Mini Project #1

```
# Load in libraries
library(tidyverse)
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.4     v readr     2.1.5
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.1     v tibble    3.2.1
v lubridate 1.9.3     v tidyr     1.3.1
v purrr     1.0.2
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to becor
```

```
library(maps)
```

```
Attaching package: 'maps'

The following object is masked from 'package:purrr':

    map
```

```
library(viridis)
```

```
Loading required package: viridisLite

Attaching package: 'viridis'

The following object is masked from 'package:maps':
```

unemp

```
library(statebins)
library(leaflet)
library(sf)
```

```
Linking to GEOS 3.11.0, GDAL 3.5.3, PROJ 9.1.0; sf_use_s2() is TRUE
```

```
library(htmltools)
library(glue)
library(readr)
```

```
# Load in datasets
decennial_census10 <- read_csv("Data/DECENNIALCD1162010.P1-Data.csv")
```

```
New names:
Rows: 53 Columns: 4
-- Column specification
-------------------------------------------------------- Delimiter: "," chr
(3): GEO_ID, NAME, P001001 lgl (1): ...4
i Use `spec()` to retrieve the full column specification for this data. i
Specify the column types or set `show_col_types = FALSE` to quiet this message.
* `` -> `...4`
```

```
decennial_census20 <- read_csv("Data/DECENNIALCD1182020.P1-Data.csv")
```

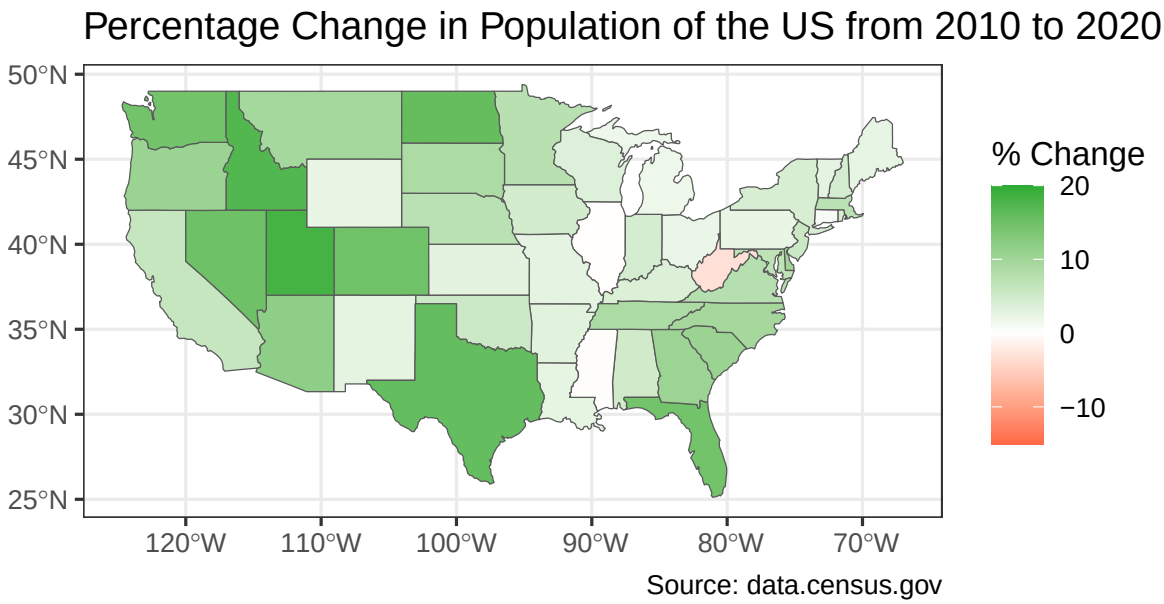
```
New names:
Rows: 53 Columns: 4
-- Column specification
-------------------------------------------------------- Delimiter: "," chr
(3): GEO_ID, NAME, P1_001N lgl (1): ...4
i Use `spec()` to retrieve the full column specification for this data. i
Specify the column types or set `show_col_types = FALSE` to quiet this message.
* `` -> `...4`
```

```
marijuana_laws2024 <- read_csv("Data/marijuana-laws-by-state-2024.csv")
```

```
Rows: 51 Columns: 4
-- Column specification --------------------------------------------------------
Delimiter: ","
chr (4): state, LegalStatus, Medicinal, Decriminalized

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```r
# Data wrangling
census_sf <- decennial_census10 |>
  left_join(decennial_census20, join_by(NAME)) |>
  rename(name = NAME,
         population20 = P1_001N,
         population10 = P001001) |>
  select(name,
         population10,
         population20) |>
  filter(!(name %in% c("Alaska",
                       "Hawaii",
                       "District of Columbia",
                       "Puerto Rico",
                       "Label for GEO_ID"))
  ) |>
  mutate(population10 = as.double(population10),
         population20 = as.double(population20),
         perc_change = (population20 - population10)/abs(population10) * 100,
         perc_change = round(perc_change, 3)) |>
  left_join(states, join_by(name)) |>
  st_as_sf()
```

```r
# First static plot
  ggplot(census_sf) +
  geom_sf(aes(fill = perc_change)) +
  scale_fill_gradient2(
    high = "#2aab32",
    mid = "white",
    low = "red",
    limits = c(-15, 20)) +
  labs(title = "Percentage Change in Population of the US from 2010 to 2020",
       fill = "% Change",
       caption = " Source: data.census.gov") +
  theme_bw()
```




```
# Load in states sf
states <- read_sf("https://rstudio.github.io/leaflet/json/us-states.geojson") ②
states
```

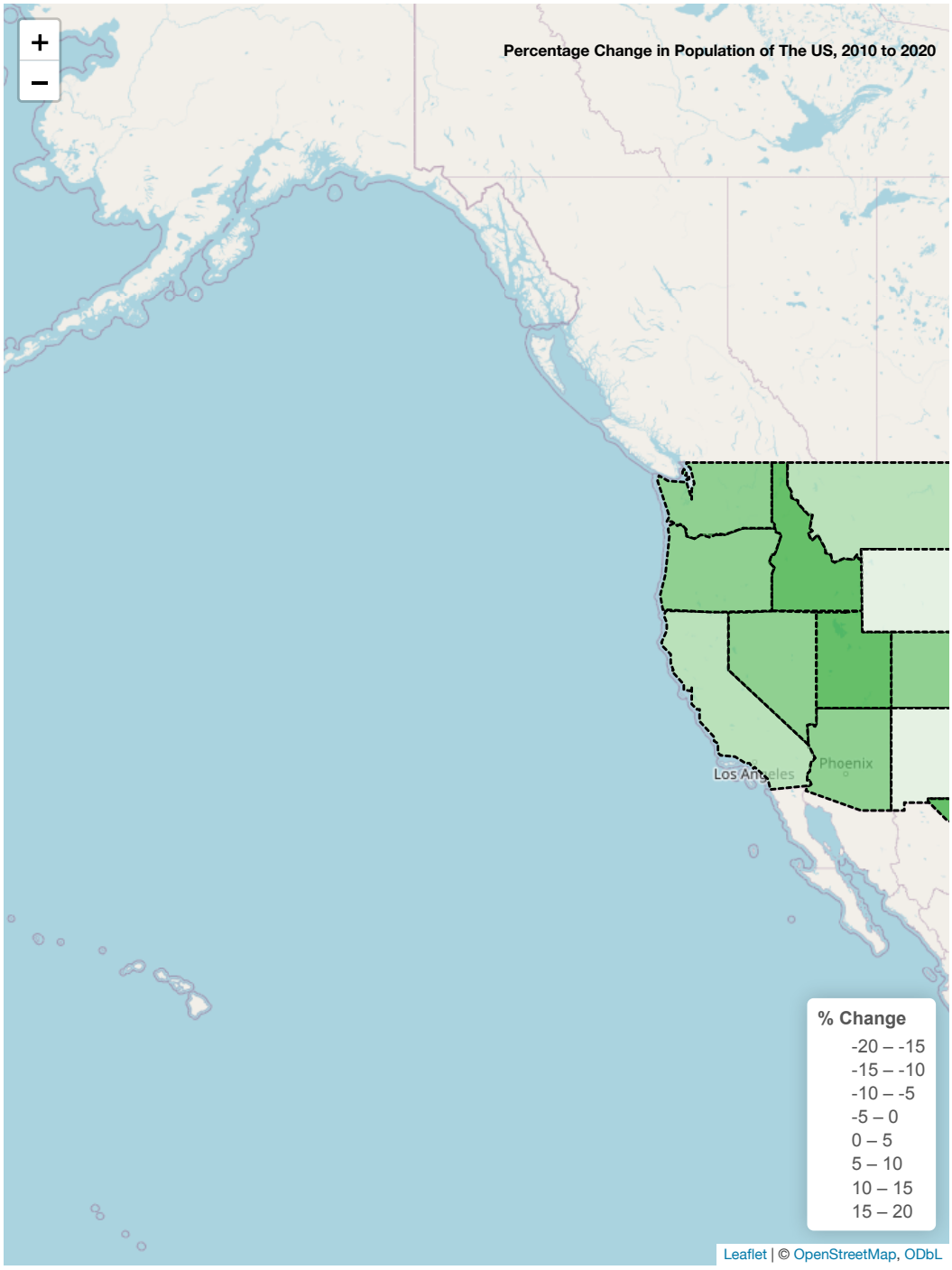
```
Simple feature collection with 52 features and 3 fields
Geometry type: MULTIPOLYGON
Dimension:     XY
Bounding box:  xmin: -188.9049 ymin: 17.92956 xmax: -65.6268 ymax: 71.35163
Geodetic CRS:  WGS 84
# A tibble: 52 x 4
   id    name                 density                                  geometry
   <chr> <chr>                  <dbl>                       <MULTIPOLYGON [°]>
 1 01    Alabama                 94.6  (((-87.3593 35.00118, -85.60667 34.98475~
 2 02    Alaska                   1.26 (((-131.602 55.11798, -131.5692 55.28229~
 3 04    Arizona                 57.0  (((-109.0425 37.00026, -109.048 31.33163~
 4 05    Arkansas                56.4  (((-94.47384 36.50186, -90.15254 36.4963~
 5 06    California             242.   (((-123.2333 42.00619, -122.3789 42.0116~
 6 08    Colorado                49.3  (((-107.9197 41.00391, -105.729 40.99843~
 7 09    Connecticut            739.   (((-73.05353 42.03905, -71.79931 42.0226~
 8 10    Delaware               464.   (((-75.41409 39.80446, -75.5072 39.68396~
```

```
 9 11    District of Columbia 10065    (((-77.03526 38.99387, -76.90929 38.8952~
10 12    Florida                353.   (((-85.49714 30.99754, -85.00421 31.0030~
# i 42 more rows
```

This is a map of the United States showing the percent change in population of the United States from 2010 to 2020 by state. On the y-axis is longitude and on the x-axis is latitude. Percent change varies from a decrease of -3% of the population to an increase of 18%, with red representing a decrease in population (a negative percentage) and green representing an increase in population (a positive percentage). We can see from this map that Utah, Idaho, and Texas had the largest percent increase in population. The states in the Midwest, such as Illinois, Iowa, Minnesota, South Dakota, Wisconsin, etc. (the 90W and 45N area), the states also had an increase in population however it is a smaller percentage. West Virginia is the only visible state that is red and this represents a decrease in population by 3.19%. For the population increase in states, this could be caused by people moving states, and more people in the United States overall.

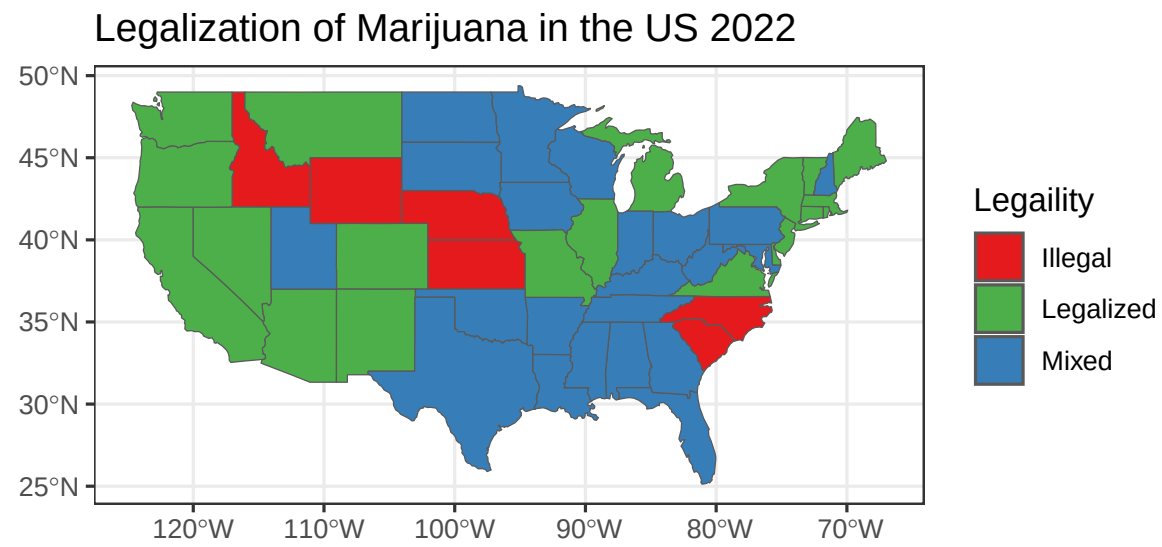
```
# First interactive plot
bins <- c(-20, -15, -10, -5, 0, 5, 10, 15, 20)
my_scale <- colorRamp(c("red", "white", "#2aab32"), interpolate="linear")
pal <- colorBin(palette = my_scale, domain = census_sf$perc_change, bins = bins)

census_sf <- census_sf |>
  mutate(labels = str_c(name, ": ", perc_change, "% Change in Population"))
  labels <- lapply(census_sf$labels, HTML)

leaflet(census_sf) |>
  setView(-96, 37.8, 4) |>
  addTiles() |>
  addPolygons(
    weight = 2,
    opacity = 1,
    color = "black",
    fillColor = ~ pal(census_sf$perc_change),
    dashArray = "3",
    fillOpacity = 0.7,
    highlightOptions = highlightOptions(
      weight = 5,
      color = "#666",
      dashArray = "",
      fillOpacity = 0.7,
      bringToFront = TRUE),
    label = labels,
```

```
    labelOptions = labelOptions(
      style = list("font-weight" = "normal", padding = "3px 8px"),
      textsize = "15px",
      direction = "auto")) |>
  addLegend(pal = pal,
            values = ~census_sf$perc_change,
            opacity = 0.7,
            title = "% Change",
            position = "bottomright") |>
  addControl("<h4>Percentage Change in Population of The US, 2010 to 2020</h4>",
             position = "topright",
             className = "map-title")
```


Percentage Change in Population of The US, 2010 to 2020
+
−
Phoenix
% Change
-20 – -15
-15 – -10
-10 – -5
-5 – 0
0 – 5
5 – 10
10 – 15
15 – 20
Leaflet | © OpenStreetMap, ODbL

```r
# Data wrangling pt. 2
marijuana_laws2024_sf <- marijuana_laws2024 |>
  mutate(legality = ifelse(LegalStatus == "Mixed" & Medicinal == "Yes" & Decriminalized == "
         legality = ifelse(LegalStatus == "Mixed" & Medicinal == "Yes" & Decriminalized == "
         legality = ifelse(LegalStatus == "Mixed" & Medicinal == "CBD Oil Only" & Decriminali
         legality = ifelse(LegalStatus == "Mixed" & Medicinal == "CBD Oil Only" & Decriminali
         legality = ifelse(LegalStatus == "Legalized" & Decriminalized == "Yes", "Legalized,
         legality = ifelse(LegalStatus == "Legalized" & Decriminalized == "No", "Legalized, r
         legality = ifelse(LegalStatus == "Fully Illegal" & Decriminalized == "No", "Illegal
         legality = ifelse(LegalStatus == "Fully Illegal" & Decriminalized == "Yes", "Illegal
         legality = ifelse(LegalStatus == "Illegal, but decriminalized" & Decriminalized == "
         LegalStatus = ifelse(LegalStatus == "Fully Illegal", "Illegal", LegalStatus),
         LegalStatus = ifelse(LegalStatus == "Illegal, but decriminalized", "Illegal", LegalS
         ) |>
  rename(name = state) |>
  filter(!(name %in% c("Alaska", "Hawaii", "District of Columbia", "Puerto Rico"))) |>
  left_join(states, join_by(name)) |>
  st_as_sf()
```

```r
# Second static plot
ggplot(marijuana_laws2024_sf) +
  geom_sf(aes(fill = LegalStatus)) +
  scale_fill_manual(values = c("#e41a1c", "#4daf4a", "#377eb8")) +
  labs(title = "Legalization of Marijuana in the US 2022",
       fill = "Legaility",
       caption = "Source: https://worldpopulationreview.com/state-rankings/marijuana-laws-by-
  theme_bw()
```



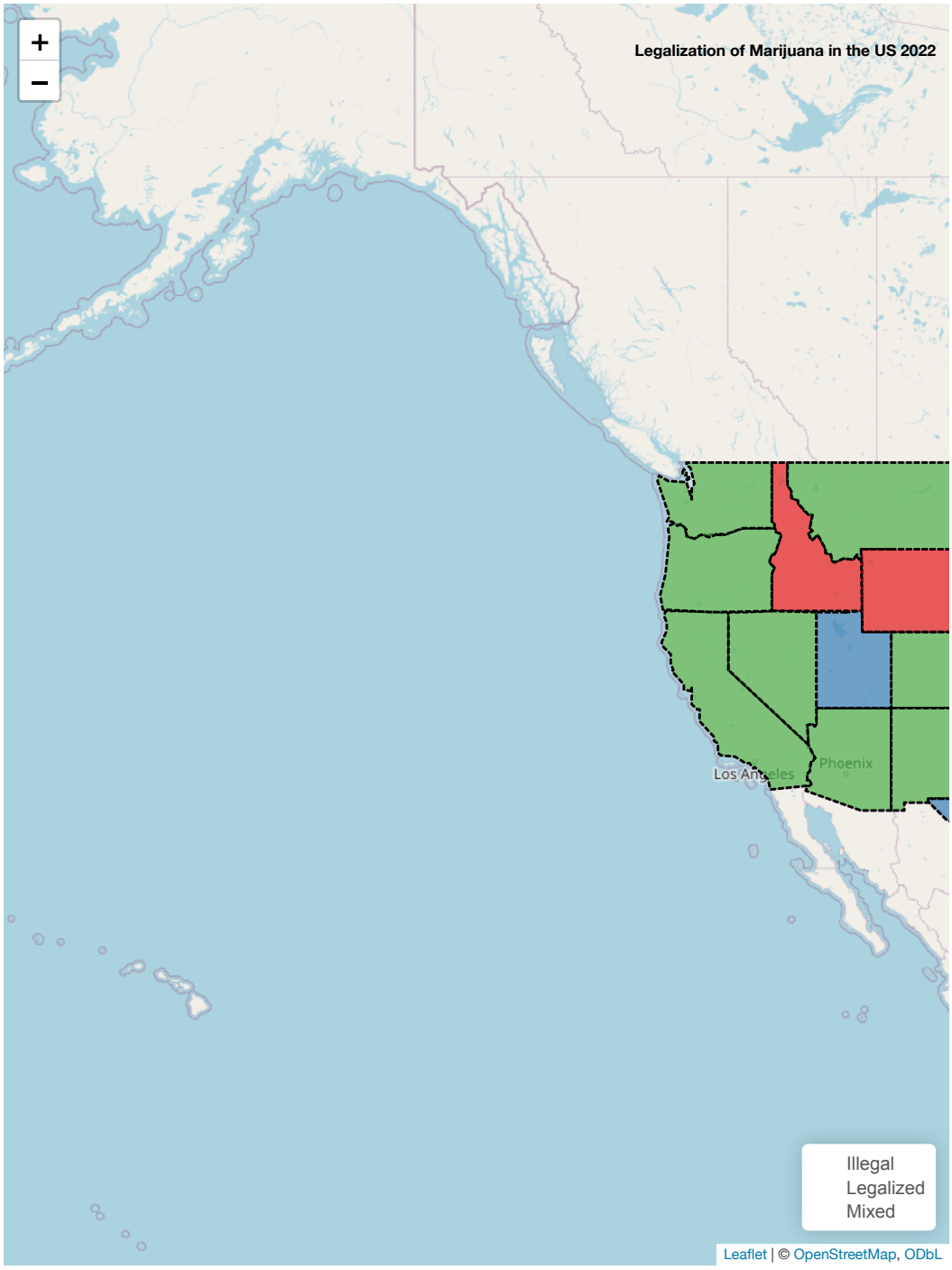
: https://worldpopulationreview.com/state−rankings/marijuana−laws−by−state

This is a map of the United States showing the legalization of marijuana in 2022. On the y-axis is longitude and on the x-axis is latitude. The categories of legality are "Illegal", "Legalized", and "Mixed", with the associated colors on the map being red, green, and blue, respectively. There are 6 states where marijuana is illegal, these states are Idaho, Kansas, Nebraska, North and South Carolina, and Wyoming. On the map, 2 of these states are on the East Coast and the rest are in the middle of the US. For the rest of the US, marijuana is either legalized or has mixed laws. A lot of the states in the west have legalized marijuana, this includes Oregon, Washington, California, along with Nevada and Arizona. There are also some states on the East Coast have also legalized marijuana. Where as states in the south and in the Midwest have mixed laws.

```
# Second interactive plot
marijuana_laws2024_sf <- marijuana_laws2024_sf |>
  mutate(labels = str_c(name, ": ", legality))

labels <- lapply(marijuana_laws2024_sf$labels, HTML)

levels(marijuana_laws2024_sf$LegalStatus)
```

```
NULL
```

```r
factpal <- colorFactor(c("#e41a1c", "#4daf4a", "#377eb8"),
                       levels(marijuana_laws2024_sf$LegalStatus))

leaflet(marijuana_laws2024_sf) |>
  setView(-96, 37.8, 4) |>
  addTiles() |>
  addPolygons(
    weight = 2,
    opacity = 1,
    color = "black",
    fillColor = ~ factpal(marijuana_laws2024_sf$LegalStatus),
    dashArray = "3",
    fillOpacity = 0.7,
    highlightOptions = highlightOptions(
      weight = 5,
      color = "#666",
      dashArray = "",
      fillOpacity = 0.7,
      bringToFront = TRUE),
    label = labels,
    labelOptions = labelOptions(
      style = list("font-weight" = "normal",
                   padding = "3px 8px"),
      textsize = "15px",
      direction = "auto")) |>
  addLegend(pal = factpal,
            values = ~marijuana_laws2024_sf$LegalStatus,
            opacity = 0.7, title = NULL,
            position = "bottomright") |>
  addControl("<h4>Legalization of Marijuana in the US 2022</h4>",
             position = "topright",
             className = "map-title")
```


Legalization of Marijuana in the US 2022
Phoenix
Illegal
Legalized
Mixed
Leaflet | © OpenStreetMap, ODbL