

Introduction to Spatial Data Programming

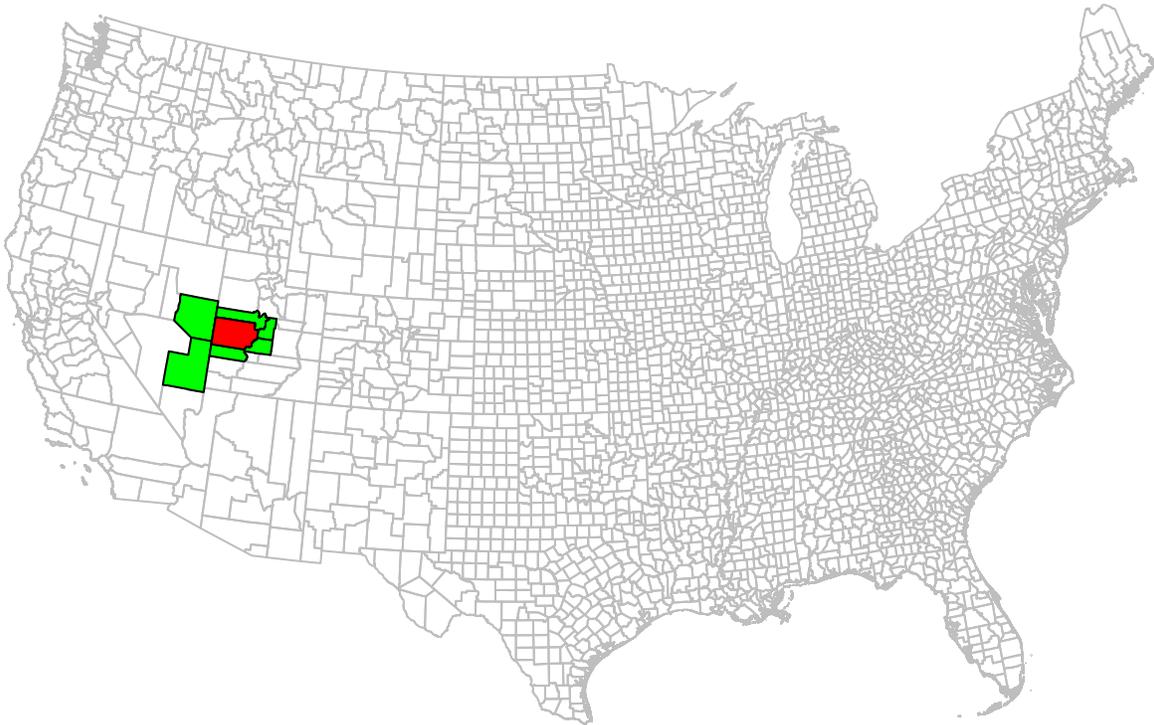
Exercise 4

Vector layers & Geometric operations with vector layers

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Question 1

- **Read** the Shapefile of US counties named `USA_2_GADM_fips`
- **Reproject** the layer to the US National Atlas projection (like we did in **Lesson 7**)
- **Choose** a county whose name (`NAME_2` attribute) starts with the same letter as your first name
- Note: there may be more than one county with the same `NAME_2` value in different states (`NAME_1`), in which case you need to choose one state
- **Plot** the US counties (in grey), with the county you chose highlighted (in red), and all bordering counties of the county you chose (in green)
- Note: use a 1 m buffer around the county you chose and subset all counties which intersect with the “buffered” county you chose



(50 points)

Question 2

- Write an **expression** that creates the following `data.frame` object with the longitude and latitude of four cities in Israel. You can copy and paste the coordinates given below
- **Replace** the fourth city ("Modiin") with a different city in Israel of your **choice**, whose name starts with the the same letter as your first name. Replace the coordinates accordingly; you can find out the longitude and latitude of the city you chose using `maps.google.com` or any other web service

```
##      name      lon      lat
## 1 Tel-Aviv 34.78177 32.08530
## 2 Jerusalem 35.21371 31.76832
## 3 Beer-Sheva 34.79146 31.25297
## 4      Modiin 35.00970 31.89177
```

- **Calculate** a pairwise distance matrix between these cities, of class `units` and in kilometers
- Note: the matrix needs to have the appropriate column and row names, as shown below

```
## Units: km
##      Tel-Aviv Jerusalem Beer-Sheva  Modiin
## Tel-Aviv    0.00000  53.88850  92.29386  30.40583
## Jerusalem  53.88850   0.00000  69.81292  23.67241
## Beer-Sheva 92.29386  69.81292   0.00000  73.79716
## Modiin     30.40583  23.67241  73.79716   0.00000
```

(50 points)