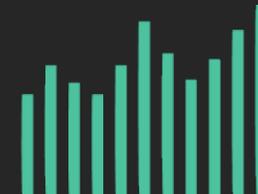
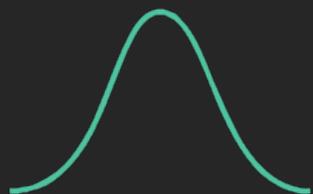


Modern approaches to data viz



Cee Nell

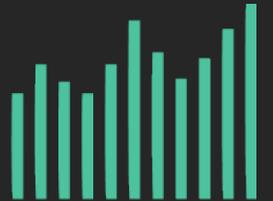
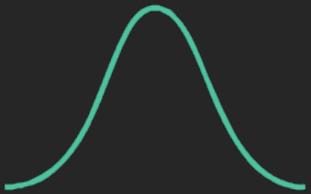
they/them

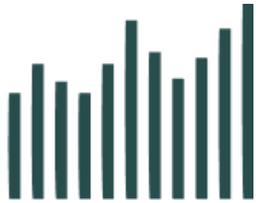
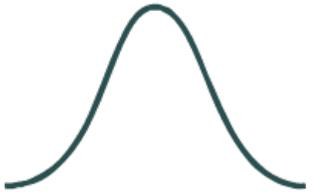
Data Visualization Specialist

USGS Water Mission Area

USGS VIZLAB

water data visualizations
labs.waterdata.usgs.gov/visualizations/vizlab-home





The Washington Post

The solutions to all our problems may be buried in PDFs that nobody reads

The most common chart types

histogram



scatter



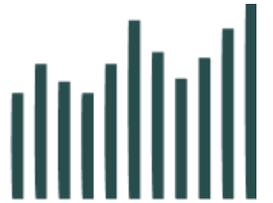
line



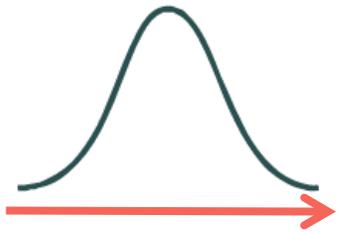
pie



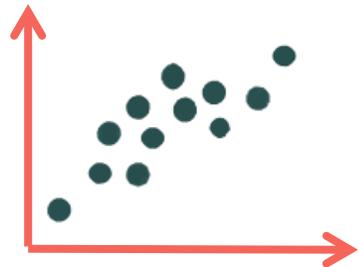
bar



Data: what are the data like?



1 continuous



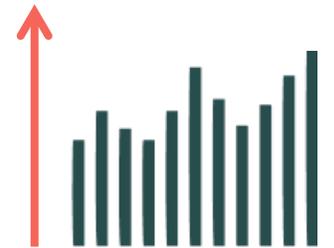
2 continuous



2 continuous



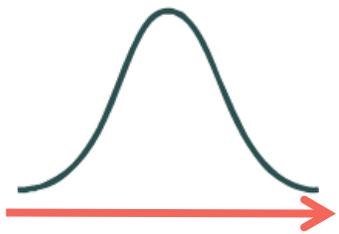
1 continuous
1 categorical
(few groups)



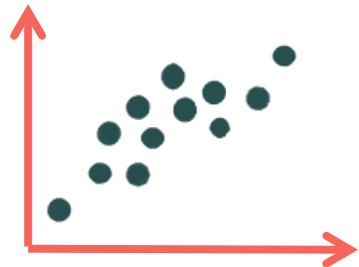
1 continuous
1 categorical
(many groups)

Data: what are the data like?

Message: what is the story?



1 continuous
distribution



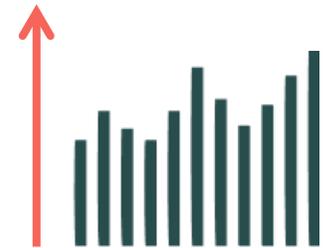
2 continuous
relationship



2 continuous
timeseries



1 continuous
1 categorical
(few groups)
composition
Part-to-whole

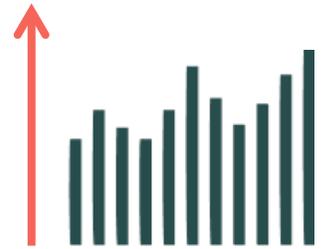
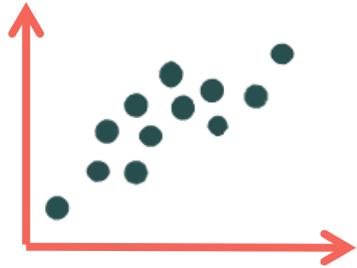
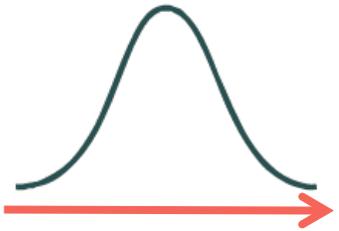


1 continuous
1 categorical
(many groups)
Comparison
Rank
magnitude

Data: what are the data like?

Message: what is the story?

Audience: who is it for?





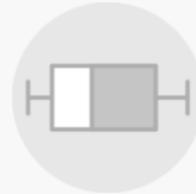
Violin



Density



Histogram



Boxplot



Ridgeline



Scatter



Line plot



Area



Choropleth



Heatmap



Correlogram



Bubble



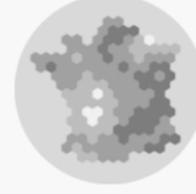
Connected scatter



Density 2d



Barplot



Hexbin map



Cartogram



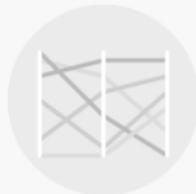
Network



Spider / Radar



Wordcloud



Parallel



Lollipop



Circular Barplot



Treemap



Sankey



Arc diagram



Map



Venn diagram



Doughnut



Pie chart



Dendrogram



Circular packing



Sunburst



Stacked area



Streamchart



Chord diagram



Line plot



Area



Stacked area



Streamchart



Map



Choropleth



Connection



Bubble map

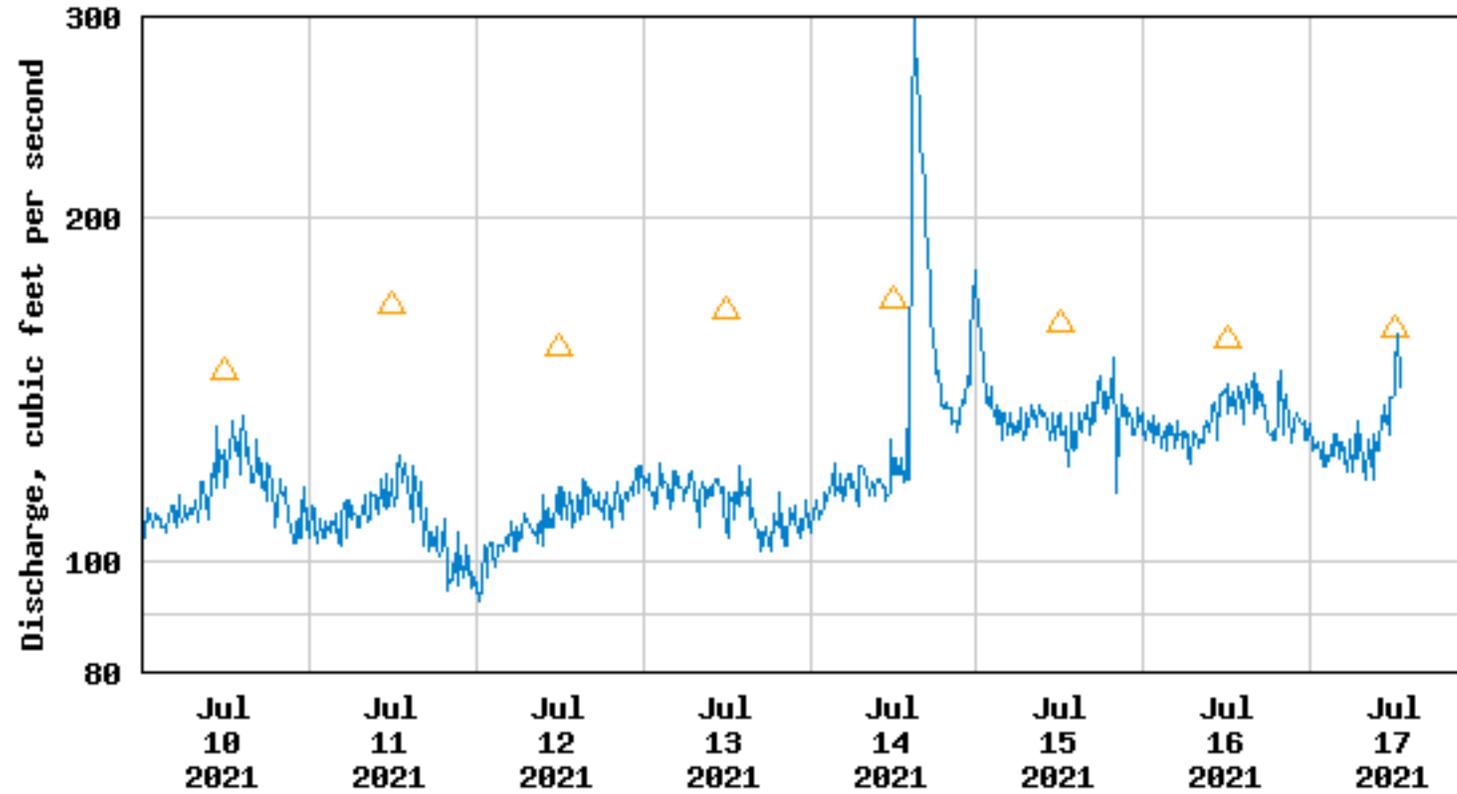


Edge bundling



Visualizing streamflow

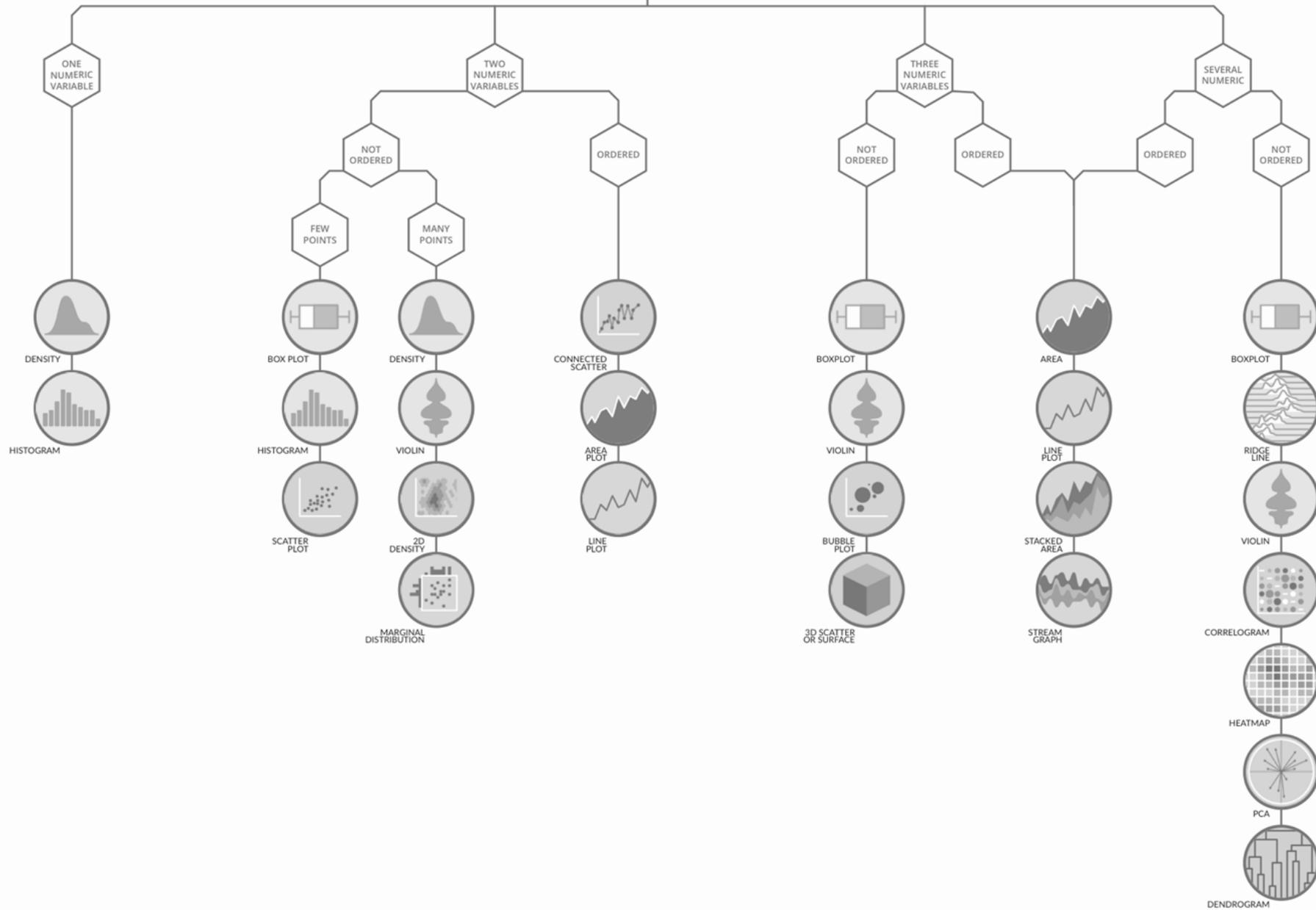
USGS 05428500 YAHARA RIVER AT EAST MAIN STREET AT MADISON, WI



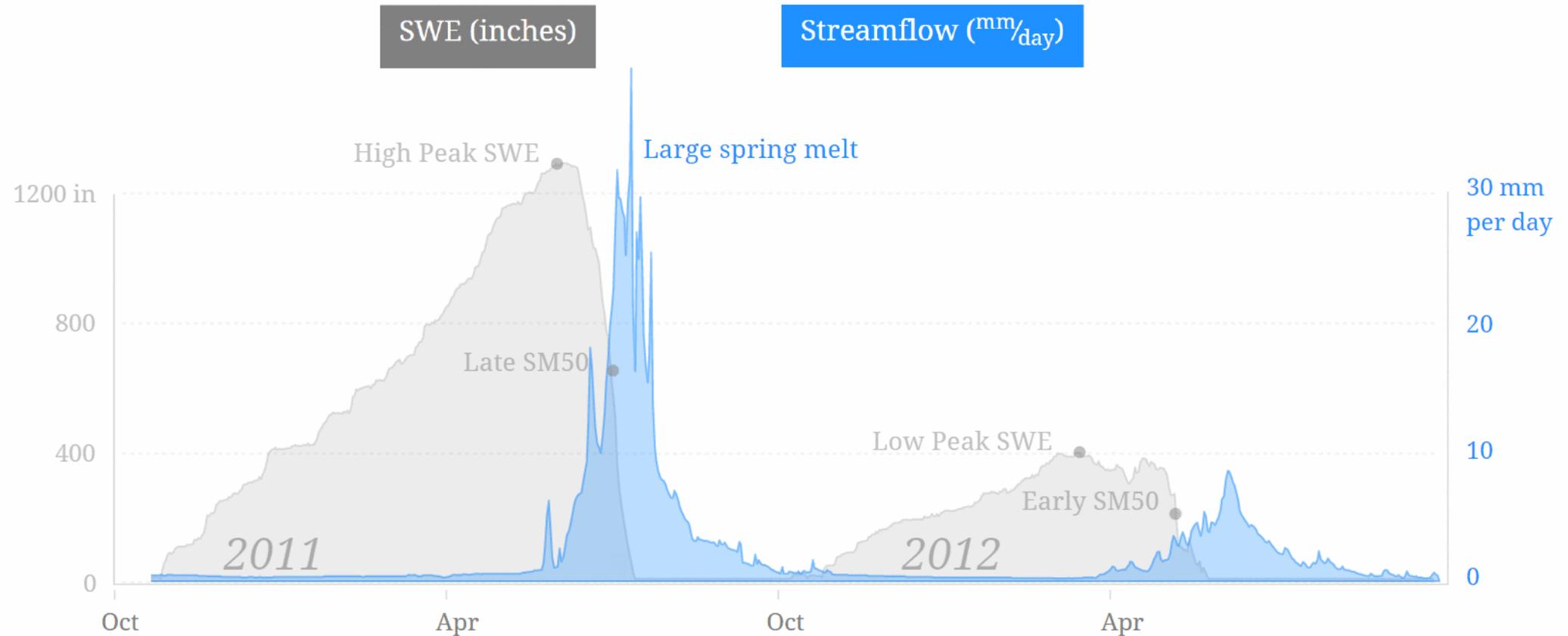
---- Provisional Data Subject to Revision ----

△ Median daily statistic (17 years) — Discharge

NUMERIC



From Snow to Flow



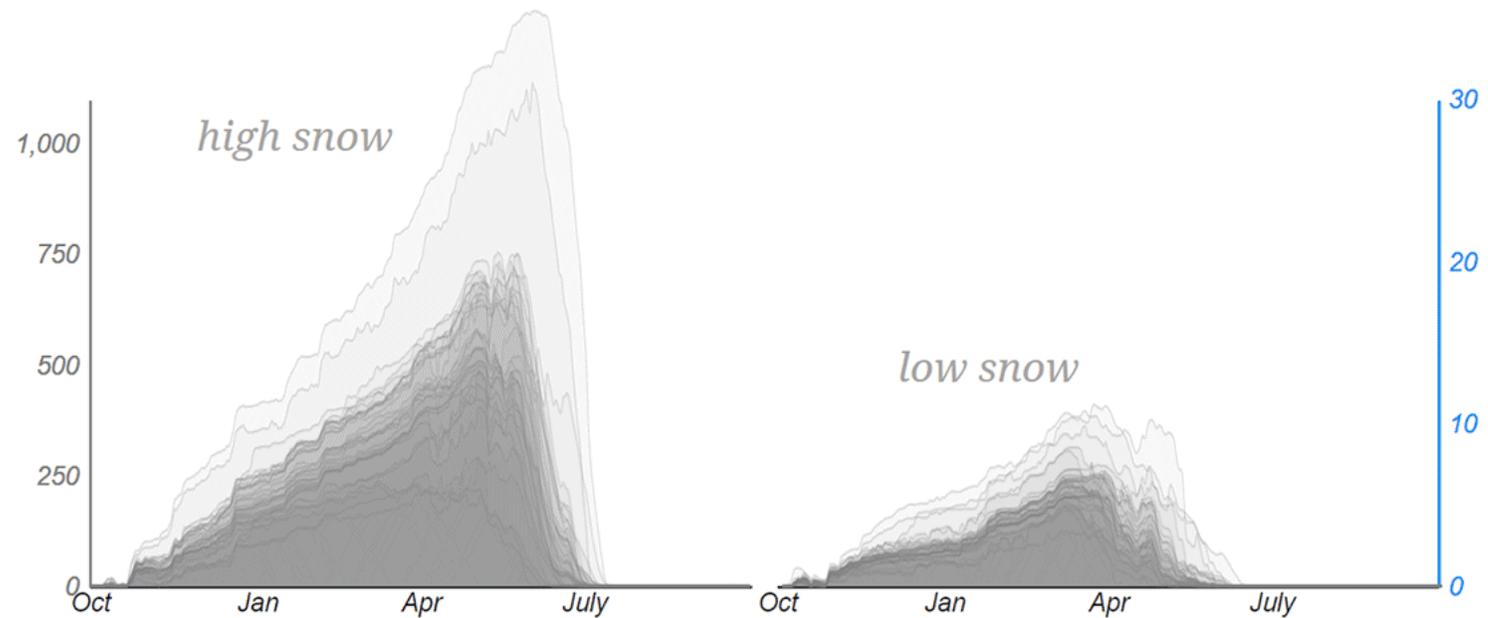
Data source: Snow water equivalent (SWE) data are from the Never Summer SNOTEL site 1031 and streamflow measurements are from USGS streamgage 06614800 on the Michigan River near Cameron Pass, CO



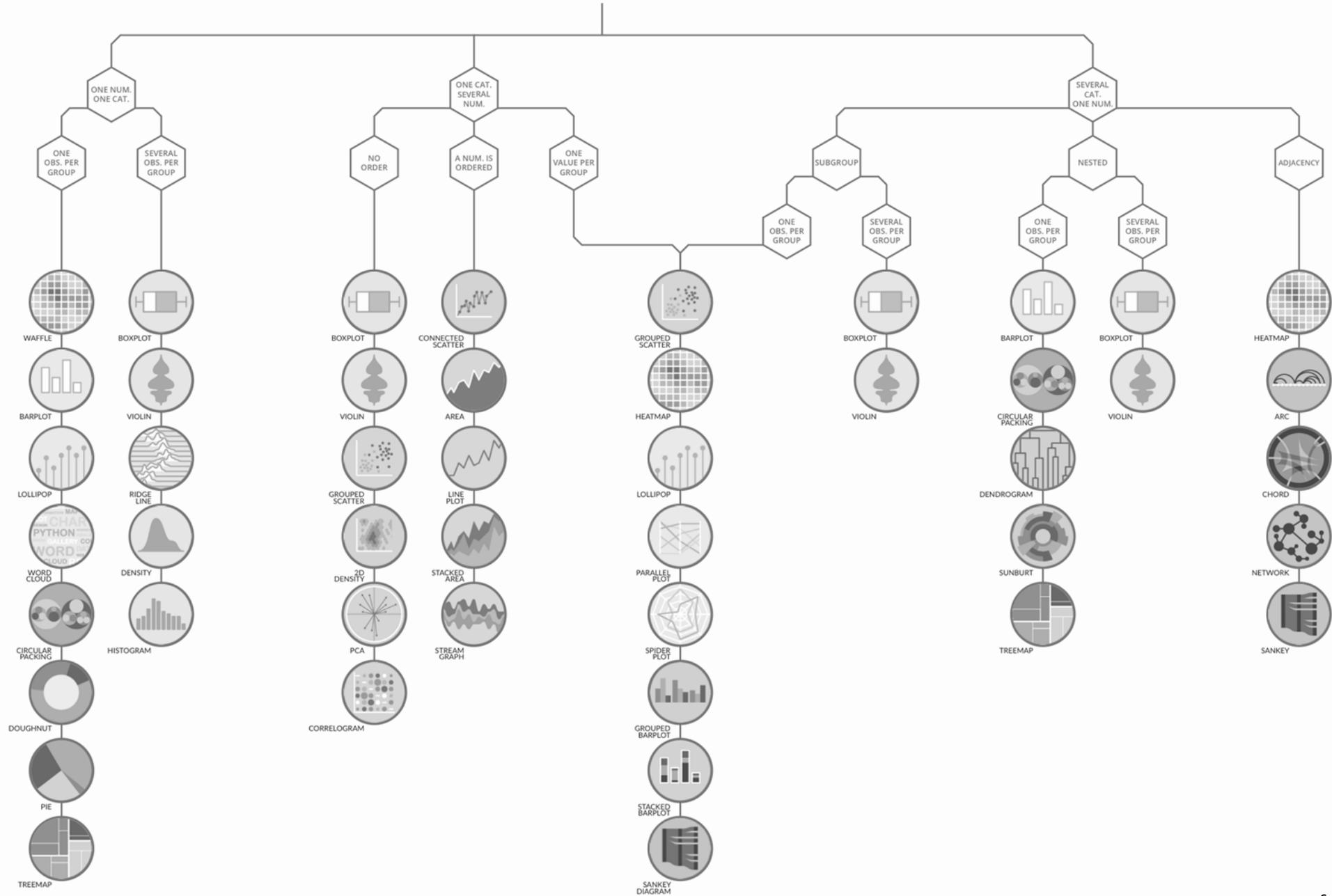
From Snow to Flow

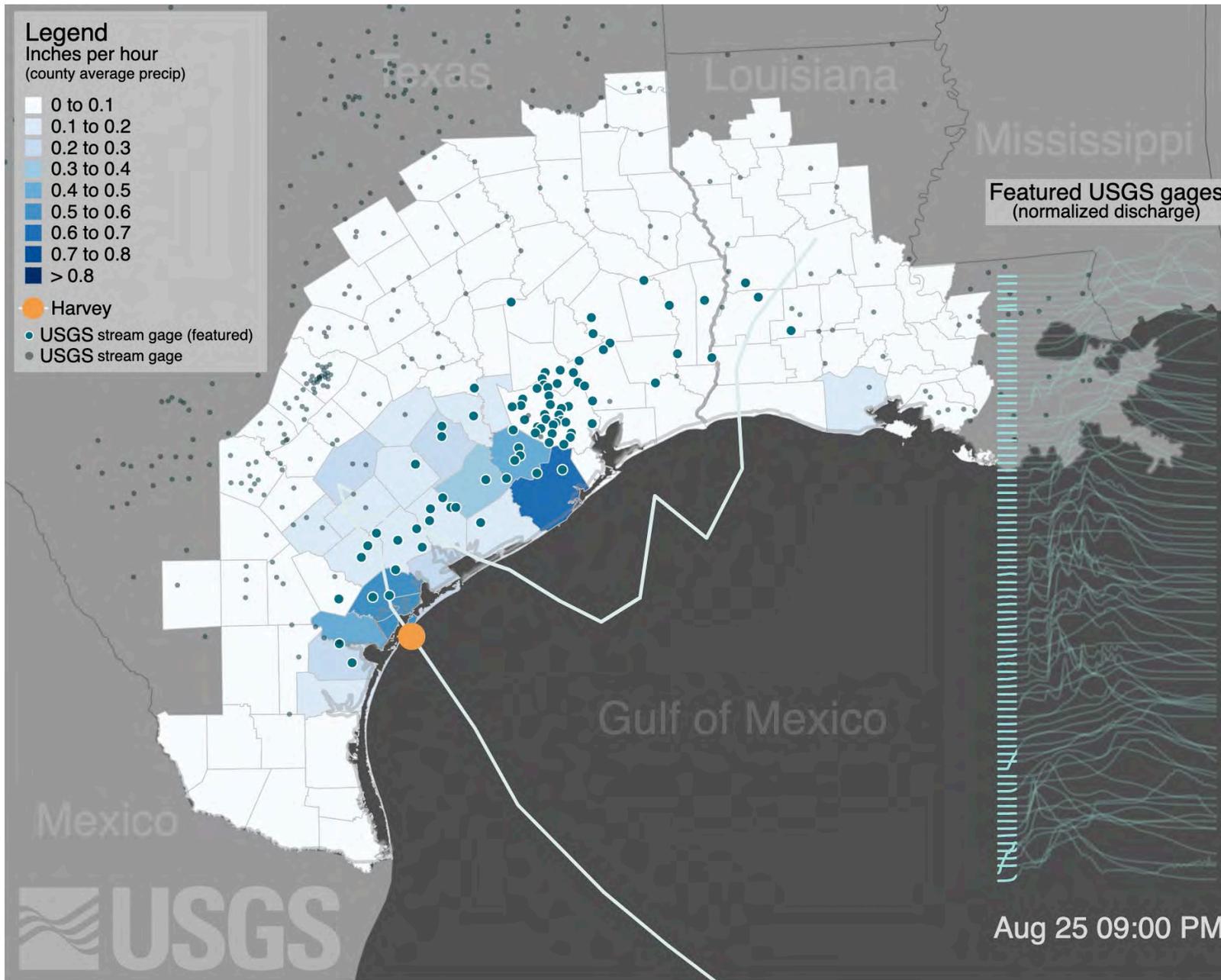
SWE (inches)

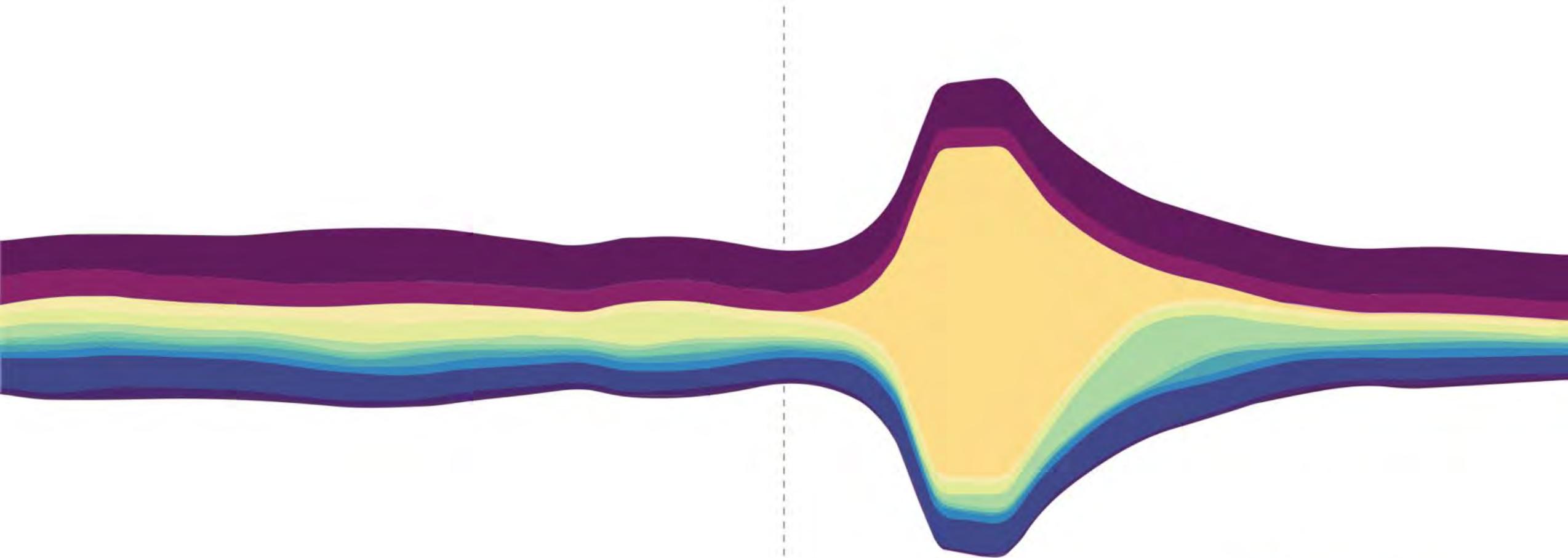
Streamflow (mm/day)



CATEGORIC AND NUMERIC







August 25, 2017

Hurricane Harvey
makes landfall.



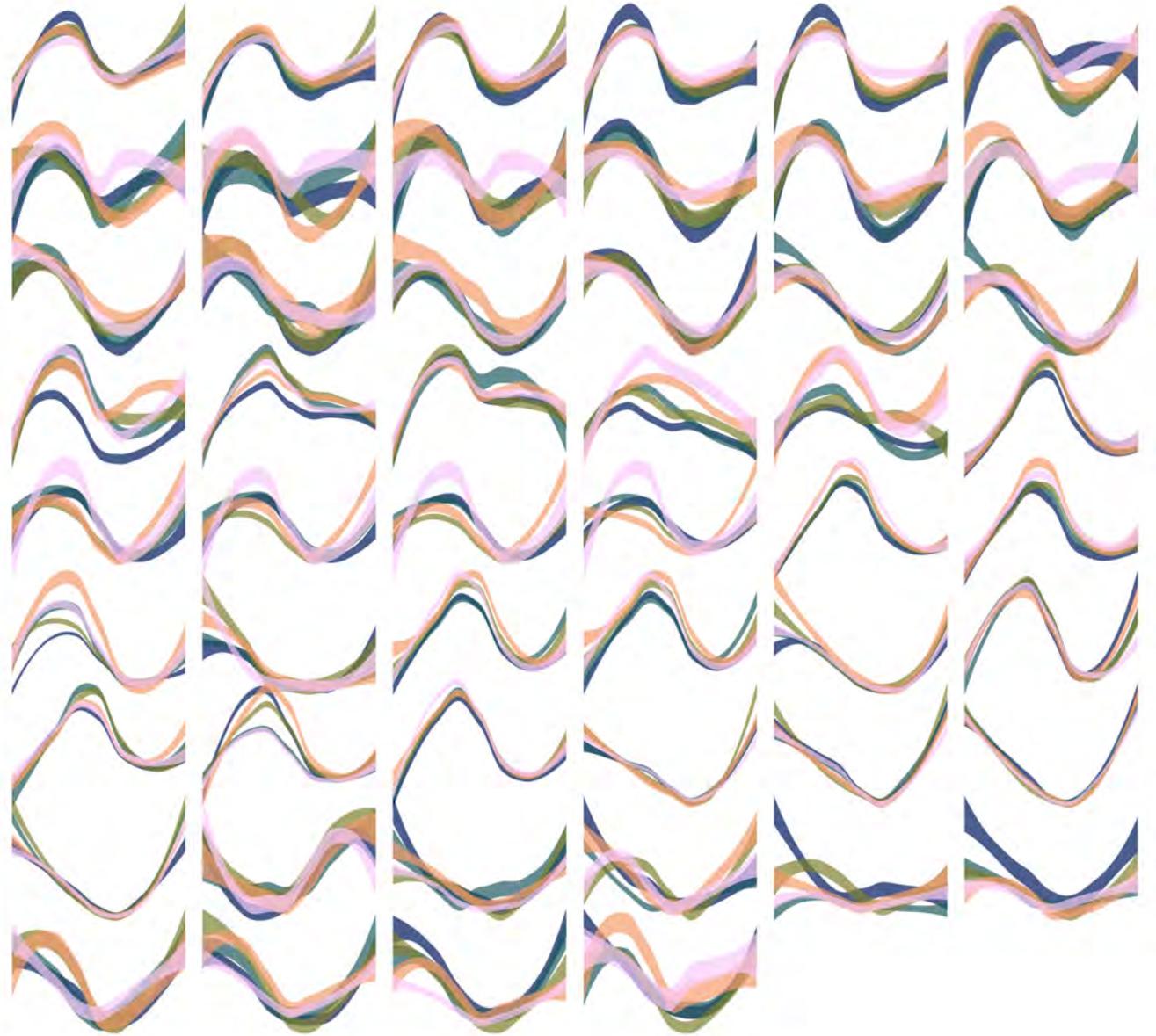
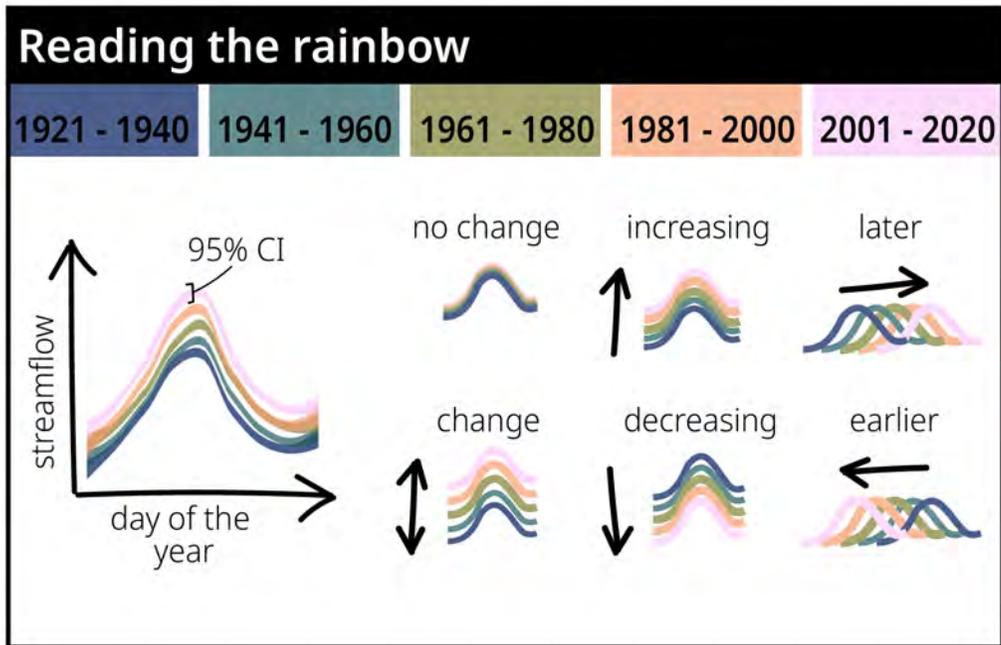
*30 days of river discharge across the
hydrologic regions of the U.S.
Data from NWIS and the USGS HCGN.*

Same data, different story



streamflow RAINBOWS

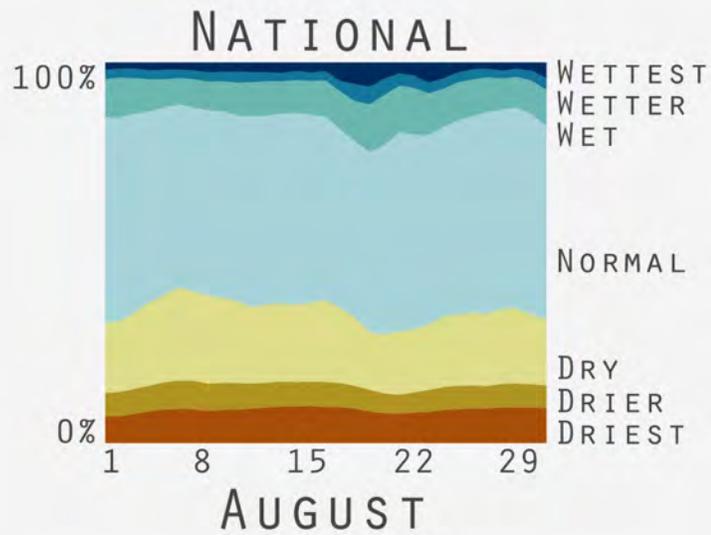
Each **rainbow** shows 7-day **streamflow** trends over 100 years for a single streamgage.



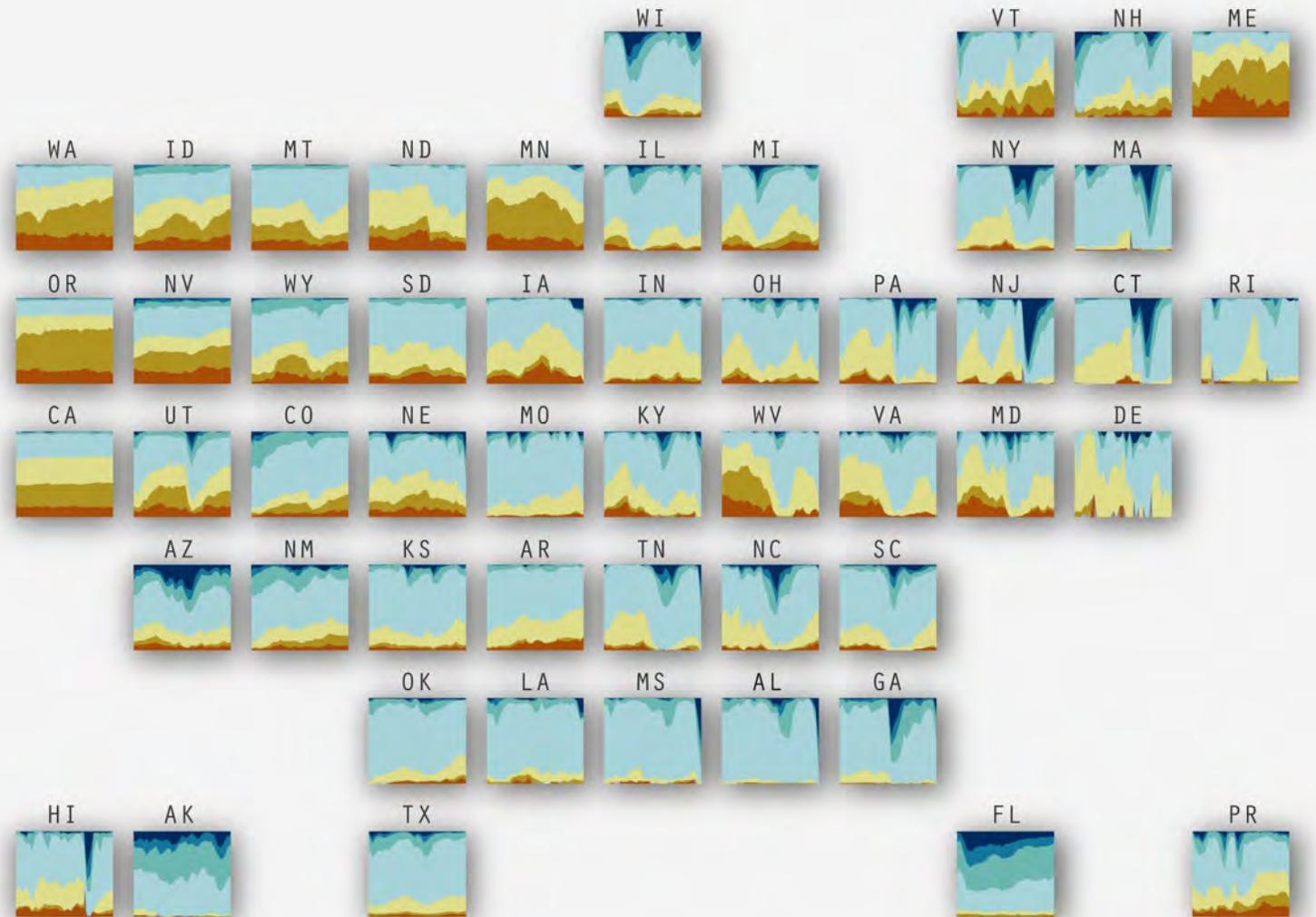
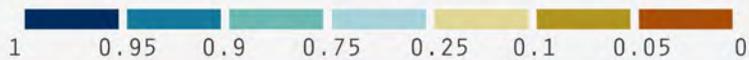
U.S. River Conditions

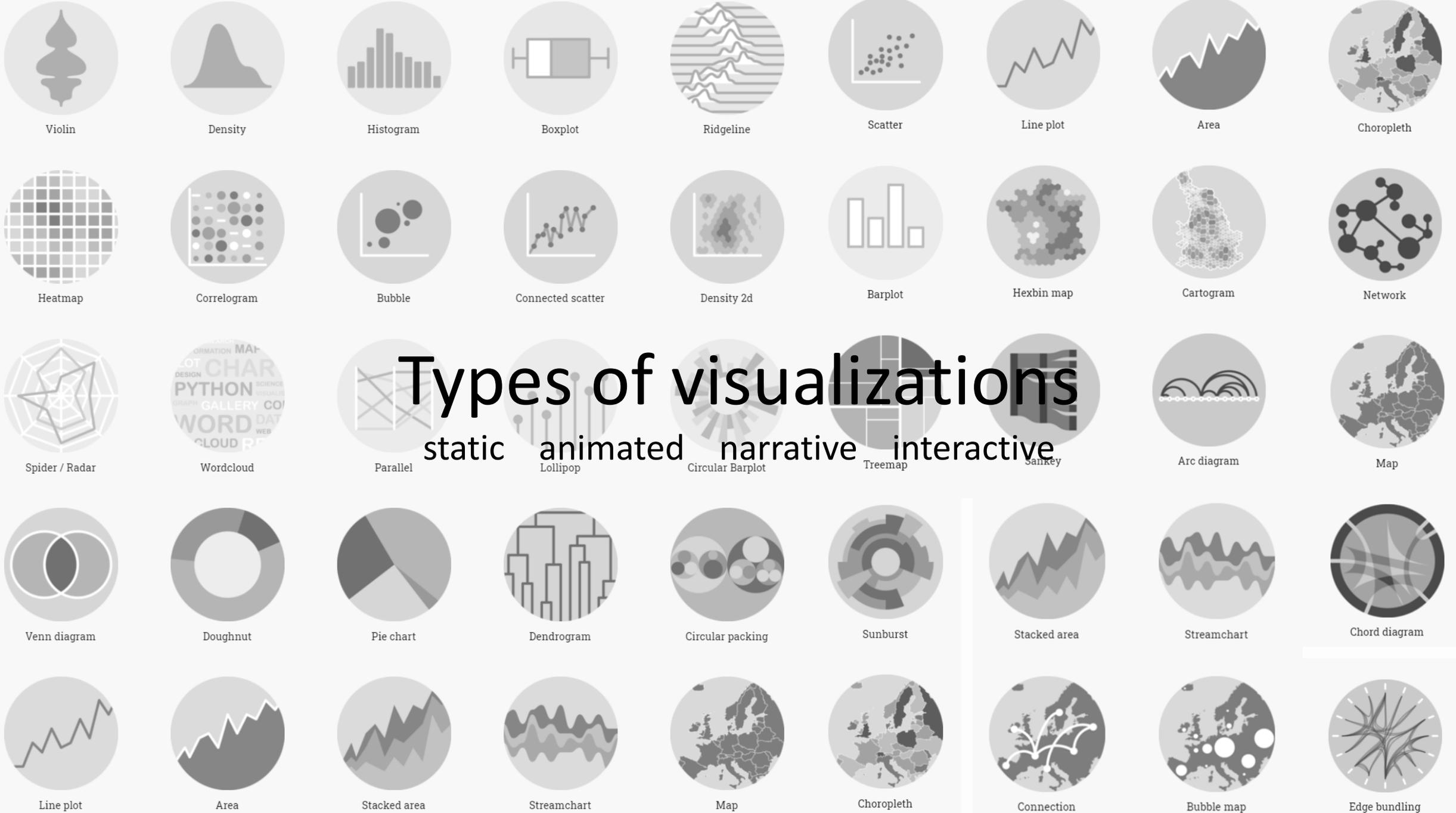
April 1, 2021 - June 30, 2021

AUGUST 2021 STREAMFLOW



FLOW PERCENTILE AT USGS STREAMGAGES
RELATIVE TO THE HISTORIC DAILY RECORD.



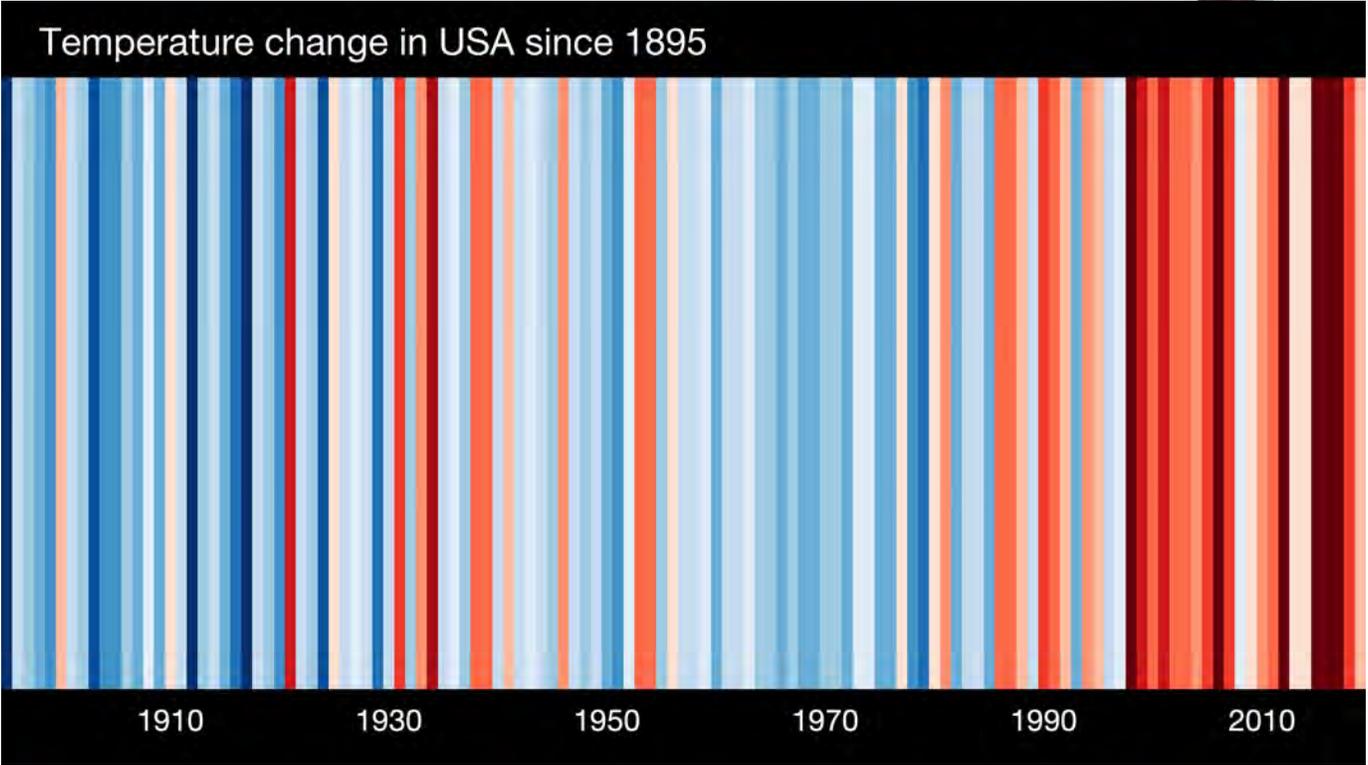


Types of visualizations

static animated narrative interactive

Static

Figure, image, diagram



Stripes in the Environment



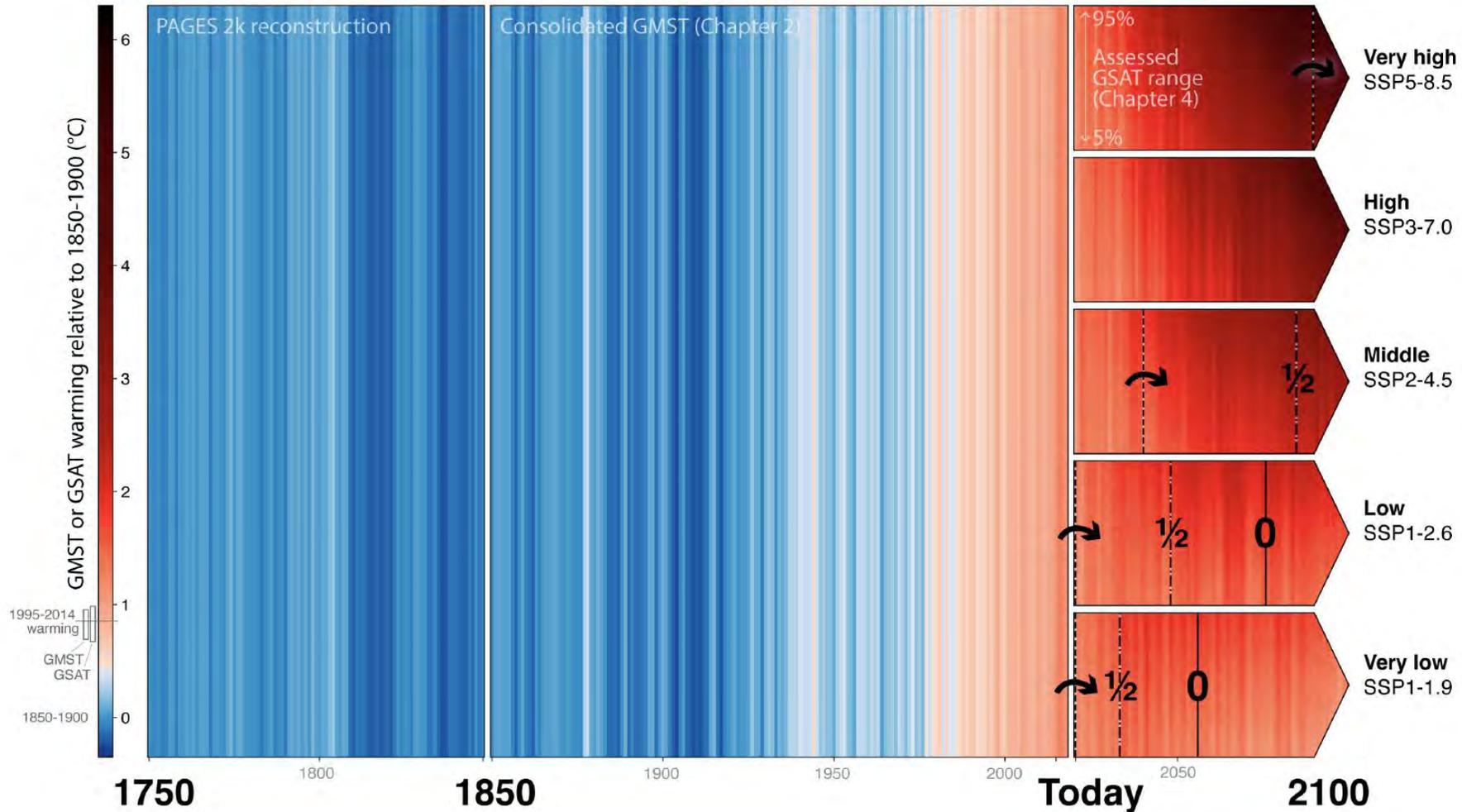
Print Media



Historical global-mean surface temperatures

Possible Futures

CO₂ Emissions:
↷ Peaking
½ Halving
0 Net-zero

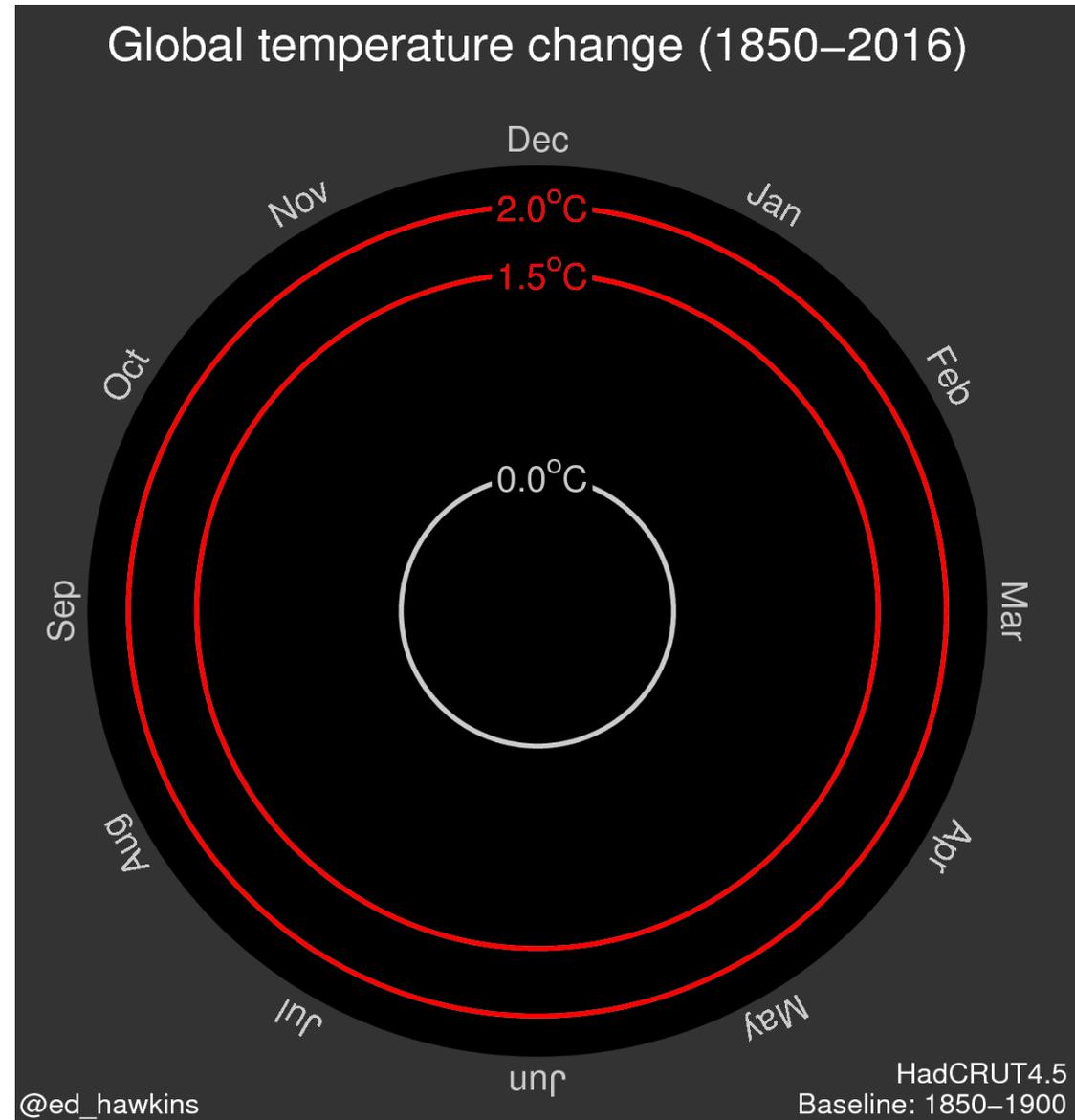


Animation

Moving image

Add complexity

Time



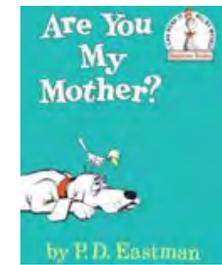
Narrative

Explanation, story

Context

Progressive discovery

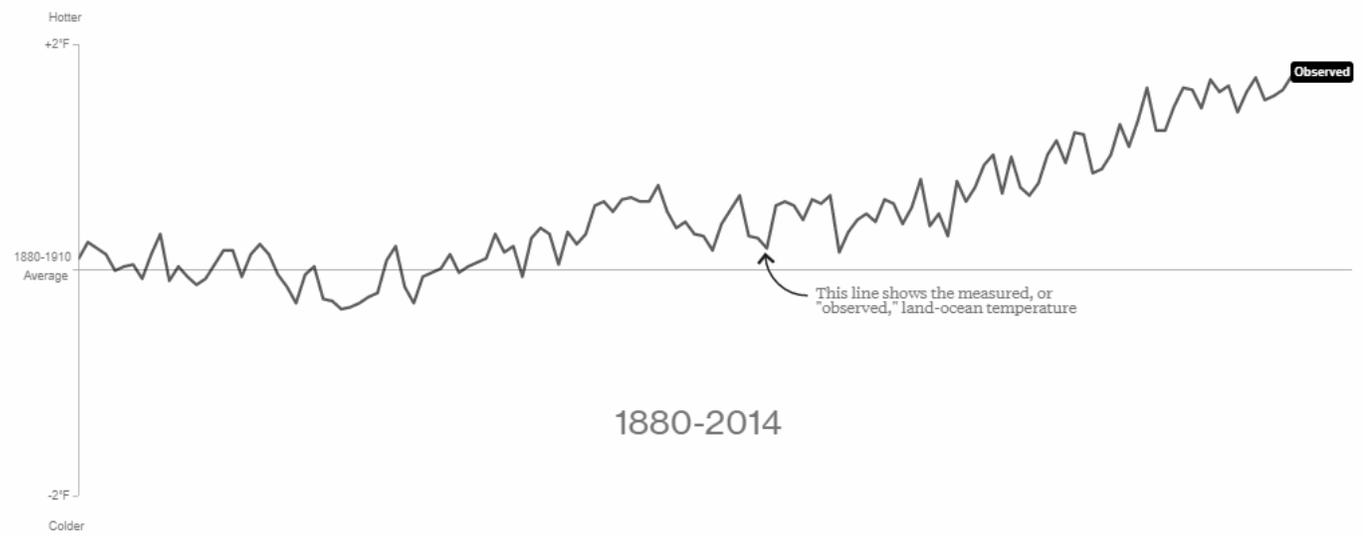
Attention pacing



What's Really Warming the World?

By Eric Roston and Blacki Migliozi | June 24, 2015

Skeptics of manmade climate change offer various natural causes to explain why the Earth has warmed 1.4 degrees Fahrenheit since 1880. But can these account for the planet's rising temperature? Scroll down to see how much different factors, both natural and industrial, contribute to global warming, based on findings from NASA's Goddard Institute for Space Studies.

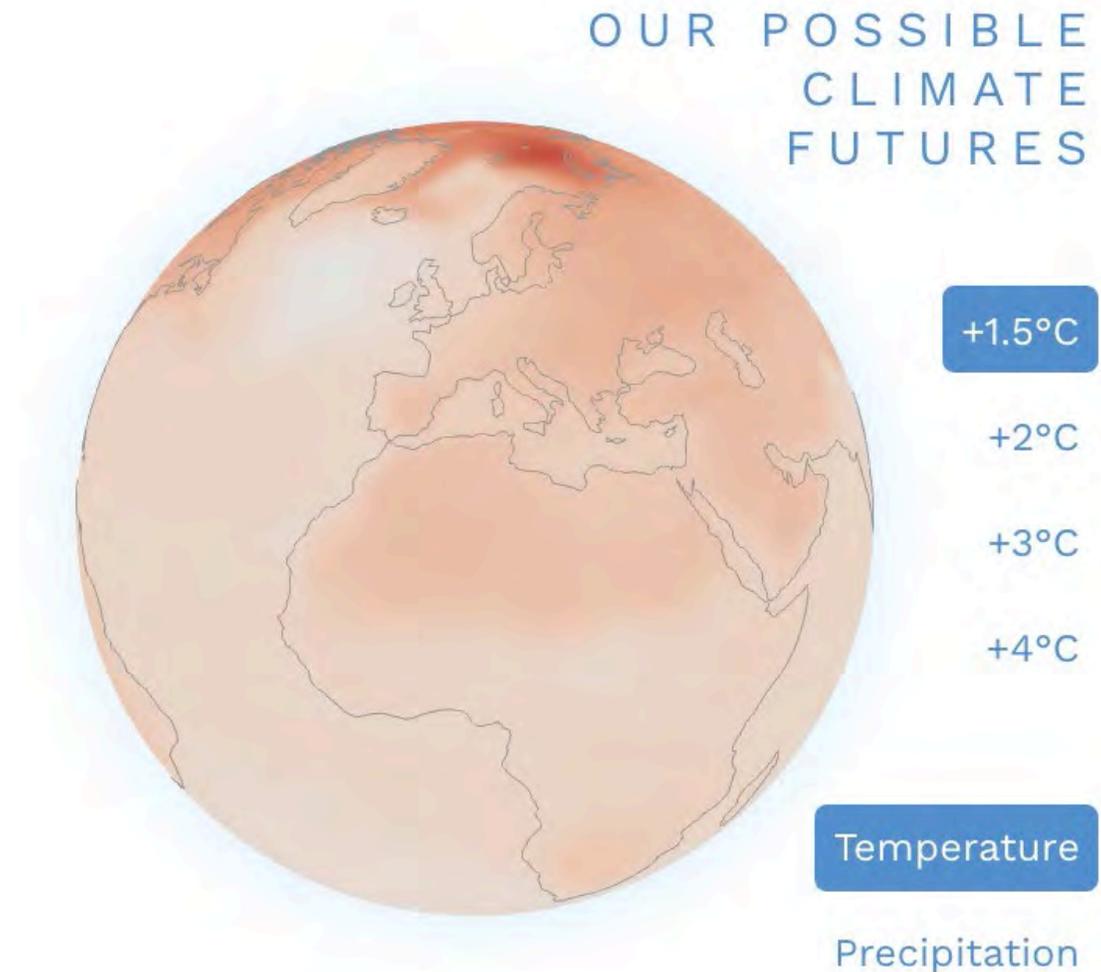


Interactive

Exploration

User-driven discovery

Personalized



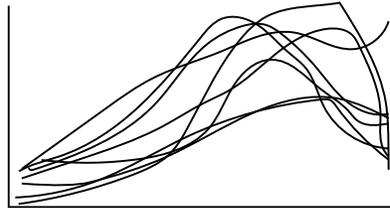


Using visual hierarchy

Hierarchy



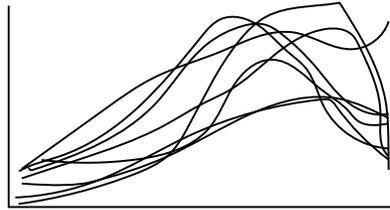
Here's the title.
And the subtitle.



This is just some random text. You really aren't going to want to read all of this. In fact, if you've gotten this far, you deserve a cookie.

Hierarchy

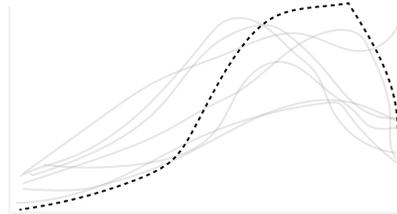
Here's the title.
And the subtitle.



This is just some random text. You really aren't going to want to read all of this. In fact, if you've gotten this far, you deserve a cookie.

Style

Differences pop out.



This is just some random text. You really aren't going to want to read all of this. In fact, if you've gotten this far, you deserve a cookie.

Weight

Make important things "weighty."



This is just some random text. You really aren't going to want to read all of this. In fact, if you've gotten this far, you deserve a cookie.

Color

Use color to direct attention.



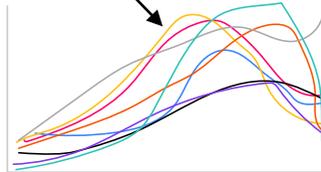
This is just some random text. You really aren't going to want to read all of this. In fact, if you've gotten this far, you deserve a cookie.

Color



Color is best used as an emphasis.

It's hard to tell which is most important.?



Time of day

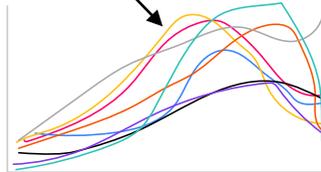
Try creating your design in black and white first. Once it works, then add color to emphasize your point.

Color



Color is best used as an emphasis.

It's hard to tell which is most important.?



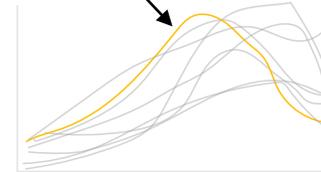
Time of day

Try creating your design in black and white first. Once it works, then add color to emphasize your point.



Color is best used as an emphasis.

Use color as an accent to reinforce hierarchy.



Time of day

Try creating your design in black and white first. Once it works, then add color to emphasize your point.



USGS researchers

+



public data sources

+



data processing pipeline

+



interactivity

+



graphic design

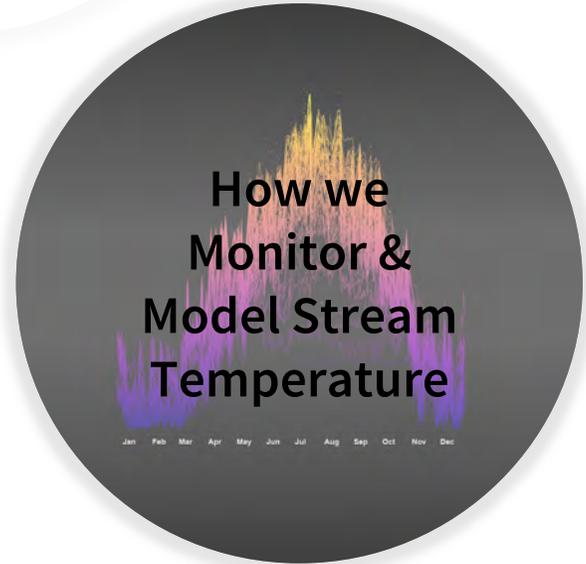
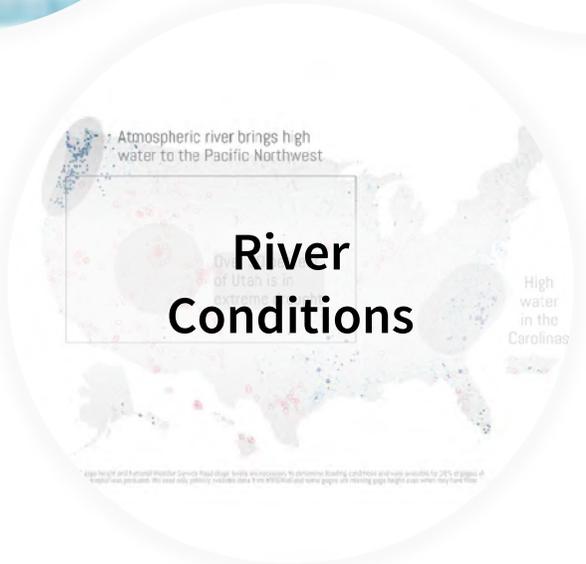
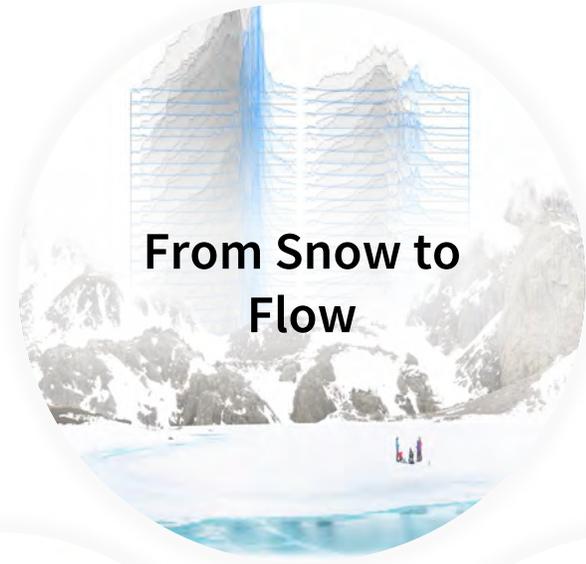
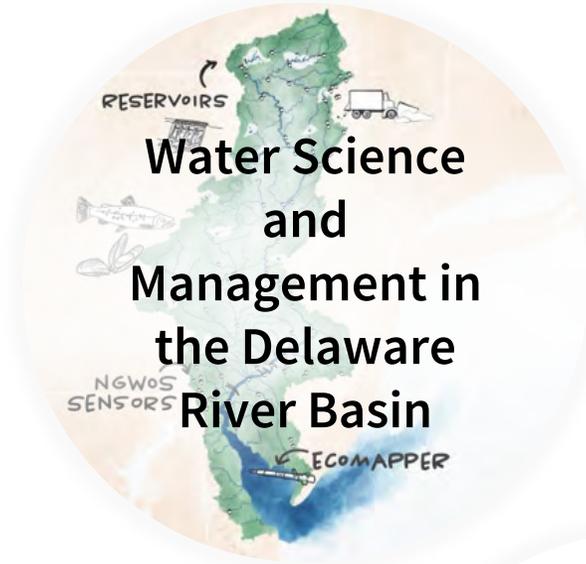
+



front end web development

USGS VIZLAB

water data visualizations
labs.waterdata.usgs.gov/visualizations/vizlab-home



USGS VIZLAB

water data visualizations
labs.waterdata.usgs.gov/visualizations/vizlab-home

