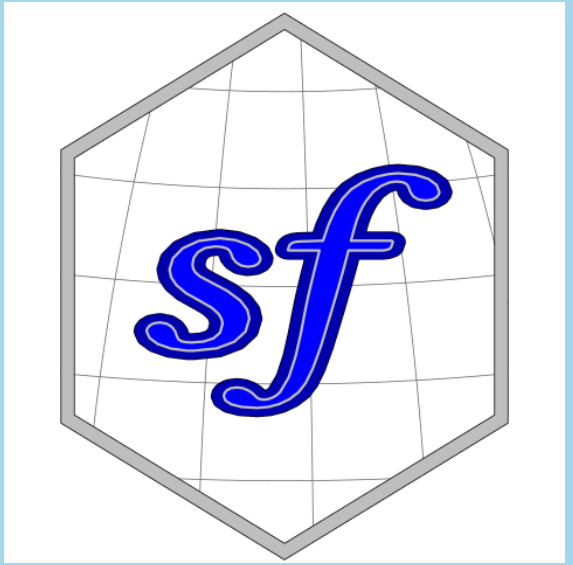
https://create.kahoot.it/share/isdr-session-4/888711f4-50a3-4732-a707-cbf68d9ae9dc

Mapping Location in R

Data Types and R Packages

Data Types

- Vector Data
  - Point features
  - Line features
  - Area features (polygons)
- Raster Data
  - Spatially continuous field
  - Based on pixels (not points)



Reading in Spatial Data: spreadsheets

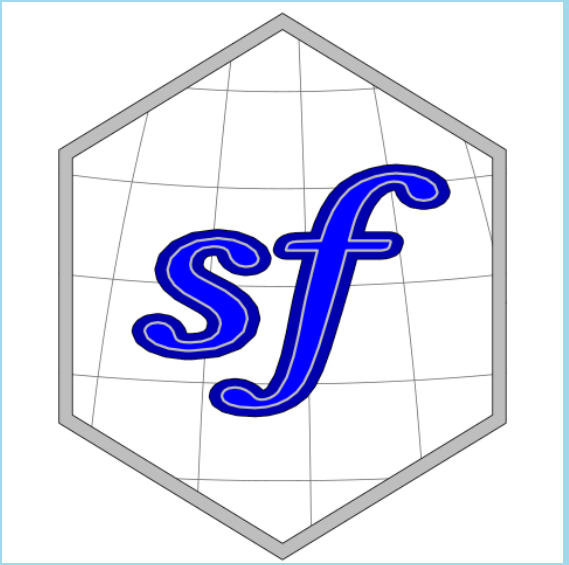
- Most basic form of spatial data
- Need `x` (longitude) and `y` (latitude) as columns
- Need to know your CRS
- `read_***` necessary to bring in the data

```
library(tidyverse)
library(sf)

file.to.read <- read_csv(file = "path/to/your/file",
                         col_names = TRUE, col_types = NULL,
                         na =na = c("", "NA"))

file.as.sf <- st_as_sf(file.to.read,
                       coords = c("longitude", "latitude"),
                       crs=4326)
```

Reading in Spatial Data: shapefiles

Reading in Spatial Data: shapefiles

```
1 library(sf)
2 shapefile.inR <- read_sf(dsn = "path/to/f
```



Reading in Spatial Data: rasters

- `rast` will read rasters using the `terra` package
- Also used to create rasters from scratch
- Returns `SpatRaster` object

```
1 library(terra)
2 raster.inR <- rast(x = "path/to/file.tif",
3                    lyrs=NULL)
```

Introducing the Data

- Good idea to get to know your data before manipulating it
- `str`, `summary`, `nrow`, `ncol` are good places to start
- `st_crs` (for `sf` class objects) and `crs` (for `SpatRaster` objects)
- We'll practice a few of these now…

Saving your data

- `write_sf` for `sf` objects; `writeRaster` for `SpatRasters`

```
1 library(sf)
2 library(terra)
3
4 write_sf(object = object.to.save, dsn = "path/to/save/object", appe
5 writeRaster(x=object, filename = "path/to/save")
```