

# Creating Maps with ArcGIS Online

Susan Powell, [smpowell@berkeley.edu](mailto:smpowell@berkeley.edu)  
GIS & Maps Librarian

October 2016

Slides adapted from Patty  
Frontiera's CARTO workshop.

# Outline

## Big Picture

- Why Map?
- Why ArcGIS Online?
- Along the way...
  - Geographic data
  - GIS
  - Spatial analysis

## Tutorial

- Interrupted with quick demo

# Power of Geographic Data

# 2013: Percent of adults who report consuming vegetables less than one time daily

Location ↓	Value ↓	95% CI	Sample Size
<a href="#">National</a>	22.4	(22.2-22.7)	434,803
<a href="#">Alabama</a>	25.8	(24.1-27.5)	5,871
<a href="#">Alaska</a>	19.2	(17.4-21.0)	4,197
<a href="#">Arizona</a>	23.8	(21.3-26.4)	3,807
<a href="#">Arkansas</a>	28.0	(26.1-30.0)	4,673
<a href="#">California</a>	17.3	(16.2-18.4)	9,651
<a href="#">Colorado</a>	19.1	(18.1-20.1)	11,978
<a href="#">Connecticut</a>	22.2	(20.7-23.8)	6,954
<a href="#">Delaware</a>	28.9	(27.0-30.8)	4,741
<a href="#">District of Columbia</a>	20.9	(18.8-23.2)	4,283
<a href="#">Florida</a>	20.8	(19.8-21.9)	30,309
<a href="#">Georgia</a>	23.7	(22.3-25.2)	7,097
<a href="#">Hawaii</a>	23.1	(21.6-24.7)	7,241
<a href="#">Idaho</a>	20.4	(18.8-22.1)	5,132
<a href="#">Illinois</a>	24.0	(22.4-25.7)	5,291
<a href="#">Indiana</a>	26.9	(25.7-28.2)	9,250
<a href="#">Iowa</a>	26.8	(25.4-28.2)	7,456
<a href="#">Kansas</a>	22.9	(22.2-23.6)	21,405
<a href="#">Kentucky</a>	24.9	(23.5-26.3)	9,819
<a href="#">Louisiana</a>	32.7	(30.5-35.0)	4,632
<a href="#">Maine</a>	17.7	(16.5-19.0)	7,537
<a href="#">Maryland</a>	22.0	(20.7-23.3)	11,646
<a href="#">Massachusetts</a>	20.1	(19.0-21.2)	13,236
<a href="#">Michigan</a>	24.8	(23.6-25.9)	11,869
<a href="#">Minnesota</a>	23.6	(22.2-25.0)	12,985
<a href="#">Mississippi</a>	30.6	(28.9-32.3)	6,644

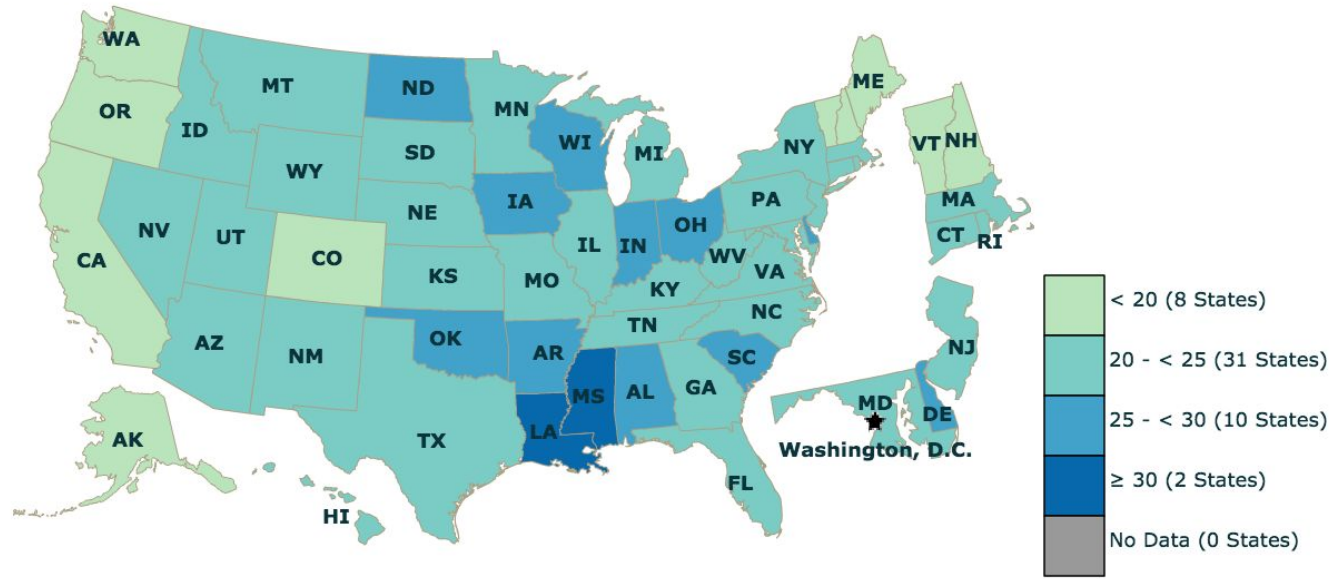
<a href="#">Missouri</a>	24.3	(22.7-25.9)	6,527
<a href="#">Montana</a>	20.5	(19.4-21.7)	8,957
<a href="#">Nebraska</a>	23.3	(22.2-24.4)	15,700
<a href="#">Nevada</a>	20.8	(18.5-23.2)	4,636
<a href="#">New Hampshire</a>	16.8	(15.6-18.2)	5,862
<a href="#">New Jersey</a>	21.4	(20.2-22.6)	11,615
<a href="#">New Mexico</a>	21.5	(20.2-22.9)	8,228
<a href="#">New York</a>	22.0	(20.8-23.3)	7,947
<a href="#">North Carolina</a>	22.4	(21.1-23.7)	7,975
<a href="#">North Dakota</a>	27.4	(25.9-28.9)	7,141
<a href="#">Ohio</a>	26.3	(25.1-27.7)	10,734
<a href="#">Oklahoma</a>	25.3	(23.9-26.7)	7,532
<a href="#">Oregon</a>	16.3	(14.9-17.7)	5,239
<a href="#">Pennsylvania</a>	24.7	(23.6-25.9)	10,230
<a href="#">Rhode Island</a>	21.4	(19.8-22.9)	5,737
<a href="#">South Carolina</a>	26.8	(25.5-28.1)	9,645
<a href="#">South Dakota</a>	24.5	(22.7-26.3)	6,409
<a href="#">Tennessee</a>	24.3	(22.5-26.2)	4,895
<a href="#">Texas</a>	21.5	(20.2-22.9)	9,557
<a href="#">Utah</a>	20.4	(19.4-21.4)	11,616
<a href="#">Vermont</a>	16.5	(15.2-17.9)	5,857
<a href="#">Virginia</a>	21.4	(20.2-22.8)	7,507
<a href="#">Washington</a>	18.2	(17.2-19.3)	10,412
<a href="#">West Virginia</a>	24.2	(22.8-25.6)	5,534
<a href="#">Wisconsin</a>	25.8	(24.0-27.7)	5,788
<a href="#">Wyoming</a>	20.1	(18.6-21.7)	5,819

What 2 states have the highest percent of adults who don't eat vegetables?

# The Power of Geographic Data, Mapped

2013: Percent of adults who report consuming vegetables less than one time daily †

[Save Map](#)



What 2 states have the highest percent of adults who don't eat vegetables?

# Data Visualization: A visual summary of the data

## What?

- The data
- Message in the data
- Summary requires simplification

## How?

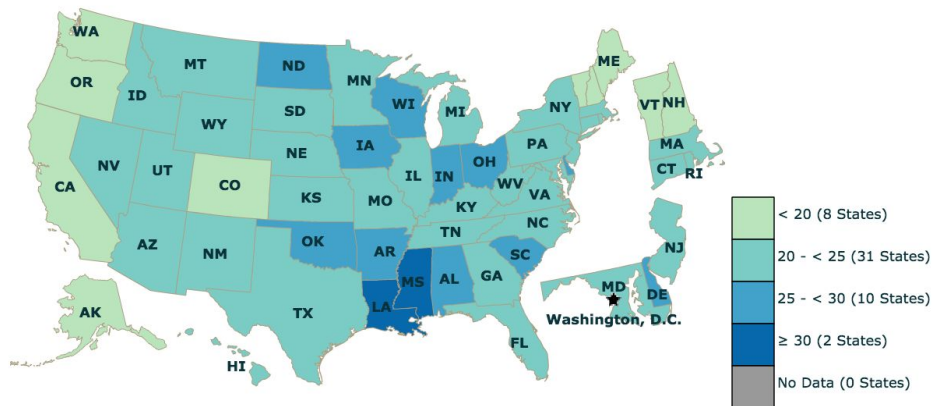
- Visualization type
- Symbology
- Context

## Why?

- exploration vs communication

2013: Percent of adults who report consuming vegetables less than one time daily †

[Save Map](#)



Why Map?

# SF Drug & Prostitution Incidents, Jan - Oct, 2016

## Location:

Where were these incidents located?



Simple point or dot map

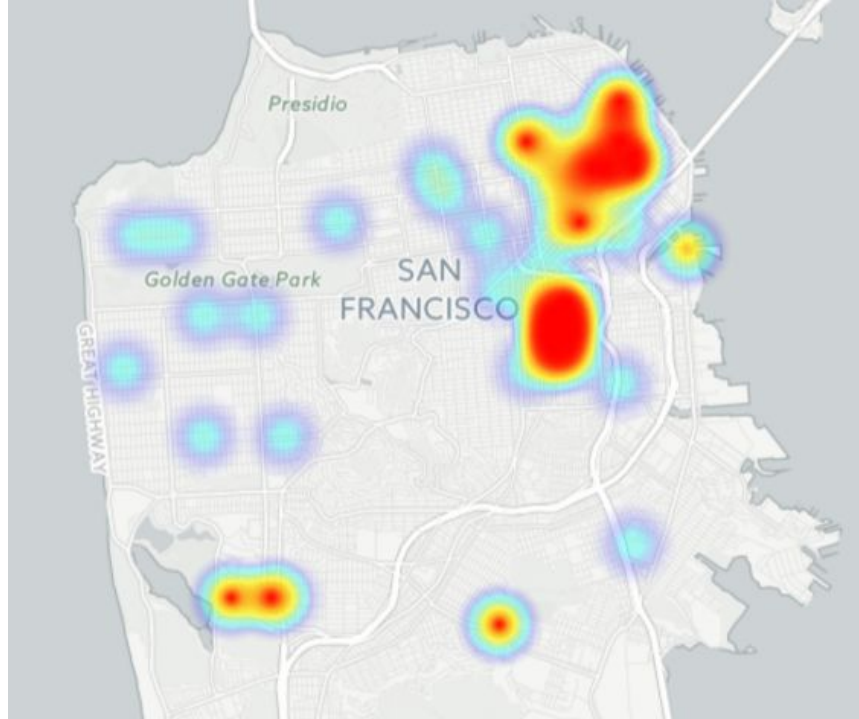
Shows geographic context when displayed on a *basemap*



# SF Prostitution Incidents, Jan - Oct, 2016

## Location:

How does the distribution vary within the study area?

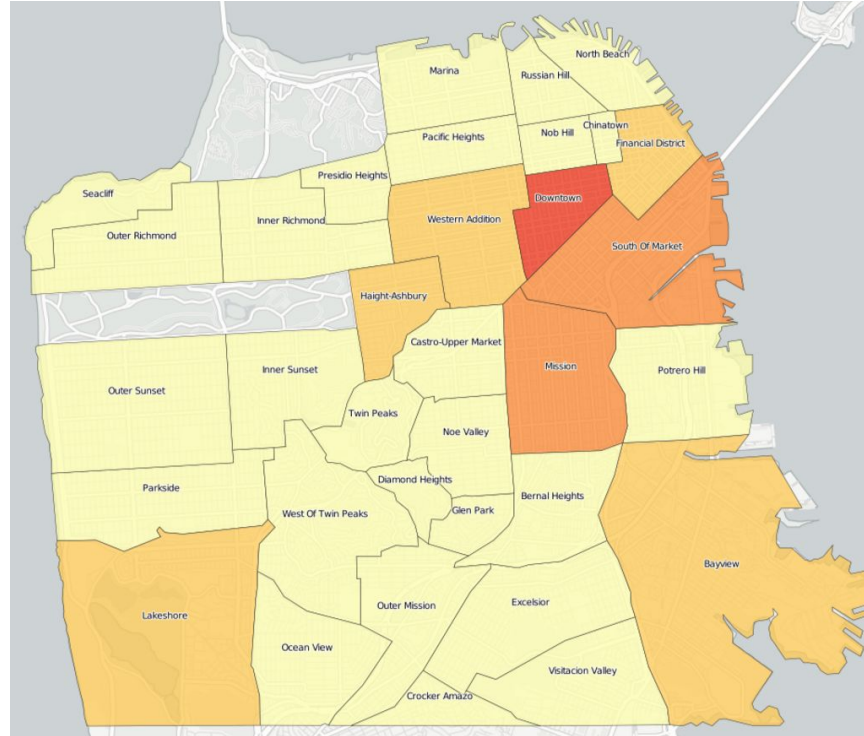


A heat map transforms the data to show density

# SF Drug & Prostitution Incidents, Jan - Oct, 2016

## Location:

How does the distribution vary within areas of interest?



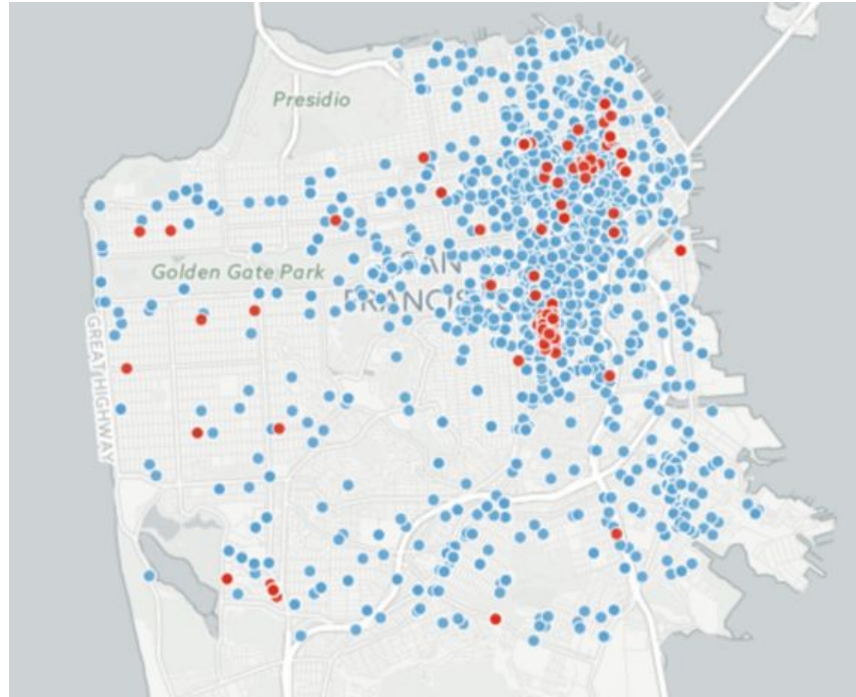
## Choropleth map

- Color areas by data values

# SF Drug & Prostitution Incidents, Jan - Oct, 2016

## Spatial Relationships

Where were these incidents located relative to one another?



Category map shows locations by type.

# SF highways & Prostitution Incidents, Jan - Oct, 2016

## Spatial Relationships

Where were these incidents located relative to other features?



Map Layers

Basemap + one or more thematic layers

# SF Poverty & Prostitution Incidents, Jan - Oct, 2016

## Spatial Relationships

Where were these incidents located relative to other factors?

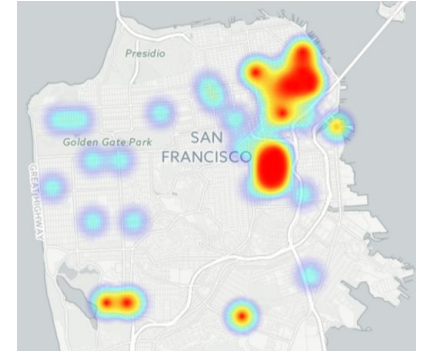
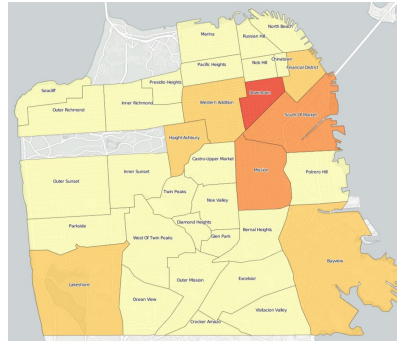
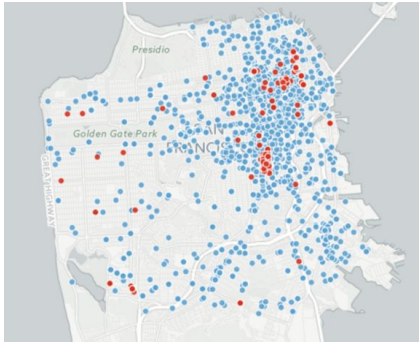


Map layers

Basemap + one or more thematic layers

# Mapping Geographic Data

# Types of Geographic Data



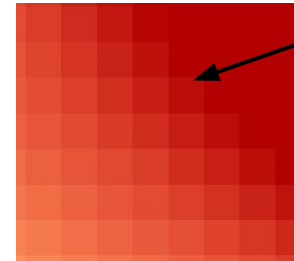
Points

Lines

Polygons

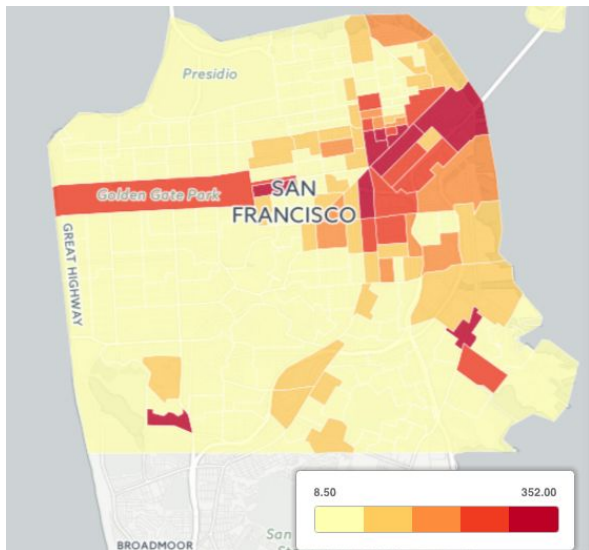
Vector Data

**Raster  
Data**

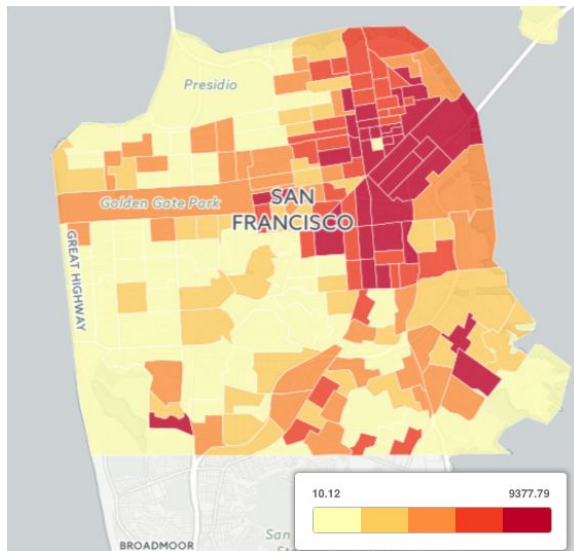


20 per  
unit  
area

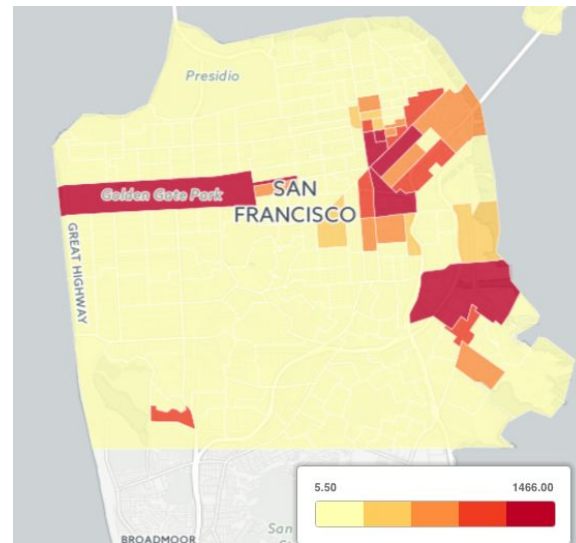
# Aggregating Data to Areas



Counts



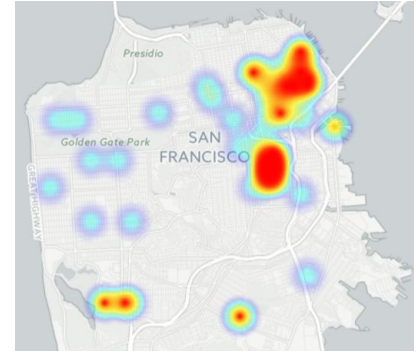
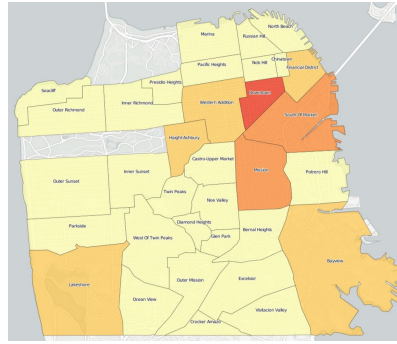
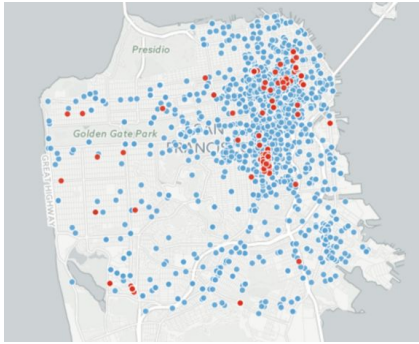
Density per sq mile



Rate per 1000 persons



# Symbolizing Geographic Data



Shape, Size, Color

# Cartography Tips

Color: your best friend or worst enemy

Avoid clutter (data, symbology, text) but provide contrast & context

Interactive maps give us new tools for communicating and exploring geodata

Avoid gimmicky animation or 3D unless it aids the message/goal.

Be aware of the ways that symbology choices, classification schemes and data aggregation may impact the data's message

These issues are important when you are doing exploratory analysis or communication.

[The 7 deadly sins data visualisation](#) by James Cheshire

# Web Mapping

# Interactivity

## What Could Disappear

Maps show coastal and low-lying areas that would be permanently flooded, without engineered protection, in three levels of higher seas. Percentages are the portion of dry, habitable land within the city limits of places listed that would be permanently submerged.

● Today's waterways   ● Land submerged by rising oceans

Select sea level rise over current level:

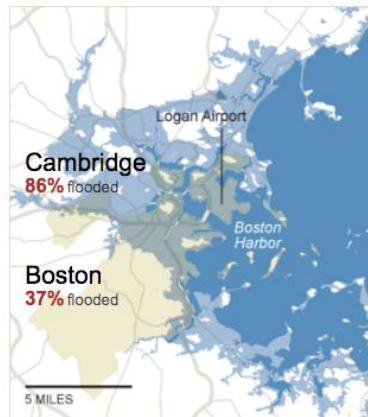
- 25 feet:** Potential level in coming centuries, based on historical climate data.
  - 12 feet:** Potential level in about 2300 if nations make only moderate pollution cuts.
  - 5 feet:** Probable level in about 100 to 300 years.
  - 0 feet:** Today's sea levels and land area.
- Notes on sea level estimates

### Baltimore 12% flooded



Flooding extends over much of downtown and many waterfront communities, like Dundalk.

### Boston



The downtown island shrinks to mostly Beacon Hill. Many shore communities are flooded.

### Charleston, S.C. 80% flooded



The coast moves up to 10 miles inland. The old city is submerged.

### Houston



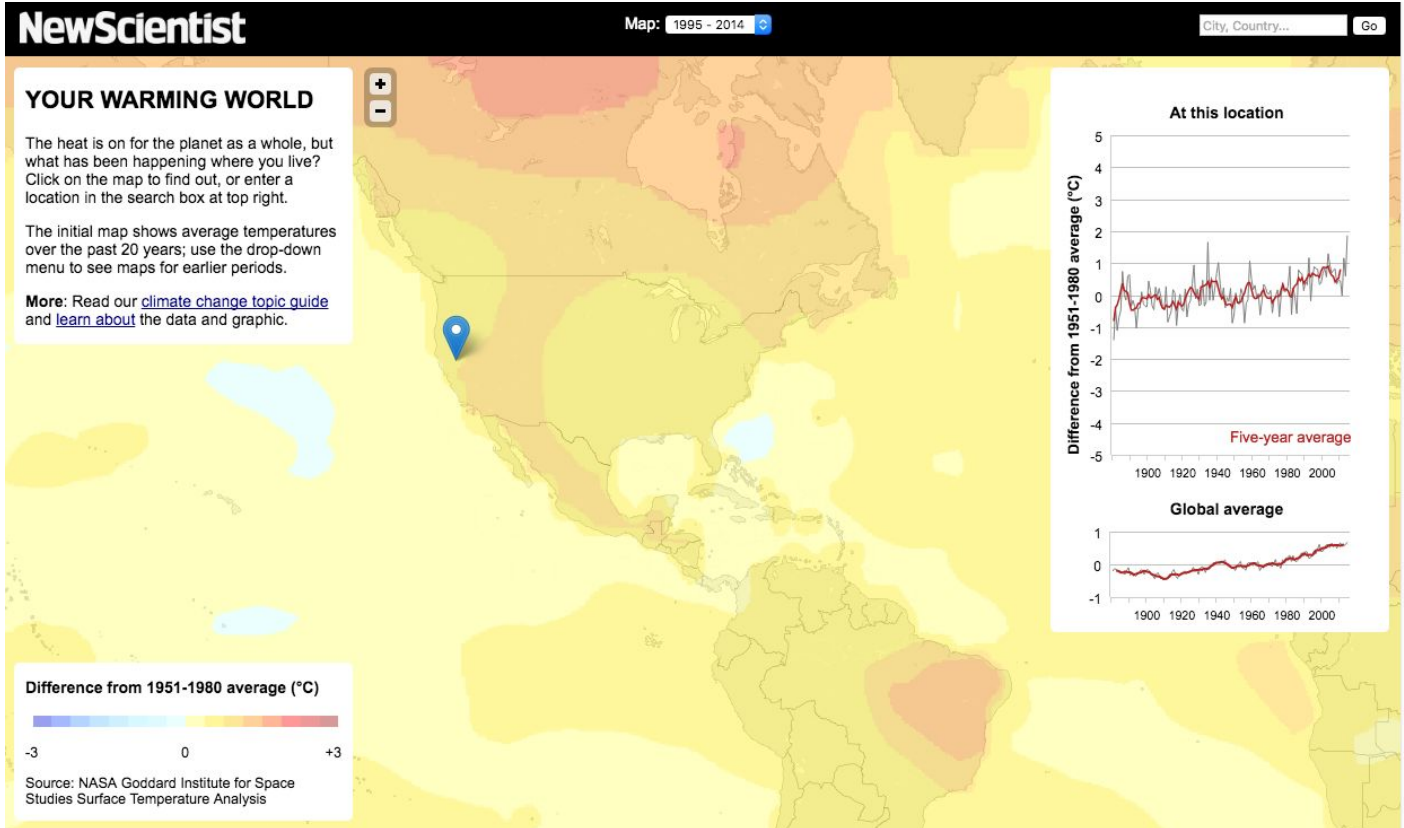
### Jacksonville, Fla. 56% flooded



### Los Angeles area



# Interactivity



# Getting Started with Mapping

# GIS: Geographic Information System

A **geographic information system (GIS)** is a system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

[Wikipedia](#)

# Types of GIS

Desktop GIS: ArcGIS, QGIS

Spatial Databases: PostGIS

Programming tools: R, Python

WebGIS: CARTO (formerly CartoDB), ArcGIS Online



# Why ArcGIS Online?

Gentle(ish) learning curve

UCB has license

Limited free version also available

Expanding functionality

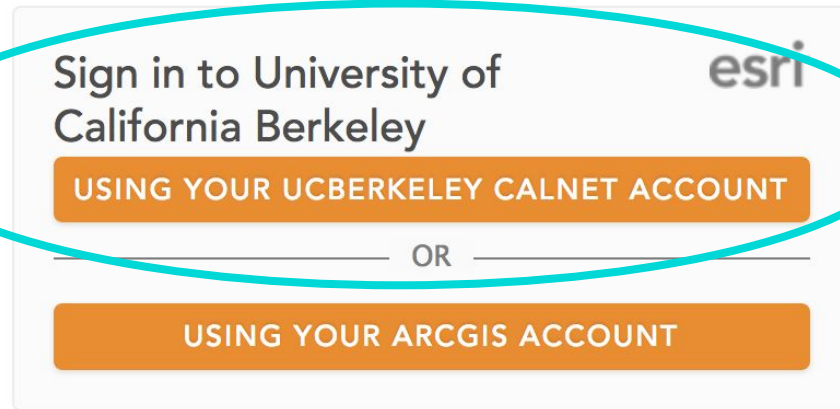
Spatial analysis tools

Share interactive web maps and apps

# Log in to your ArcGIS Online account

The UCB subdomain is:

<http://cal.maps.arcgis.com>



Sign in to University of California Berkeley esri

USING YOUR UCBERKELEY CALNET ACCOUNT

OR

USING YOUR ARCGIS ACCOUNT

Go to the “Get Started with ArcGIS Online” training page:

<https://arcg.is/1TS84jr>

# A quick demo...

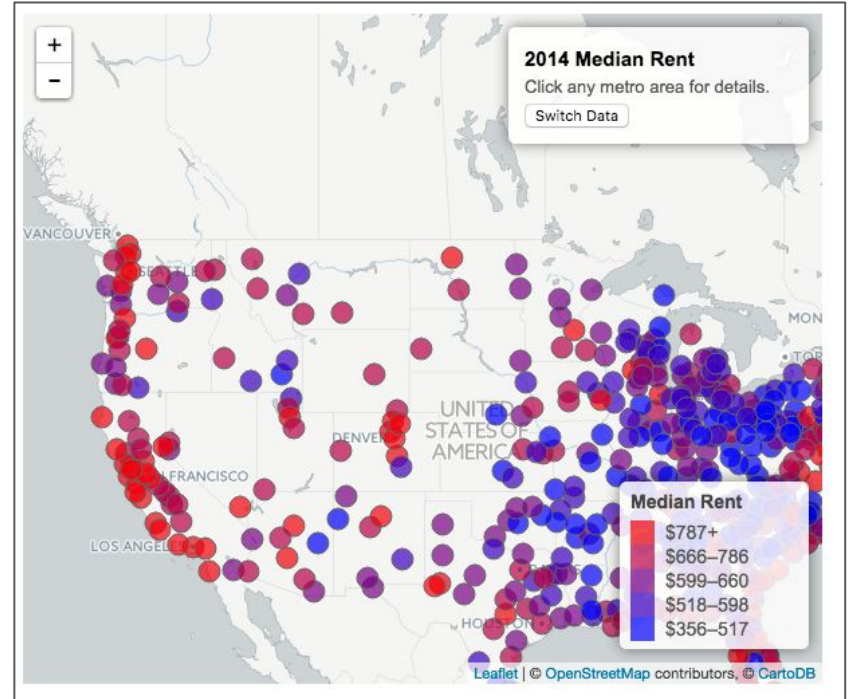
Managing data

Creating maps

Adding data from different sources

Geoff Boeing's data:

[https://raw.githubusercontent.com/gboeing/data-visualization/master/census-rents-2014/rent\\_latlong.csv](https://raw.githubusercontent.com/gboeing/data-visualization/master/census-rents-2014/rent_latlong.csv)



Read about it:

<http://geoffboeing.com/2015/11/landscape-us-rents/>

Questions?

# What we didn't talk about

Latitude, longitude, Map projections & Coordinate reference systems.

- The Earth is not flat, but it is not round either. How that complicates working with geographic data

Digitizing data from a map

Geoprocessing & spatial analysis

Thanks!