

# Utah Car Accidents Data and Code

Kenneth Pomeyie, Scout Jarman, Paul Gaona-Partida

## Load Libraries and Data file

```
# For Data Cleaning and Visualization
library("dplyr")

## Warning: package 'dplyr' was built under R version 4.1.1
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##   filter, lag
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
library("tigris")

## Warning: package 'tigris' was built under R version 4.1.1
## To enable
## caching of data, set `options(tigris_use_cache = TRUE)` in your R script or .Rprofile.
library("ggplot2")

## Warning: package 'ggplot2' was built under R version 4.1.1
library("sf")

## Warning: package 'sf' was built under R version 4.1.1
## Linking to GEOS 3.9.1, GDAL 3.2.3, PROJ 7.2.1; sf_use_s2() is TRUE
# For AOI and climateR
library('lattice')

## Warning: package 'lattice' was built under R version 4.1.1
library("raster")

## Warning: package 'raster' was built under R version 4.1.1
## Loading required package: sp
## Warning: package 'sp' was built under R version 4.1.1
##
## Attaching package: 'raster'
## The following object is masked from 'package:dplyr':
```

```
##
##      select
library("rasterVis")

## Warning: package 'rasterVis' was built under R version 4.1.1
library("AOI")

##
## Attaching package: 'AOI'
## The following object is masked from 'package:tigris':
##
##      list_states
library("climateR")

crash <- read.csv("RawCrashData2020.csv")
```

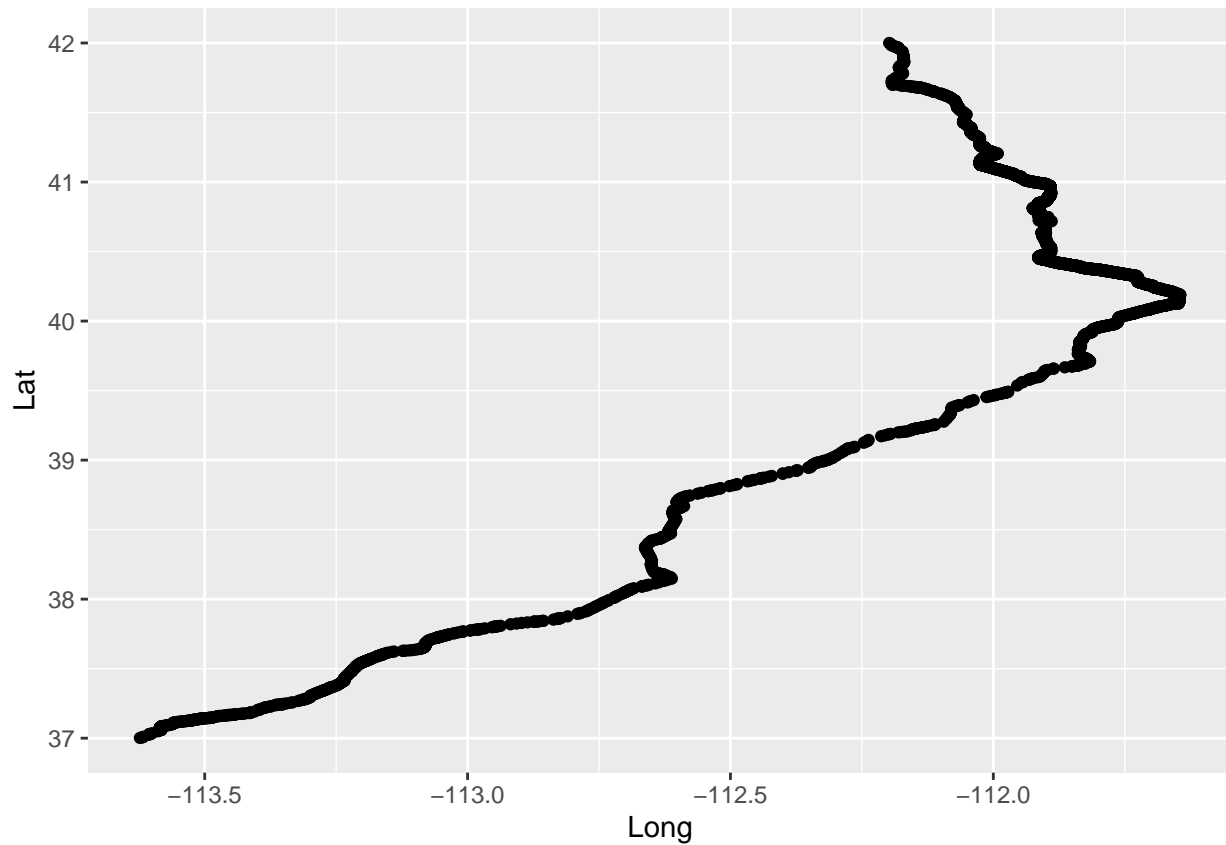
## Data Prepping

### Car Accidents

```
# subset to retain only potentially useful information
# Route: I-15 Highway route
# milepoint: Milepoint of accident
# Coords: Lat and Long

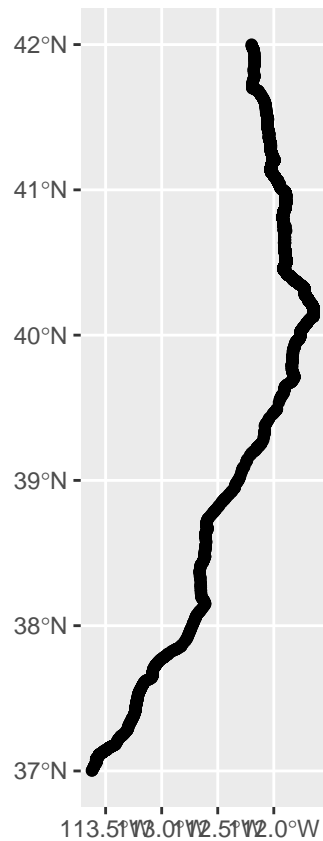
crash_i15 <- crash %>%
  dplyr::select(.,Route,Milepoint,Lat,Long) %>%
  dplyr::filter(Route == "0015")

# Basic plot of points of accidents
ggplot()+
  geom_point(data = crash_i15,
            aes(x = Long, y = Lat))
```



```
# Sf with NAD83 matches CRS of Utah map and Roads  
i15_spat <- sf::st_as_sf(x = crash_i15,  
                        coords = c( "Long", "Lat"),  
                        crs = 4269)
```

```
# Plot of spatial object crashes  
crash_plot <- ggplot(i15_spat) +  
  geom_sf()  
crash_plot
```



## Roads

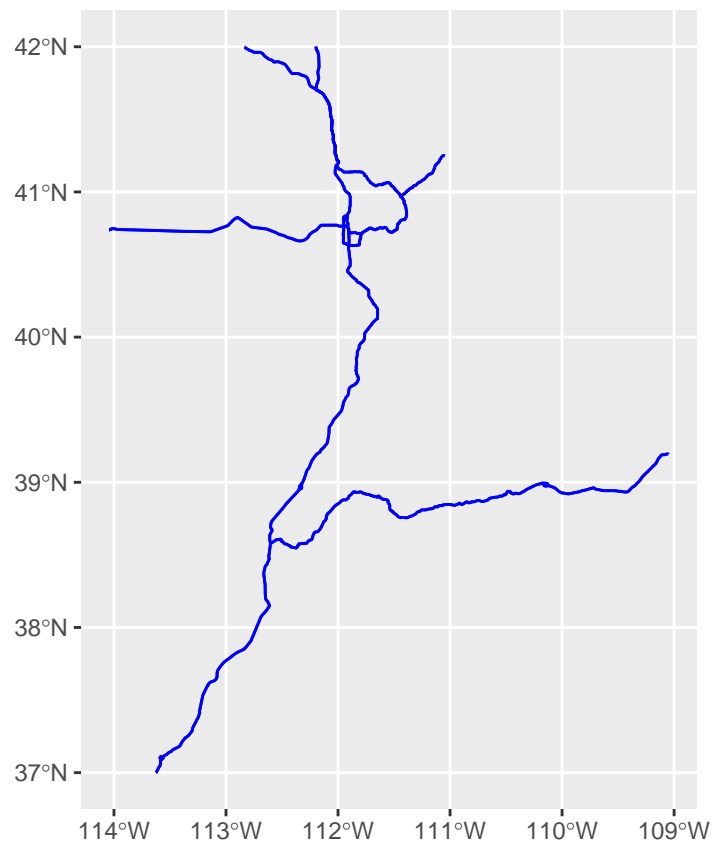
[https://www2.census.gov/geo/pdfs/maps-data/data/tiger/tgrshp2020/TGRSHP2020\\_TechDoc.pdf](https://www2.census.gov/geo/pdfs/maps-data/data/tiger/tgrshp2020/TGRSHP2020_TechDoc.pdf)

Link: Census.gov information on Tigris shapefiles

Important: Original CRS = NAD83

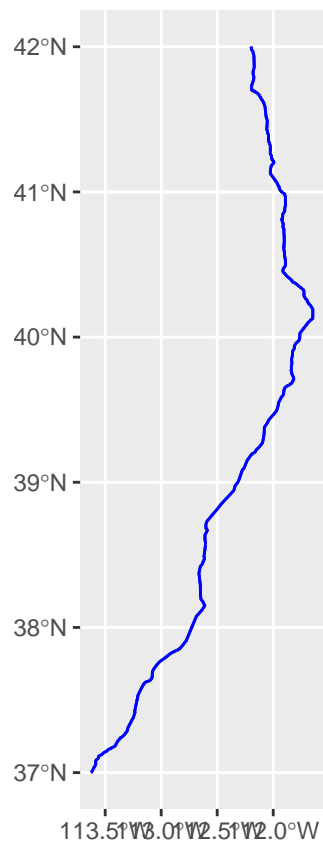
```
# subset of Interstates in Utah
roads <- tigris::primary_secondary_roads("Utah") %>%
  dplyr::filter(RTTYP %in% c('I'))
```

```
## |
# plot of ALL Interstates in Utah (Utah not fitted)
ggplot()+
  geom_sf(data = roads,
    color = 'blue',
    aes(geometry = geometry))
```



```
# subset of I-15 and convert to MultiLineString
roads_i15 <- roads[which(roads$FULLNAME == "I- 15"), ] %>%
  sf::st_cast(., "MULTILINESTRING")
```

```
# plot of i-15 in Utah (Interstate only)
road_plot <- ggplot()+
  geom_sf(data = roads_i15,
    color = 'blue',
    aes(geometry = geometry))
road_plot
```



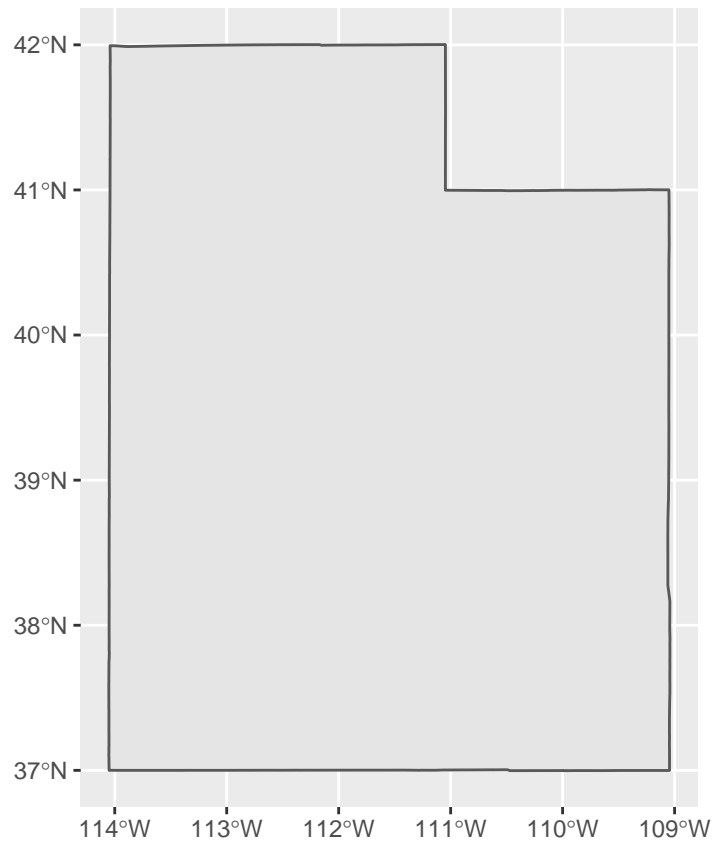
## Utah

```
# sf of USA
us_geo <- tigris::states(class = "sf", cb = TRUE) %>%
  shift_geometry()

## |

# Subsetting to Utah and changing crs to match roads in Utah
ut_map <- us_geo[which(us_geo$NAME == "Utah"), ] %>%
  st_transform(. ,crs = st_crs(roads_i15))

# plot of Utah
ut_plot <- ggplot(ut_map) +
  geom_sf()
ut_plot
```



*# plot of Utah, I-15, and Car Accidents*

```
all_plot <- ggplot(ut_map)+  
  geom_sf(fill = NA)+  
  geom_sf(data = roads_i15,  
          color = 'red') +  
  geom_sf(data = i15_spat,  
          color = 'blue',  
          alpha = 0.05)  
all_plot
```

