



Your Maps Might Be Lying to You

Gus Lipkin
2023-10-20

Mapping the Stage

(Some) Maps Are Bad

The World



Image Credit u/Erewhon1984

- Australia
- Iceland
- Hawaii
- Many others

The United States of America

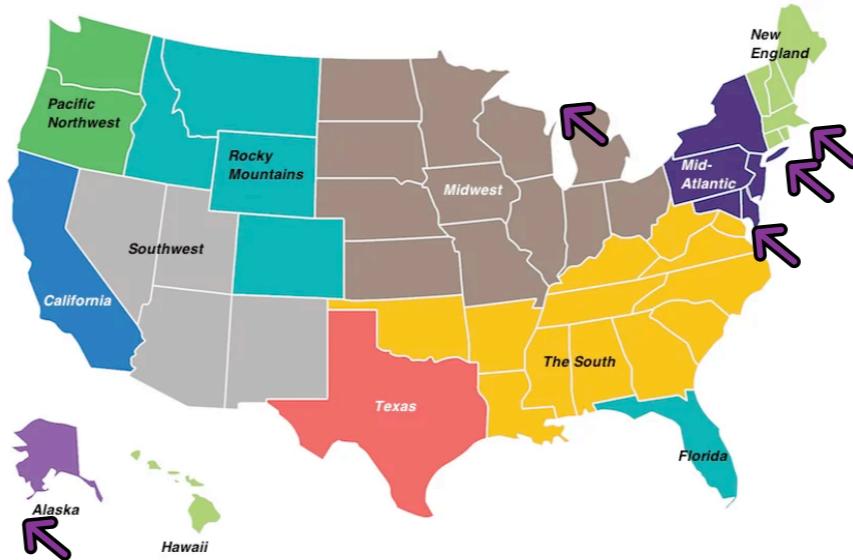


Image Credit u/[deleted]

- Cape Cod
- Long Island
- Michigan UP
- Whatever's going on in the DC region
- Alaska Aleutian Islands

New Zealand*

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We're sorry, something's missing...



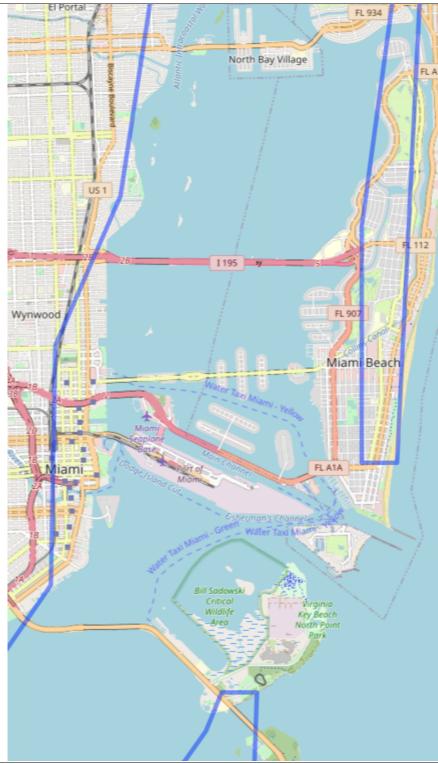
Image Credit u/damndanman

- New Zealand
 - This one's on purpose

Borders Are Tricky Too

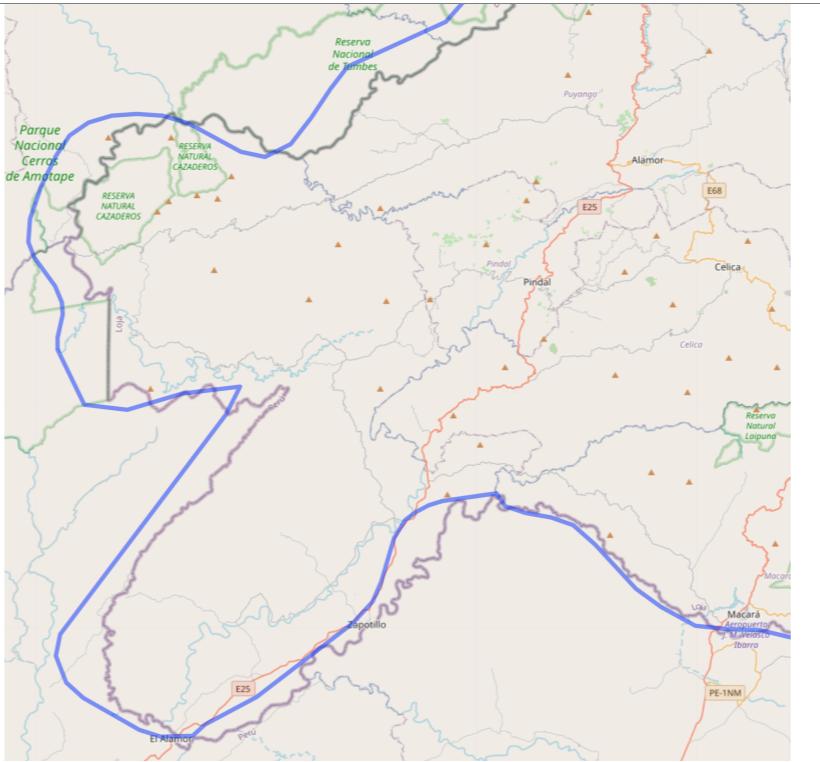
- Depend on
 - where you are
 - who you ask
 - when you ask

DataHub



- Miami is outside the US
- Polygon resolution

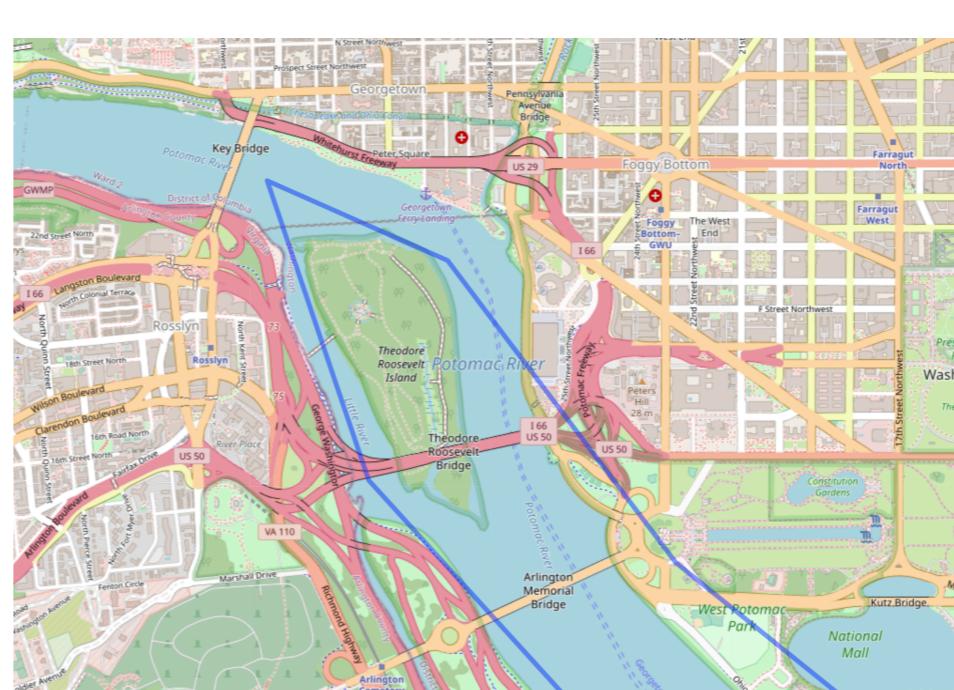
World Bank



- The gray line is the “true” border and the blue line is the world bank
- Peru and Ecuador
- Resolution and shifted a bit

Natural Earth

Roosevelt Island is outside
the USA



- Roosevelt Island is outside the US
- DataHub has this problem too
- Extra polygons aren't included
- How far up a river do you go?

**Surely the US Department of State Knows
Where Borders Are?**

Egypt and Sudan



- To be fair, this is a disputed border

Sudan and Eritrea



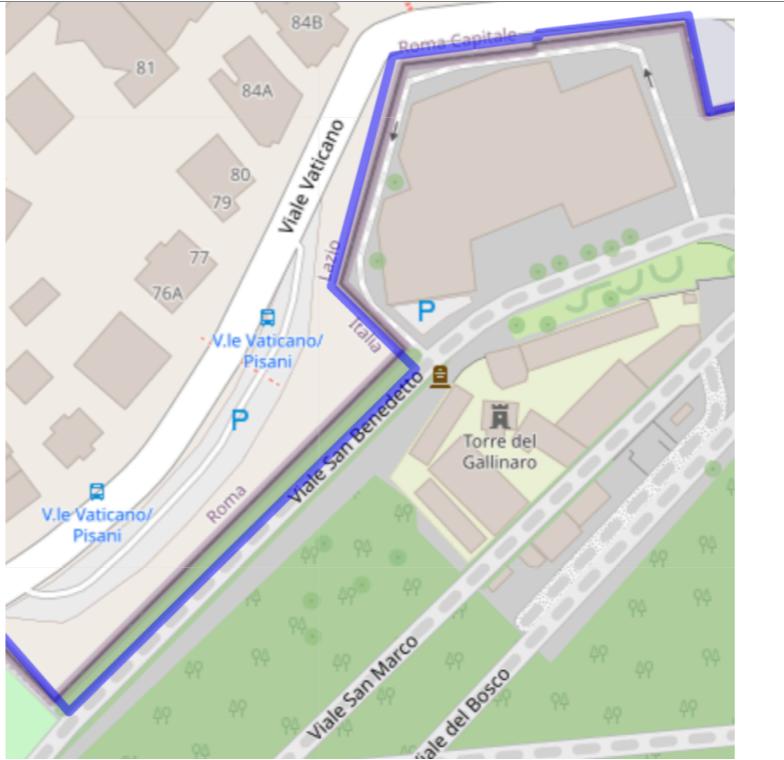
- Extra resolution
- Shifted a bit

The Vatican



- They have walls!
 - Straight lines
 - Hundreds of years old
 - Built in ~850AD

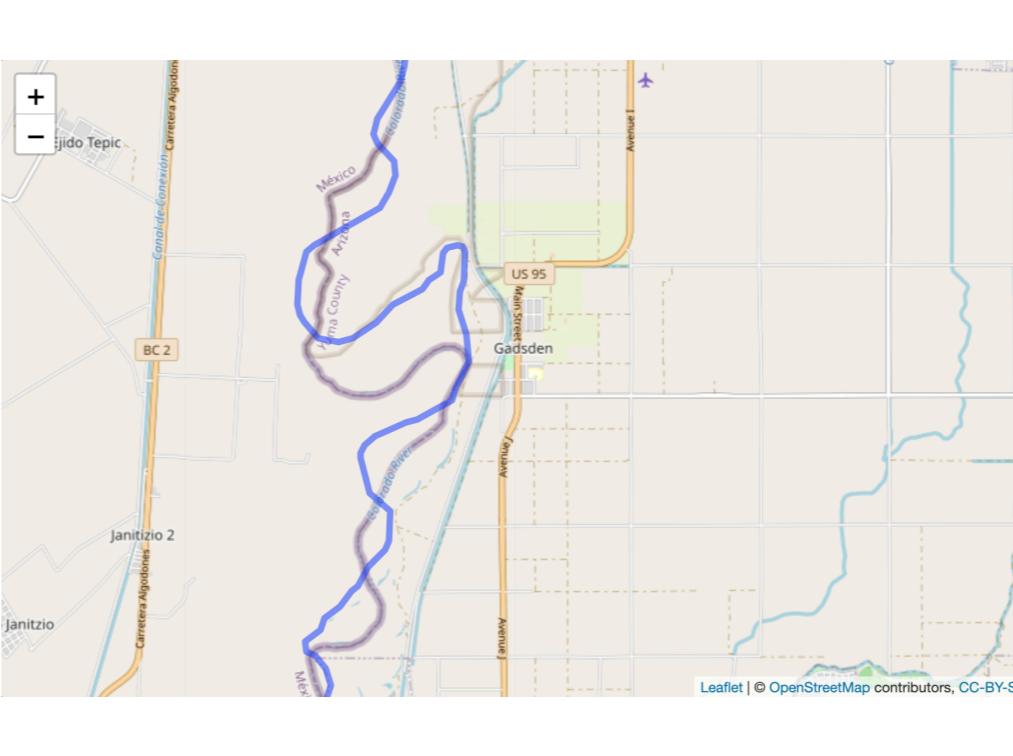
The Vatican



- They have walls!
 - Straight lines
 - Hundreds of years old
- That border line is on the road

**Surely the US Department of State Knows
Where the US Borders Are?**

They Don't

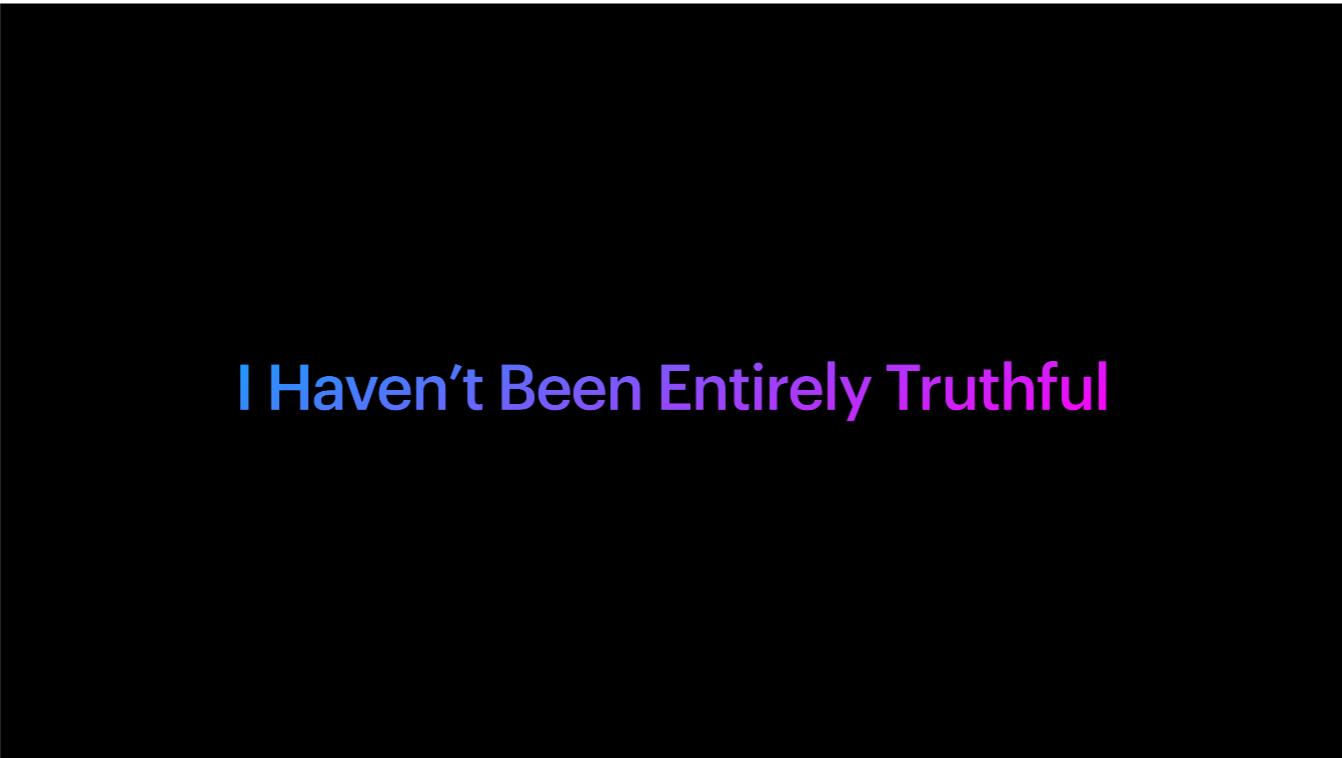


- Mexico-Arizona border
- They got the 49th parallel with Canada right (it's a relatively straight line)

These Seem Like Relatively Minor Problems

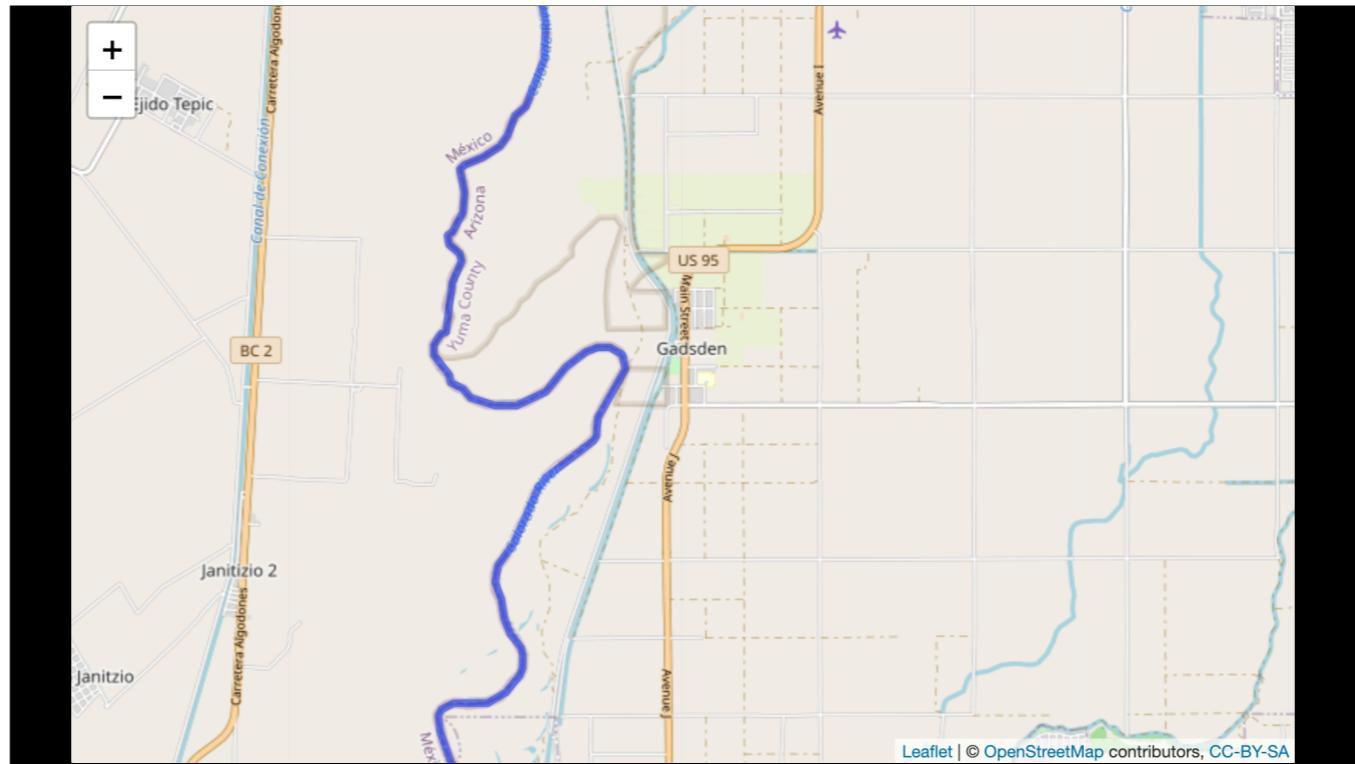
- Property disputes
 - This is why people get surveys!
- Water rights
- Border security (where to patrol) (what map do they use)
- Human trafficking along border roads

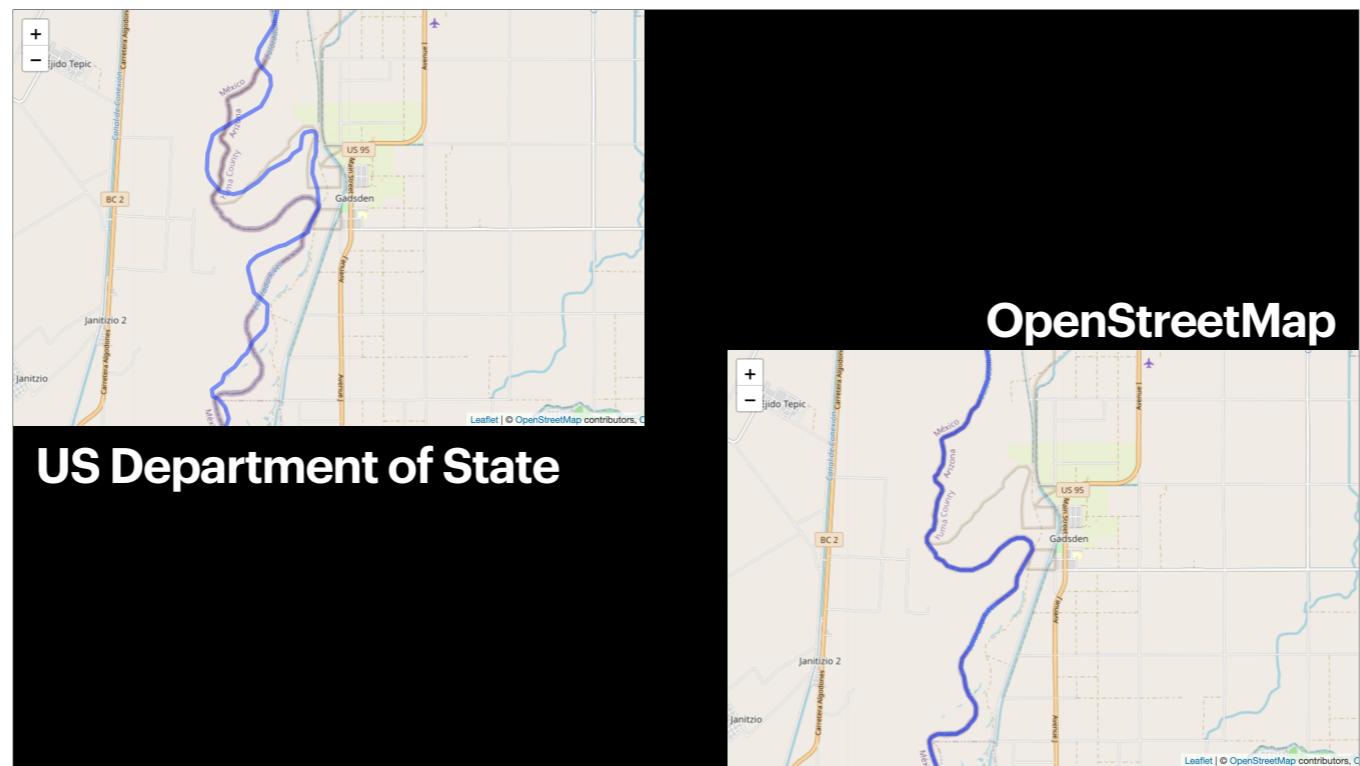
What's going wrong?



I Haven't Been Entirely Truthful

- I'm comparing everything to OSM base maps
 - What made them the "true" map
- I didn't check my projections
 - I did check my CRS





Other Common Problems

Projections and Coordinate Reference Systems (CRS)

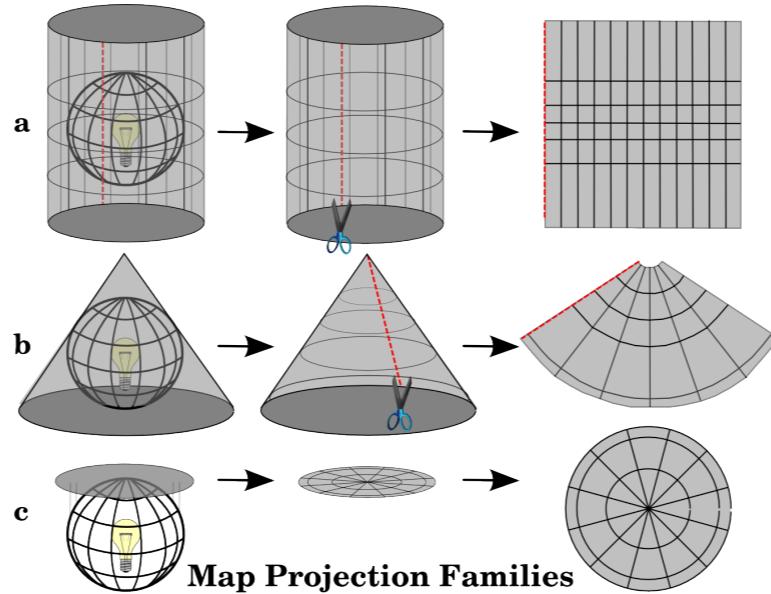


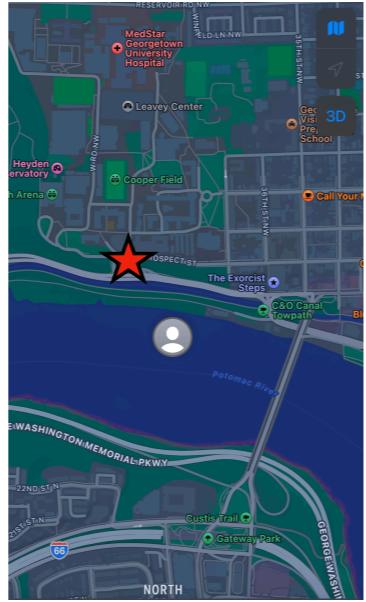
Image Credit QGIS

- Represent 3D planet on 2D maps
- Distance changes between points

Data Problems

- Incomplete data
- Extra data:
 - Features
 - All versions of a disputed border
- Incorrect or out of date data
- File type or data type mismatches
- Data resolution
- Fake data so people don't steal your maps

Where in the World is Travis Knoche?



Now what?

Finding Your Source of Truth

Base Maps

- Function
 - Street, Satellite, Hybrid, Topographic
- Style
 - Full color, grayscale, dark, labels/no labels
- Data sources
 - OpenStreetMap, Government, MapBox, Overture Maps, many more!
- Coordinate reference system
 - WGS 84, everything else

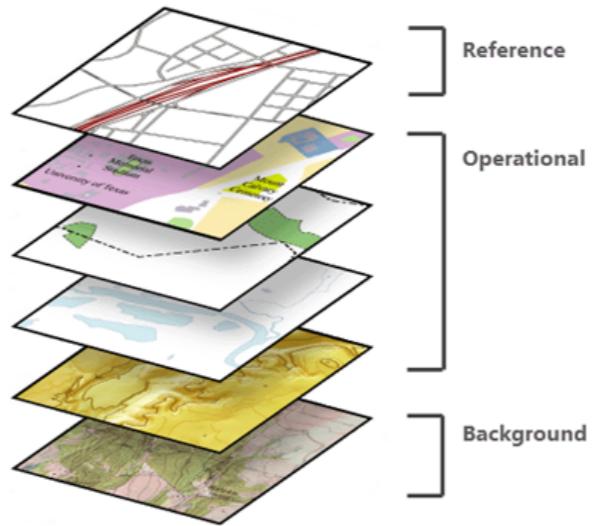


Image Credit [arcgis.com](#)

Choosing a Base Map

- Function
 - What am I trying to show?
- Style
 - Does a certain style help communicate
 - How can I display my data to make the impact I want?
- Data Sources
 - Where does my data come from? Do they have a base map?
- Coordinate Reference System
 - What CRS is my data?

Adding Data

Data Layers

- Your data!
- Other data you might want
 - Borders
 - Roads
 - Weather patterns
 - Migratory patterns of Canada Geese
 - Locations of working McDonald's Ice Cream Machines

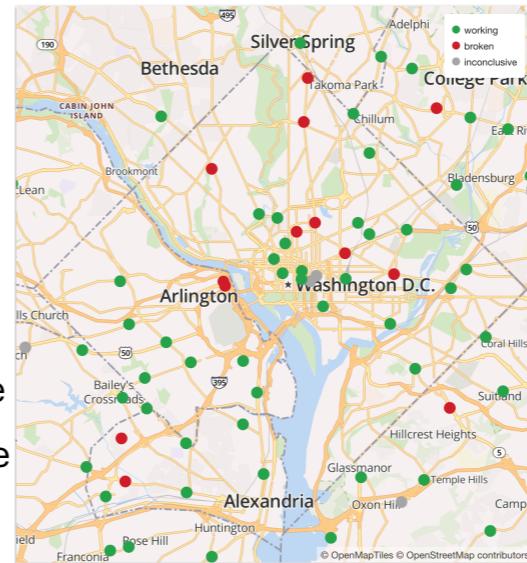


Image Credit mcbroken.com

Kinds of Data Layers

- Raster layers
 - Tiles
- Vector layers
 - Lines, polygons, images
- UI layers
 - Markers, popups, tooltips
- And more!

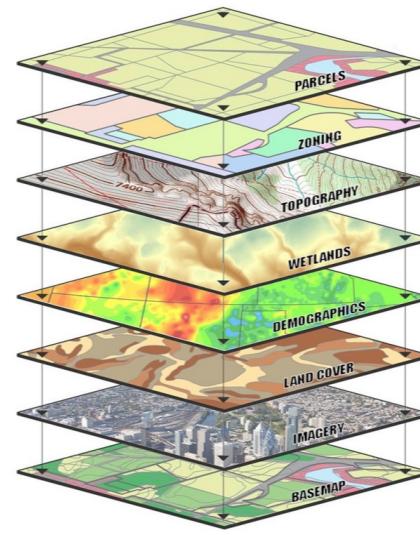


Image Credit [USGS.gov](#)

- Raster (satellite images, weather radar)
 - These have a specific resolution
 - Why maps have to reload when you zoom
- Vector (borders, paths)
- UI (extra info, about whatever)

This Is Complicated and I Don't Care

Fair Enough

- You don't need super accurate locations
 - You don't need to know where in the McDonald's the ice cream machine is located
 - Population centers in cities
- You're using maps as visualizations, and the data itself is what matters
 - Choropleth (colorful polygons) voting maps
 - Visualizations of a region's watersheds

- conveying other data via the map



Just Be Consistent

- Projection
- Coordinate reference system
- Data sources
- Base map sources

All Maps Are Lying to You

- Do you know how?
- What are you sacrificing to communicate your message?



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