Lab 5.
Small Multiples, Big Insights: Maps & TidyTuesday in R

PUBH 6199: Visualizing Data with R, Summer 2026

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Outline for today

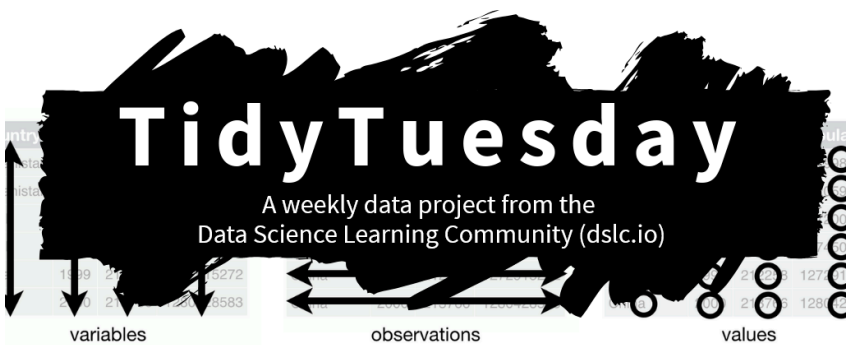
- **#tidytuesday: a weekly social data project**
  - #tidytuesday as a helpful, fun practice
  - My experience with #tidytuesday
- Geofacet-ing in R
- Live walkthrough with unregulated drinking water contaminant monitoring data
- Q&A and summary

About me

- Jahred Liddie, Postdoctoral Associate in the Water, Health, and Opportunity Lab at GWSPH
- Research focuses: drinking water quality, exposure assessment, emerging contaminants, and environmental justice
- Hobbies: flute, tennis, and playing with my dog, Georgette

What is #tidytuesday?

- #tidytuesday is a weekly social data project organized by the Data Science Learning Community since 2018
- Each Monday, a curated dataset is posted to their Github repo
- Participants explore the data and share visualizations on social media (formerly on Twitter, now Bluesky)

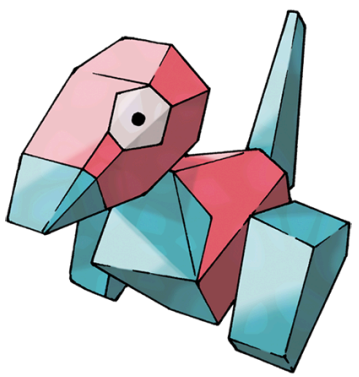


Some other notes on TidyTuesday

- Participants also encouraged to share code. This is nice since there are some very experienced R users with public TidyTuesday portfolios!
- The focus is on **exploring** data, rather than establishing causal relationships.
- Participants can also submit datasets for future weeks

Past example datasets

- Bob Ross paintings
- Weekly US gas prices
- *Stranger Things* dialogue
- A dataset of all Pokemon and their stats (available from the `pokemon` package)



My experience with TidyTuesday

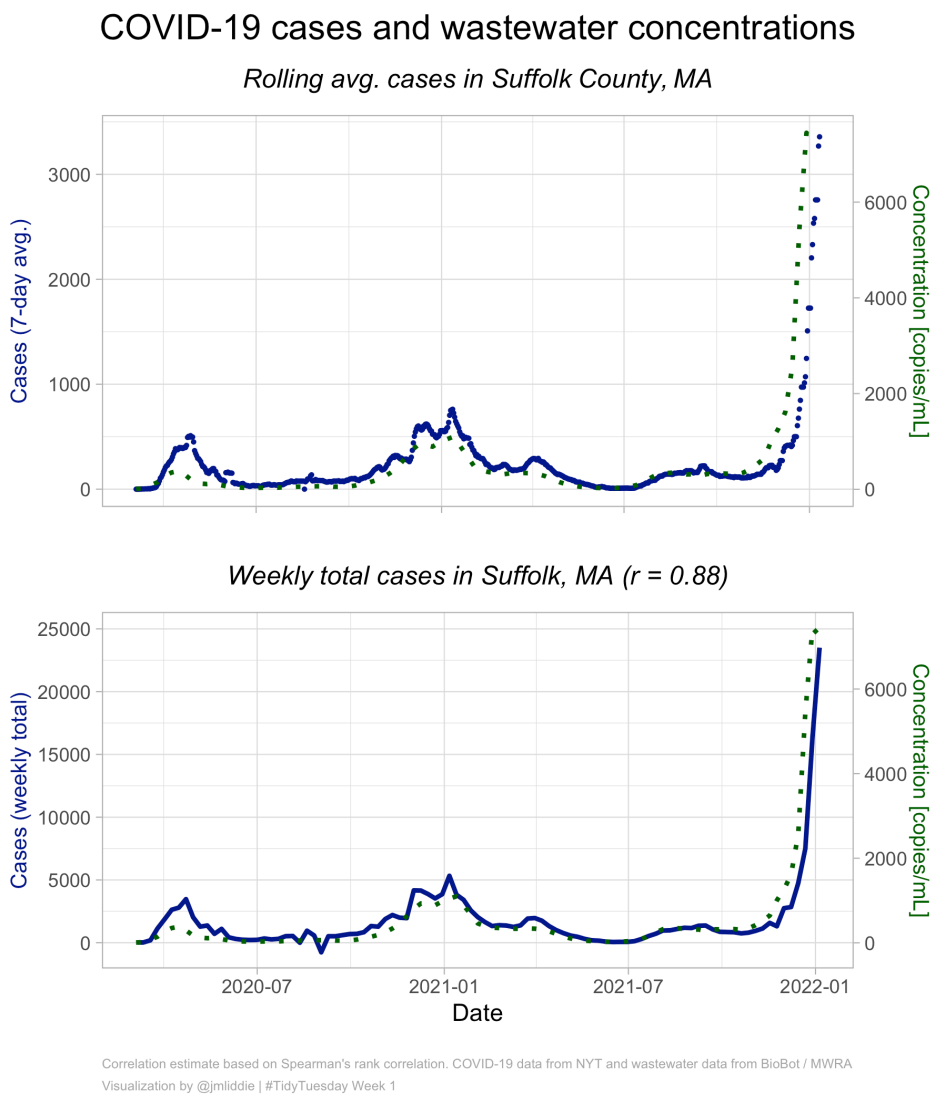
- I participated first in 2022 as a way to improve my data visualization skills
- Also enjoyed the community
- My full portfolio is available here

Some resources I found helpful…

- The R Graph Gallery: to give me ideas for different chart types
- R-Charts.com: a similar website, but with more base R and leaflet examples
- Other people's #tidytuesday repos
- Note: in the age of more widespread LLMs, I find these useful to go to if I'm stuck on a specific formatting issue, but certainly not for making a plot from scratch

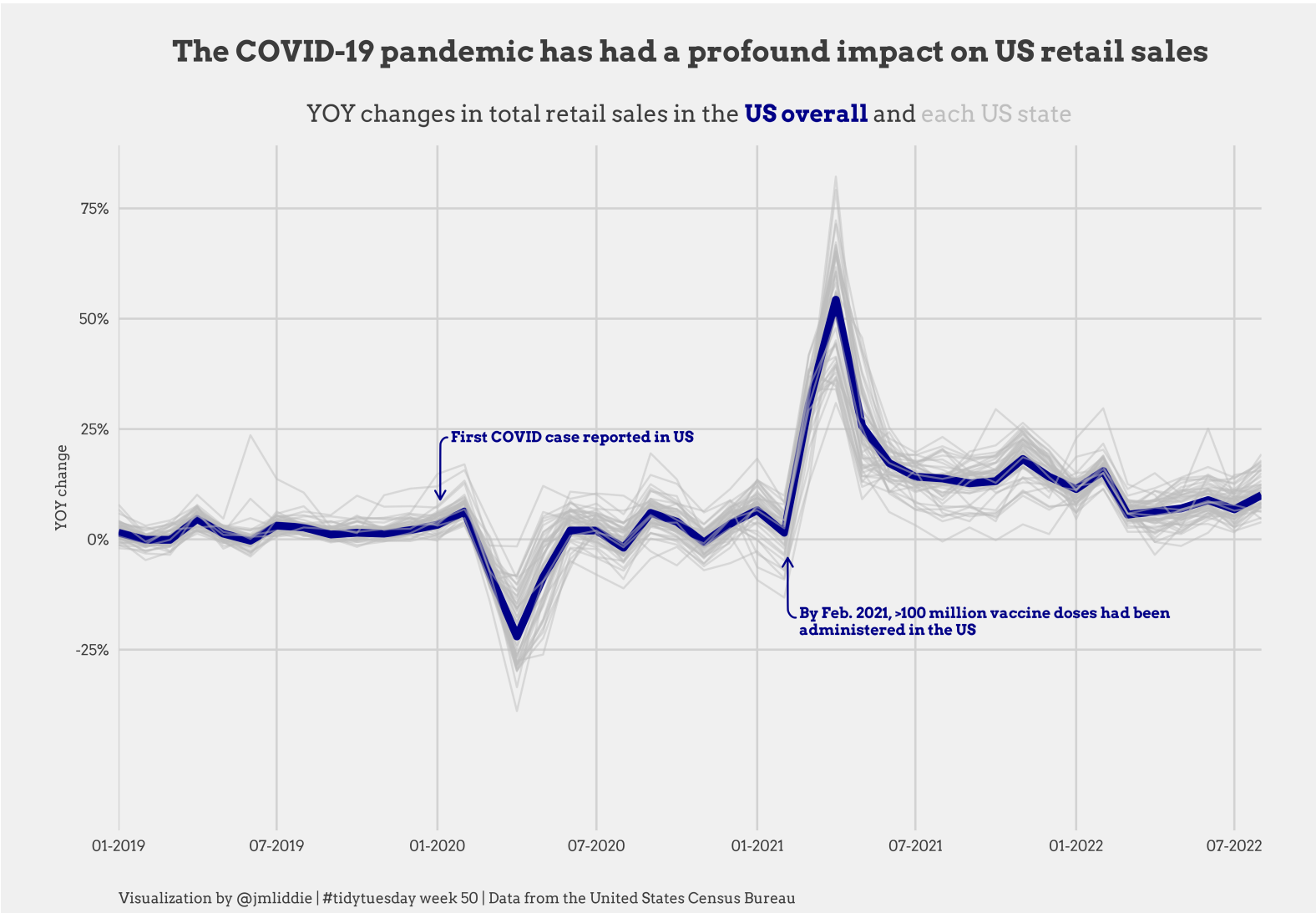
My very first plot

Key packages: `cowplot`, `ggtext`



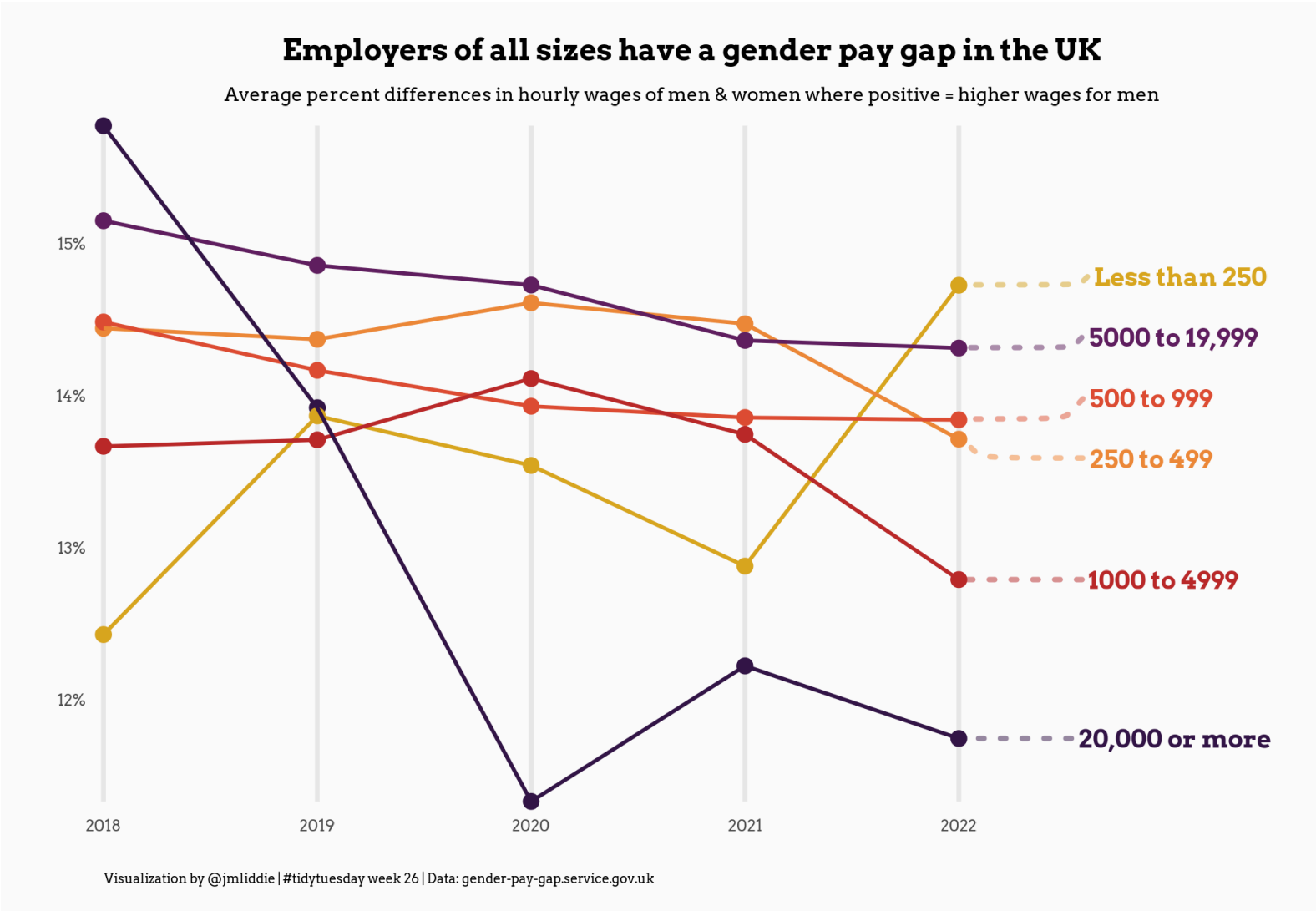
Other examples (pt 1)

Key packages: `showtext`, `ggrepel`



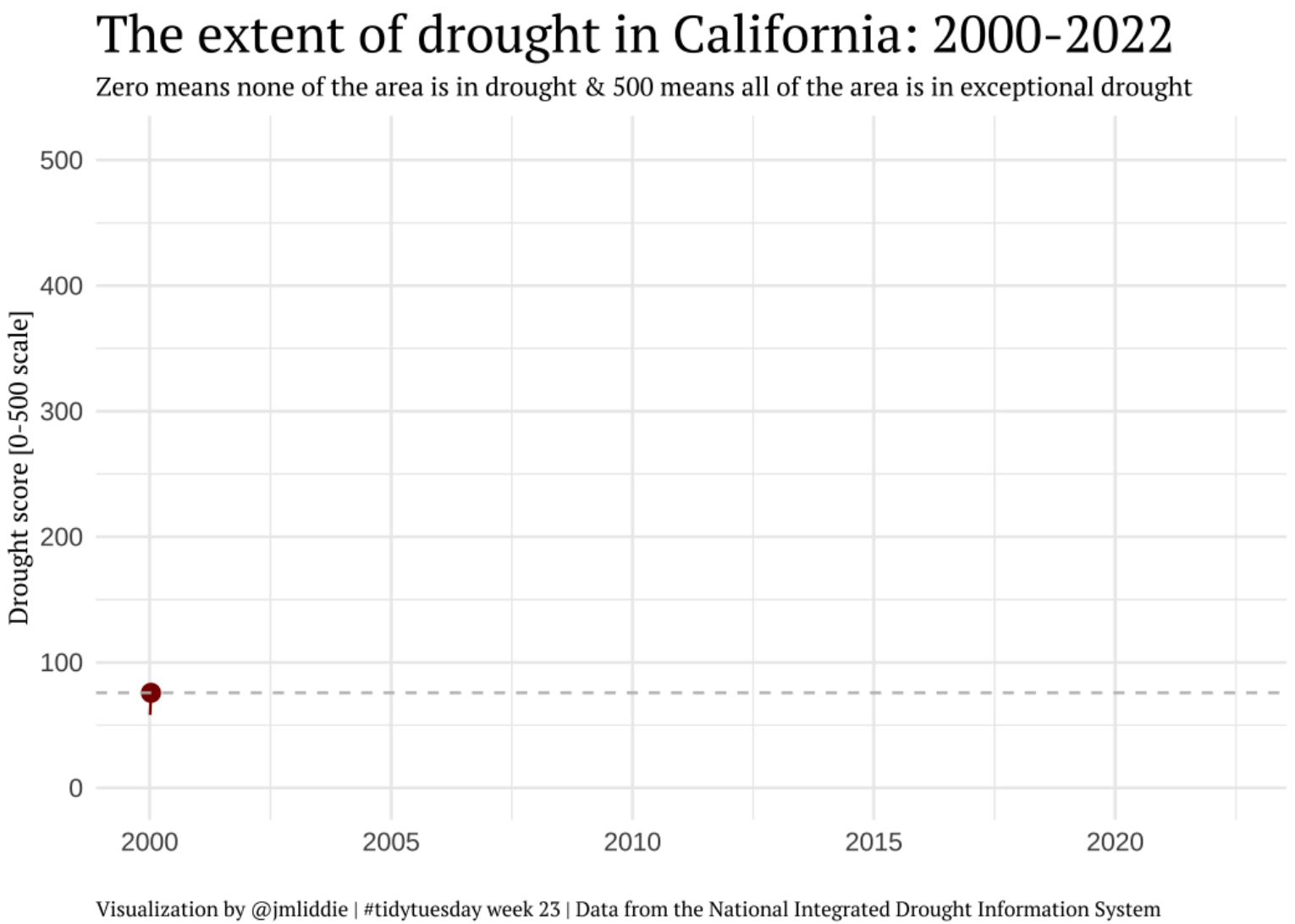
Other examples (pt 2)

Key packages: `showtext`, `ggrepel`



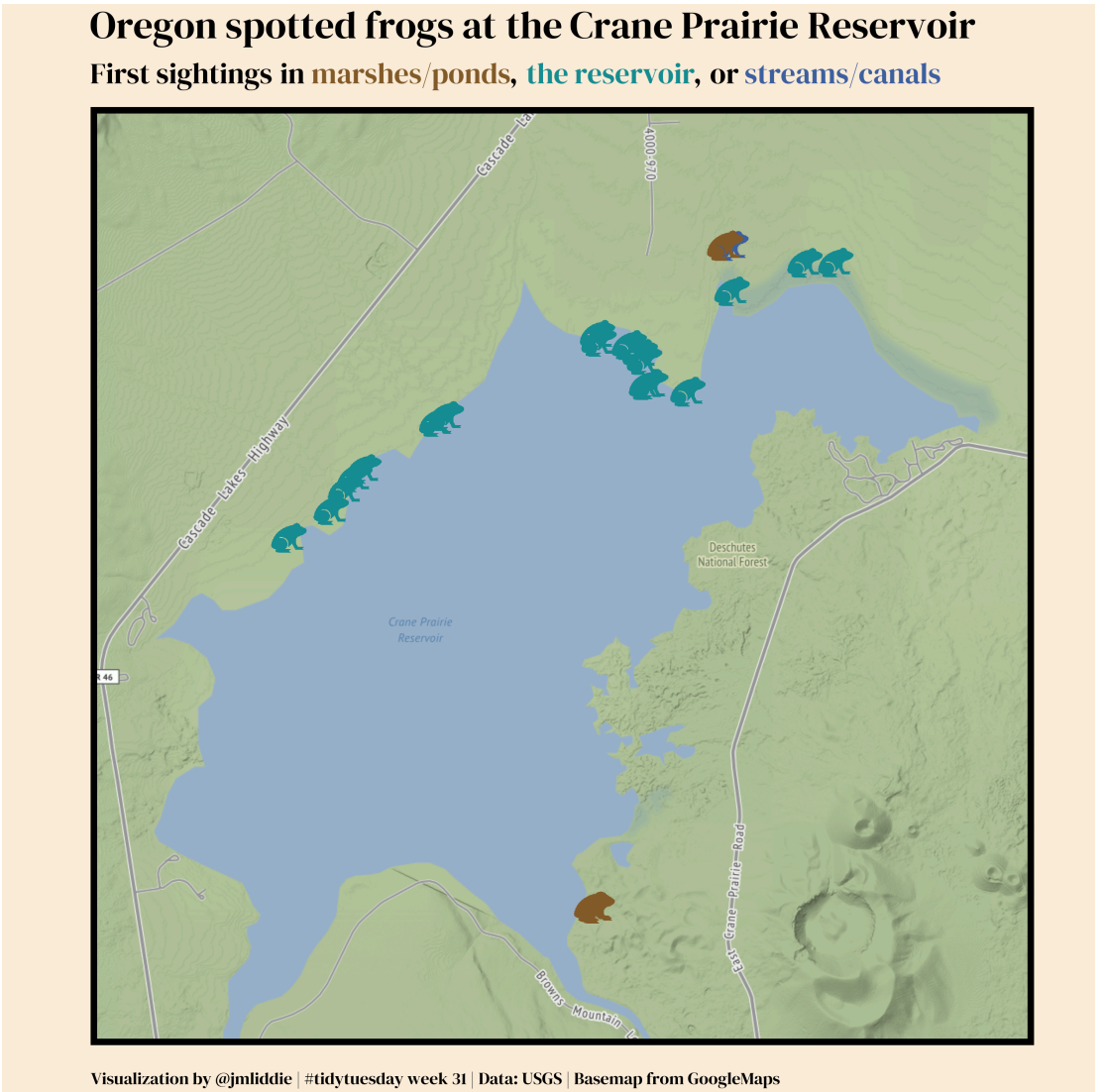
Other examples (pt 3)

Key packages: `gganimate`, `ggtext`

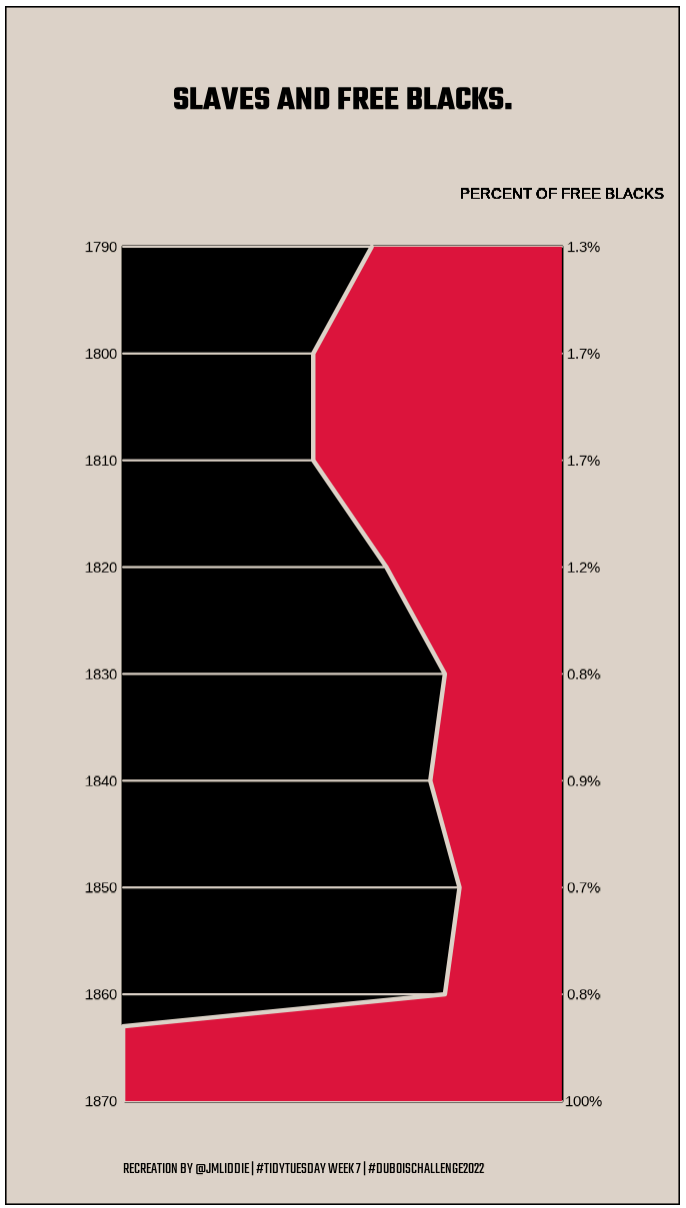


Other examples (pt 4)

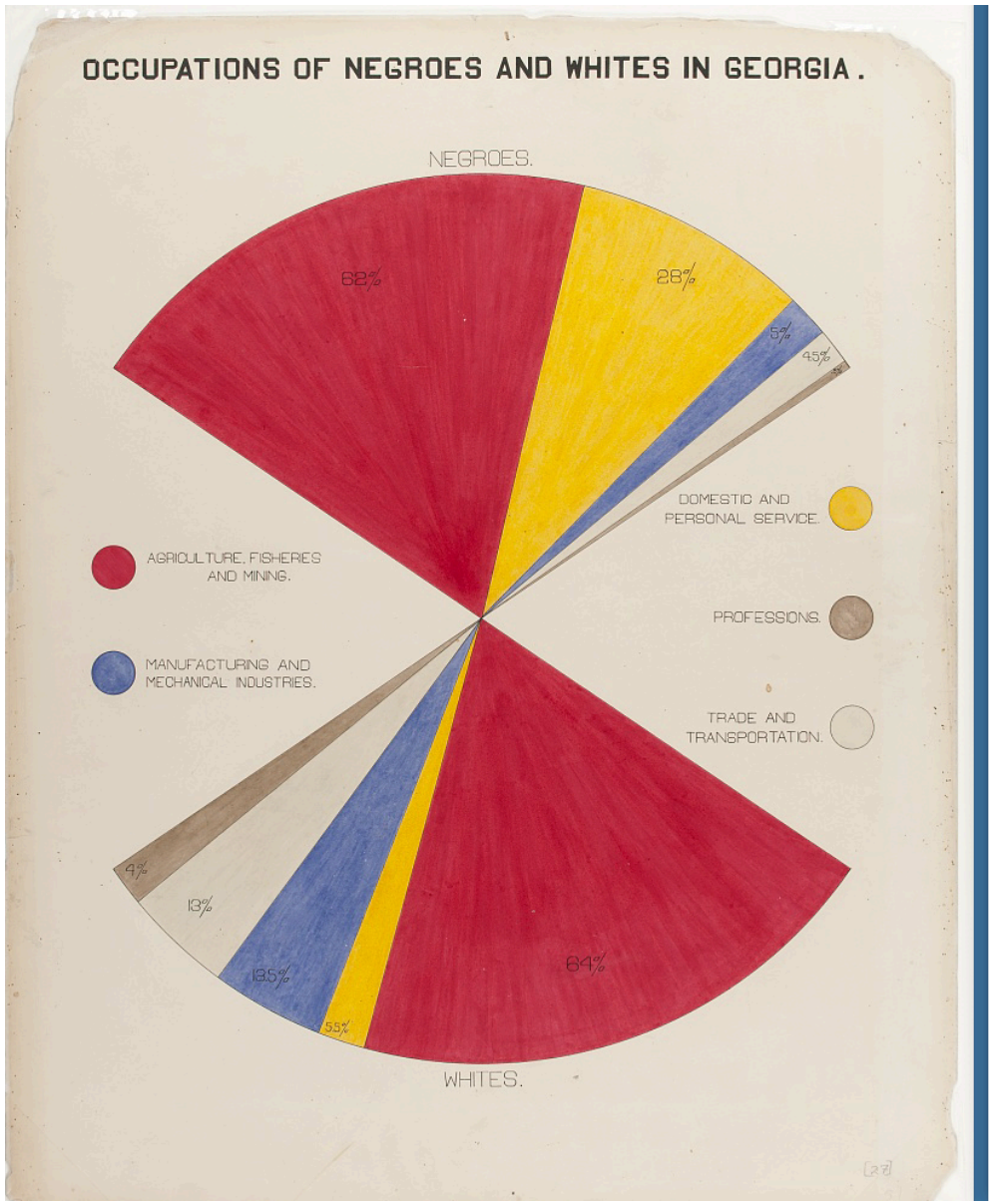
Key packages: `sf`, `ggimage`, `ggmap`

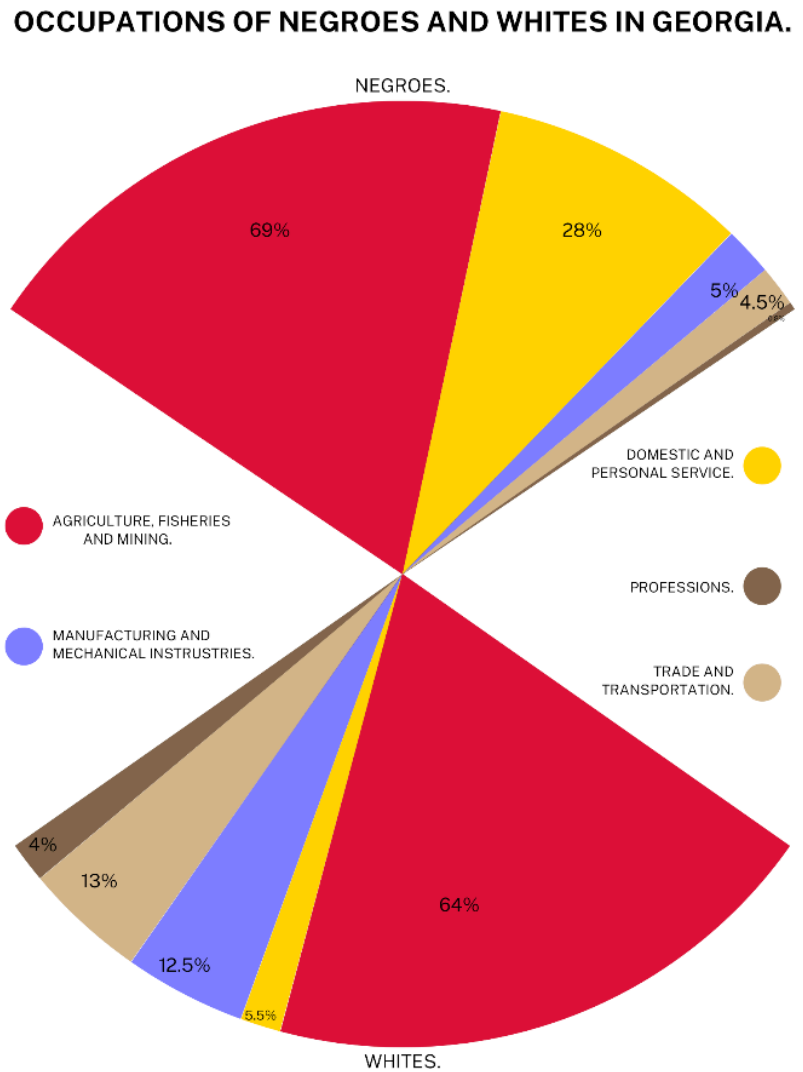


WEB Du Bois data portraits (pt 1)



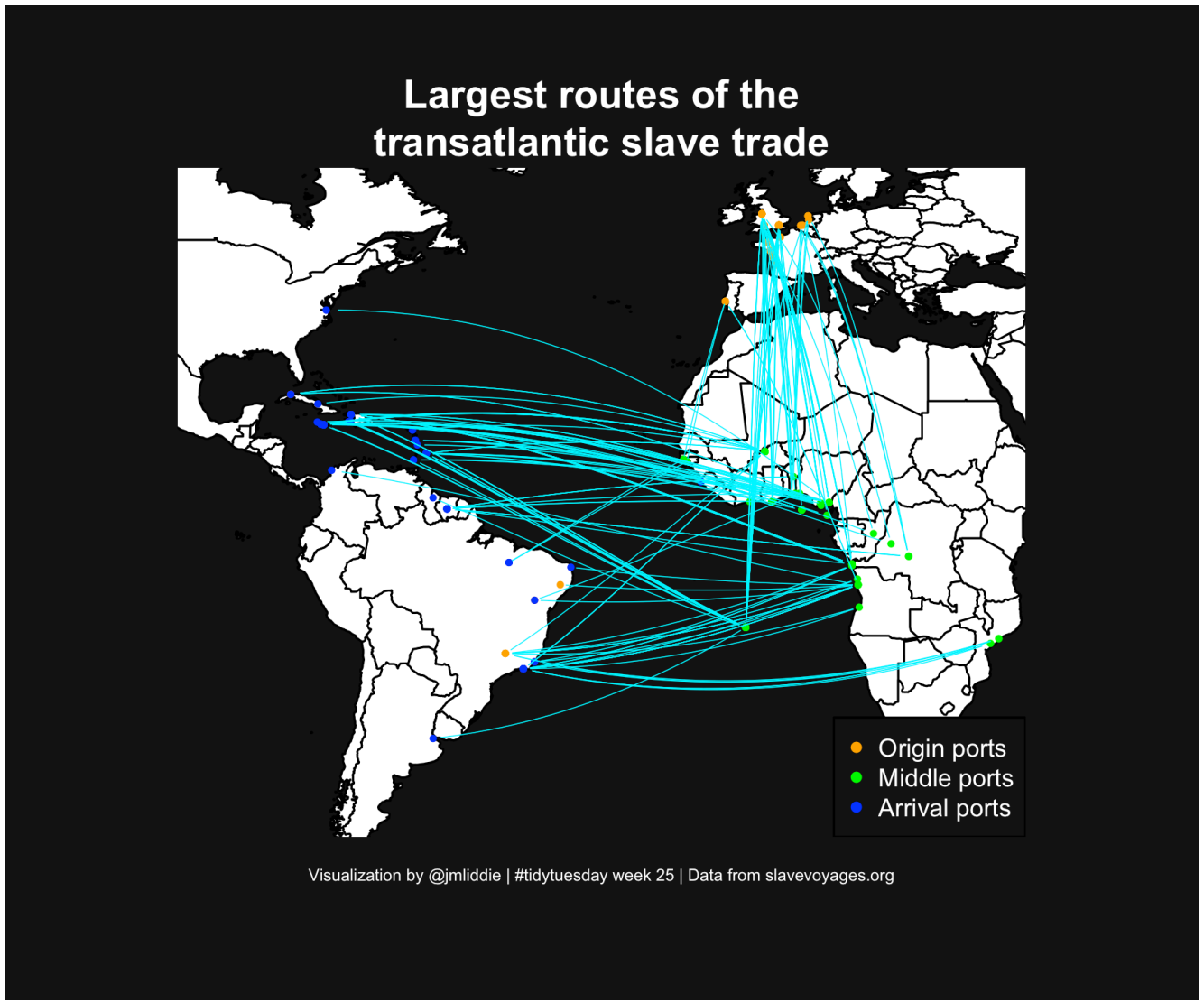
WEB Du Bois data portraits (pt 2)





Other examples (pt 5)

Key packages: `geosphere`, `ggmap`



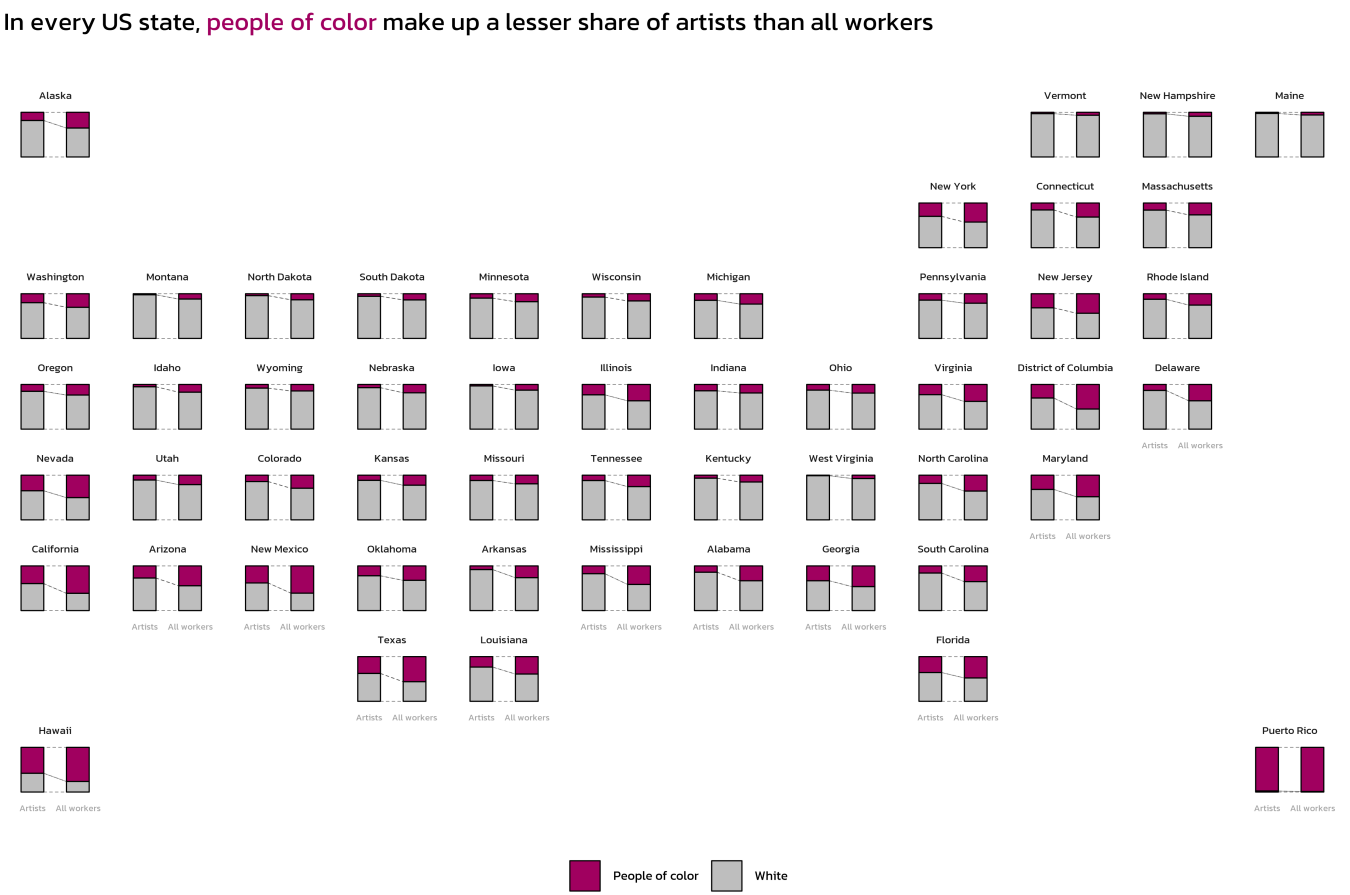
Other examples (pt 6)

In every US state, people of color make up a lesser share of artists than all workers

Visualization by @jmliddie | #tidytuesday week 39 | Data from arts.gov by way of Data is Plural

What is geofacet?

> geofacet is a package developed by Ryan Hafen to display a sequence of plots (like normal faceting) but within a structure that preserves the original geographical orientation



Let's look at some code…(pt 1)

Load necessary libraries and the data…

```
library(tidyverse)
library(showtext)
library(geofacet)
library(ggalluvial)
library(ggtext)

# load data and state helper dataframe
artists <- readr::read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/data/2022/2

names(artists)
```

```
[1] "state"            "race"             "type"
[4] "all_workers_n"    "artists_n"        "artists_share"
[7] "location_quotient"
```

Let's take a look at some code (pt 2)

```r
states <- rbind(
  data.frame(state = datasets::state.name,
             state.abb = datasets::state.abb),
  data.frame(state = c("District\nof Columbia", "Puerto Rico"),
             state.abb = c("DC", "PR"))
)

# set up data for plotting, calculate necessary new vars
artists <- artists %>%
  mutate(POC = ifelse(race == "White", "White", "People of color"))

state.summaries <- artists %>%
  group_by(state, POC) %>%
  summarise(artists_n = sum(artists_n, na.rm = T),
            workers_n = sum(all_workers_n)) %>%
  ungroup()

totals <- artists %>%
  group_by(state) %>%
  summarise(total_artists = sum(artists_n, na.rm = T),
            total_workers = sum(all_workers_n)) %>%
  ungroup()

state.summaries <- left_join(state.summaries, totals)

```

Let’s look at some code (pt 3)

```r
# finally, convert to plot format needed
state.summaries <- state.summaries %>%
  select(state, POC, perc_artists, perc_workers) %>%
  pivot_longer(cols  = c("perc_artists", "perc_workers"), names_to = "type")

state.summaries <- state.summaries %>%
  mutate(type.clean = ifelse(type == "perc_artists", "Artists", "All workers")) %>%
  mutate(type.clean = factor(type.clean, levels = c("Artists", "All workers")))

state.summaries <- left_join(state.summaries, states)

# grid of states
my_grid <- us_state_grid2

# adding puerto rico manually
my_grid <- rbind(my_grid,
                 data.frame(row = 8, col = 12, code = "PR", name = "Puerto Rico")
                 )
```

What does the `my_grid` object look like?

```
1 head(my_grid)
```

```
  row col code       name
1   6   7   AL    Alabama
2   1   1   AK     Alaska
3   6   2   AZ    Arizona
4   6   5   AR   Arkansas
5   6   1   CA California
6   5   3   CO   Colorado
```

```
1 tail(my_grid)
```

```
   row col code                 name
47   3   1   WA           Washington
48   5   8   WV        West Virginia
49   3   6   WI            Wisconsin
50   4   3   WY              Wyoming
51   4  10   DC District of Columbia
52   8  12   PR          Puerto Rico
```

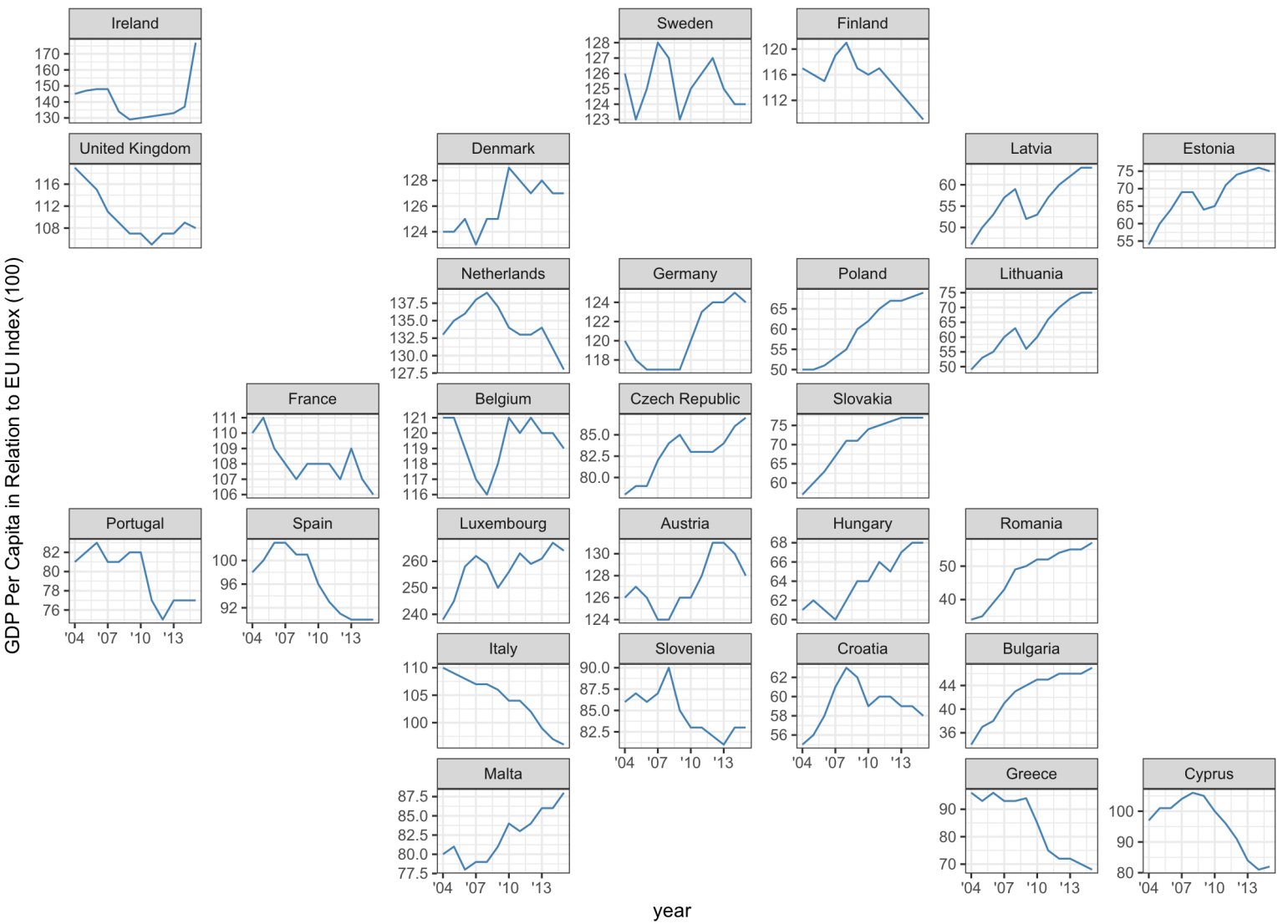
Let’s look at some code (pt 4)

```
# nice font
font_add_google("Kanit")
showtext_auto(enable = TRUE)

ggplot(state.summaries, aes(x = type.clean, y = value)) +
  geom_flow(aes(alluvium = POC), lty = 2, fill = "white", color = "black",
            curve_type = "linear", width = 0.5, size = 0.15) +
  geom_col(aes(fill = POC), width = 0.5, color = "black", size = 0.25) +
  scale_fill_manual(values = c("#a40062","grey"), name = "") +
  labs(x = "", y = "", title = "In every US state, <span style = 'color: #a40062;'>people of color</span> ma
       caption = "Visualization by @jmliddie | #tidytuesday week 39 | Data from arts.gov by way of Data is P
  theme_minimal() +
  theme(plot.title = element_markdown(margin = margin(t = 10, b = 20), hjust = 0,
                                      lineheight = 2, size = 70, family = "Kanit"),
        plot.caption = element_markdown(hjust = 0, margin = margin(t = 10), color = "grey",
                                        lineheight = 1.4, size = 35, family = "Kanit"),
        axis.ticks = element_blank(),
        axis.text.y = element_blank(),
        axis.text.x = element_text(size = 25, color = "darkgrey", family = "Kanit"),
        strip.text.x = element_text(size = 30, family = "Kanit"),
        panel.grid.major = element_blank(),
        panel.grid.minor = element_blank(),
        legend.position = "bottom",
        legend.text = element_text(size = 35, color = "black", family = "Kanit"),
        legend.key.size = unit(0.5, 'cm')) +
```

Many other regions are supported!

There are 216 grids available in the latest version of `geofacet` and users can submit their own directly using `grid_submit()`!



Let’s work through an example live

US EPA drinking water monitoring

- The US Environmental Protection Agency (EPA) monitors a list of *unregulated* contaminants every five years in public water systems as part of the Unregulated Contaminant Monitoring Rule (UCMR). The fifth cycle included 29 different PFAS (per- and polyfluoroalkyl substances or “forever chemicals”) and lithium.
- *We’ll use the most recent release of these data to visualize trends in PFAS monitoring over time across different states. Download zip file from the course website. The zip file contains `lab5.qmd`, which uses a pre-processed dataset, `ucmr5_dat.csv`*