USGS
science for a changing world

National Water Availability Assessment

USGS Water Resources Mission Area

U.S. Department of the Interior
U.S. Geological Survey

I’m your host!

Let’s learn about innovation in national scale understanding of water availability together.

Meg Shoda (she/her)
Hydrologist
Water Mission Area

USGS

What to expect from today's webinar

Opening remarks
USGS Director
David Applegate

Do we have enough water?
Understanding water supply, water use, and water limitation

How does water quality impact water availability?
Identifying top threats to water quality by source of water and water use

A more complete definition of water availability
Integrating four components of water availability

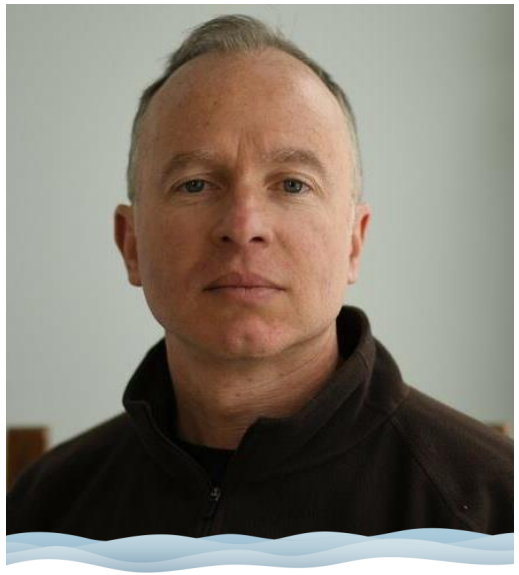
Learn more
Products and next steps

Questions and discussion

USGS

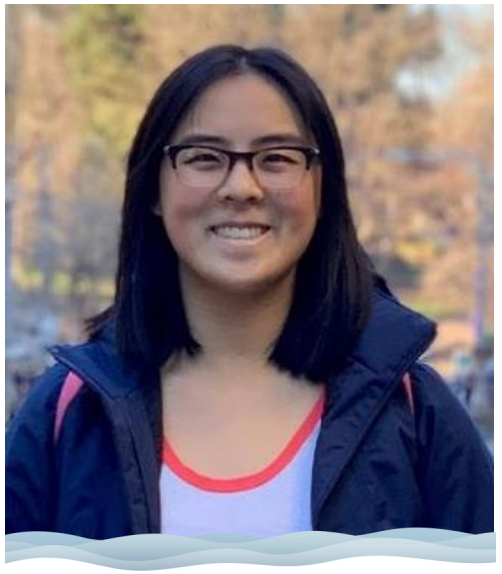
USGS Scientists

Lori Sprague (she/her)
Program Manager, Integrated Water Availability Assessments
Water Mission Area



Ted Stets
Research Ecologist
Water Mission Area

Mindy Erickson (she/her)
Research Hydrologist
Upper Midwest Water Science Center



Shirley Leung (she/her)
Product Owner
Water Mission Area

USGS

What to expect from today's webinar

Opening remarks
USGS Director
David Applegate

Do we have enough water?
Understanding water supply, water use, and water limitation

How does water quality impact water availability?
Identifying top threats to water quality by source of water and water use

A more complete definition of water availability
Integrating four components of water availability

Learn more
Products and next steps

Questions and discussion

USGS

Opening Remarks

The assessment is first of its kind, using models to fill in gaps in observations, and it integrates information on water quantity, quality and use for a more comprehensive understanding of water availability.

David Applegate
Director
US Geological Survey

USGS

Christmas tree shortage projected from severe Northeast drought: 'We can't grow anything'

Farmers report that up to 25% of young trees have been lost due to unusually dry conditions

By Jasmine Baehr | FOXBusiness |

Northeast drought may cause spike in C

Chris Moran of Vandervalk Farm in Mendon, M
conditions in the Northeast. (Credit: WBZ-TV)

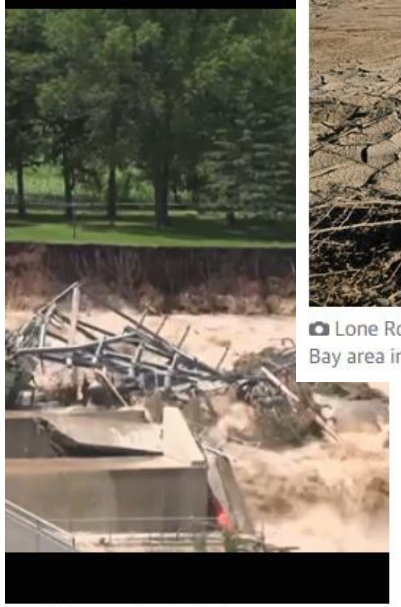
Iowa floodwaters breach levees as even more rain dumps onto parts of Midwest

Atmospheric Rivers Could Become Stronger, Study Suggests

The Weather Channel | JENNIFER GRAY
January 2, 2025 at 3:00 PM

As atmospheric rivers take aim at the West Coast, not all impacts are the same. Some events bring beneficial rain and snow, while others unleash deadly flooding and landslides.

We now know that climate change will also have a hand in how these rivers of moisture come onshore and it's not a uniform change from one end of the coast to the other.



ipted officials to prepare for a potential collapse.

Nearly all of US states are facing droughts, an unprecedented number

More than 150 million people and 318m acres of crops are affected by droughts after summer of record heat

Lone Rock, s
Bay area in Uta

Half of all global food threatened by growing water crisis, report says

Densely populated areas such as northwestern India, northeastern China and southern and eastern Europe will bear the brunt of water mismanagement, according to the Global Commission on the Economics of Water.

Dried-up crops in Lesotho, in southern Africa, on Aug. 7. Nearly a quarter of its 2 million people are without work, and half live below the poverty line, according to the country's Development Planning Ministry. Phill Magakoe / AFP via Getty Images

USGS

Do we have enough water?

USGS

National Water Availability Assessment

Comprehensive, scientific assessment of water availability in the United States, integrating water quantity, quality, and use

First of its kind – provides **new water availability information**, including potential imbalance between water supply and demand

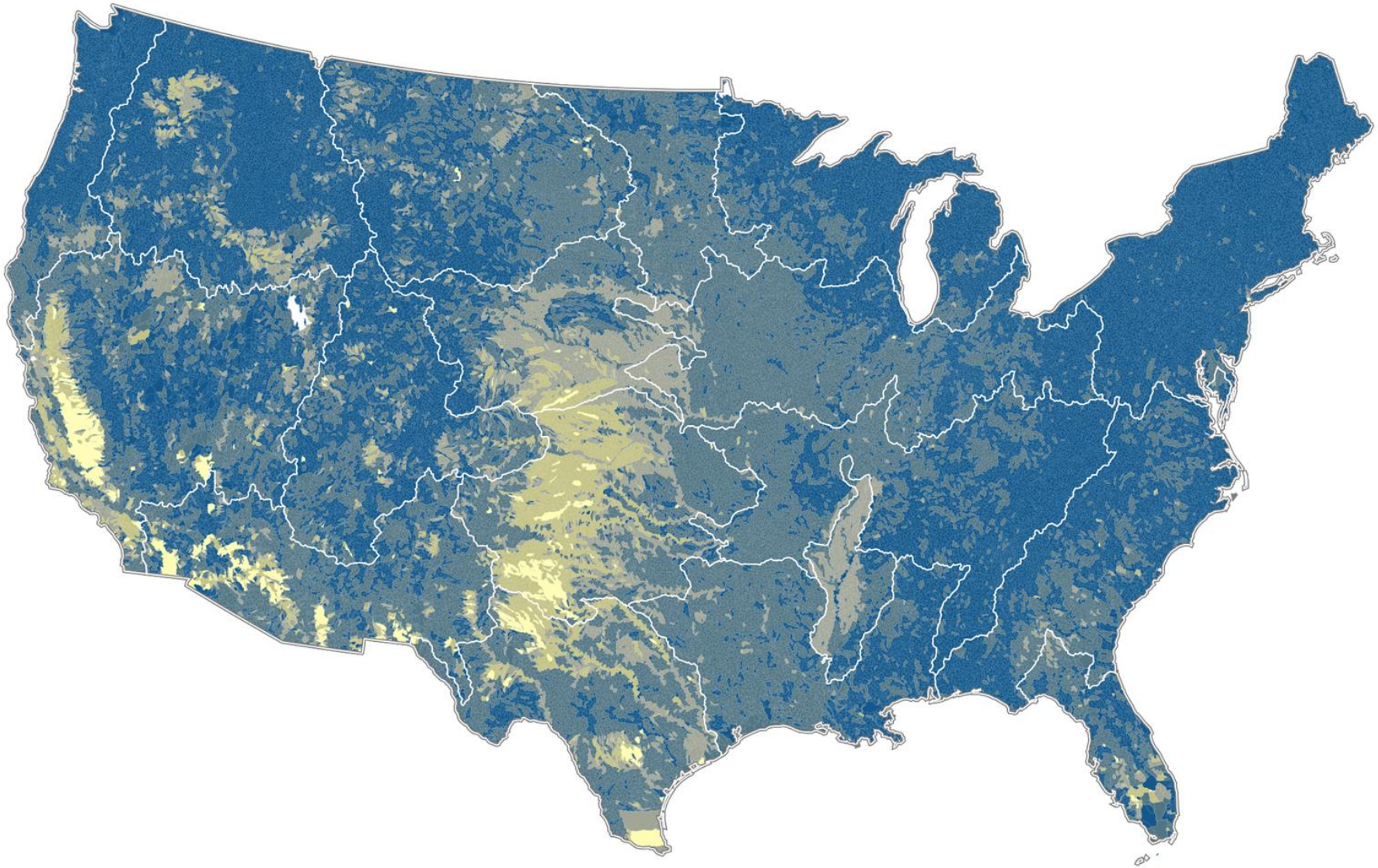
Complementary to forthcoming Regional Water Availability Assessments

USGS

Water limitation

Supply and Use Index (SUI)

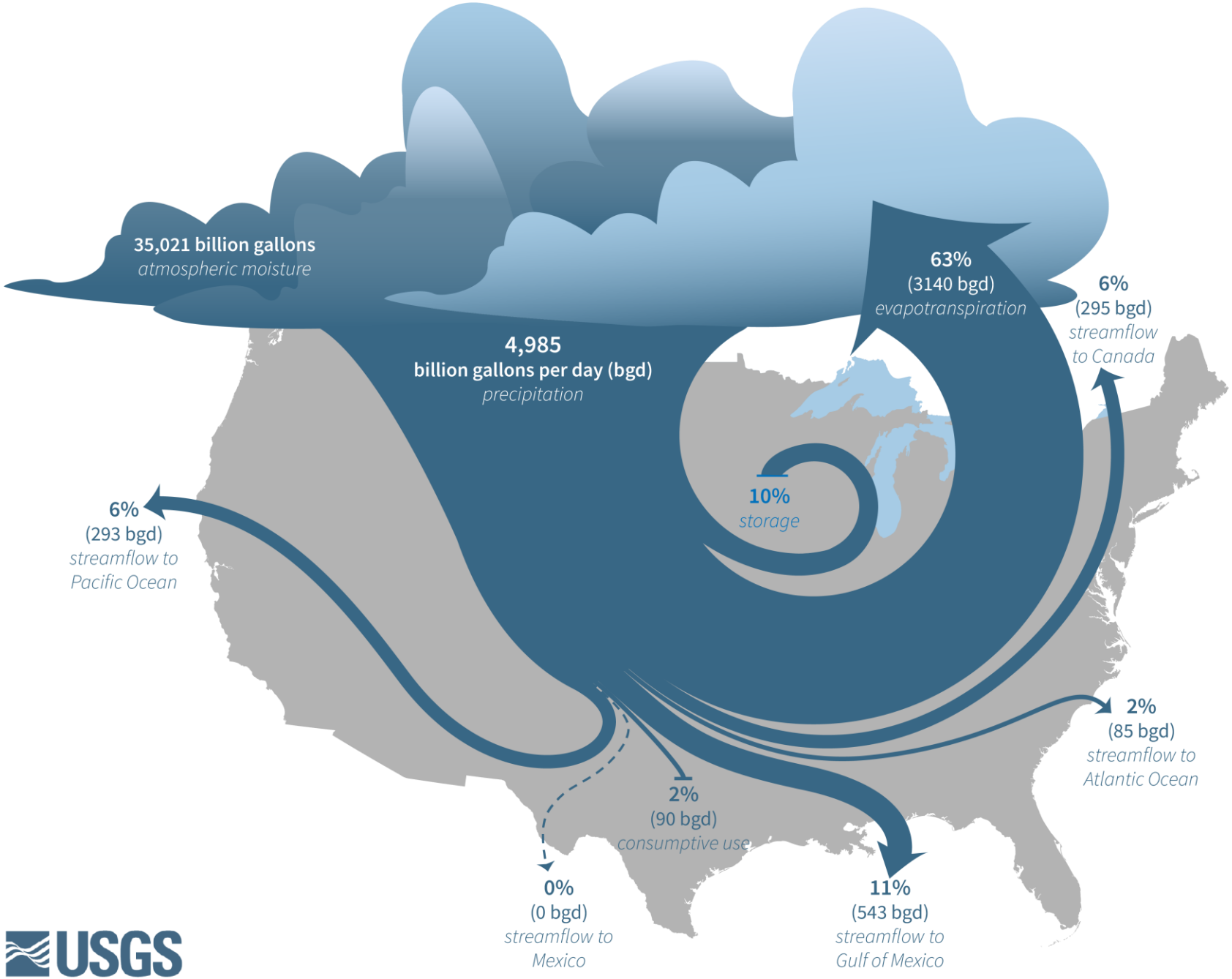
- Severe (0.8-1)
- High (0.6-0.8)
- Moderate (0.4-0.6)
- Low (0.2-0.4)
- Very low (0-0.2)



USGS

Water limitation = Supply - Demand

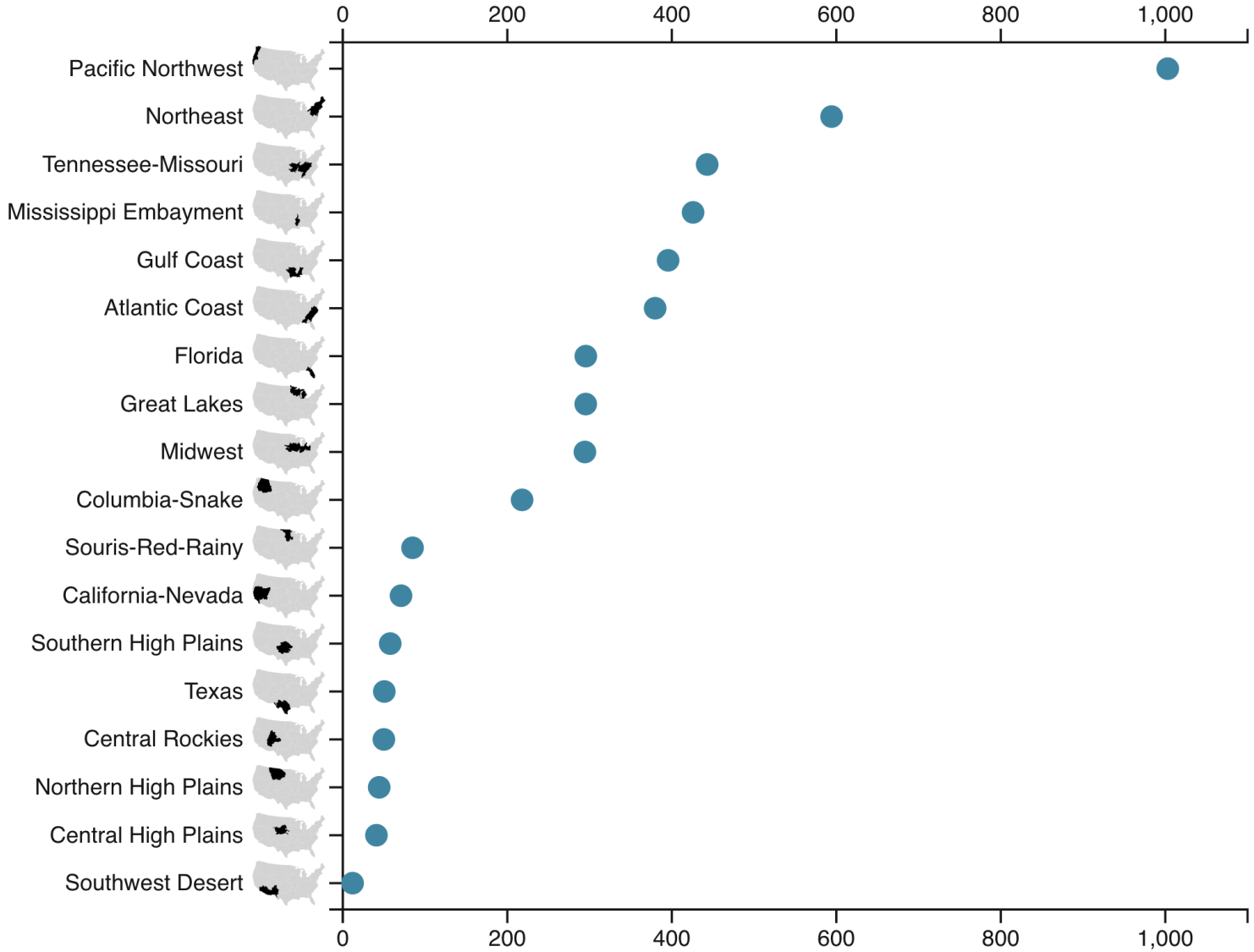
USGS


35,021 billion gallons
atmospheric moisture
4,985
billion gallons per day (bgd)
precipitation
63%
(3140 bgd)
evapotranspiration
6%
(295 bgd)
streamflow
to Canada
10%
storage
6%
(293 bgd)
streamflow to
Pacific Ocean
2%
(85 bgd)
streamflow to
Atlantic Ocean
2%
(90 bgd)
consumptive use
0%
(0 bgd)
streamflow to
Mexico
11%
(543 bgd)
streamflow to
Gulf of Mexico

USGS

Surface water supply

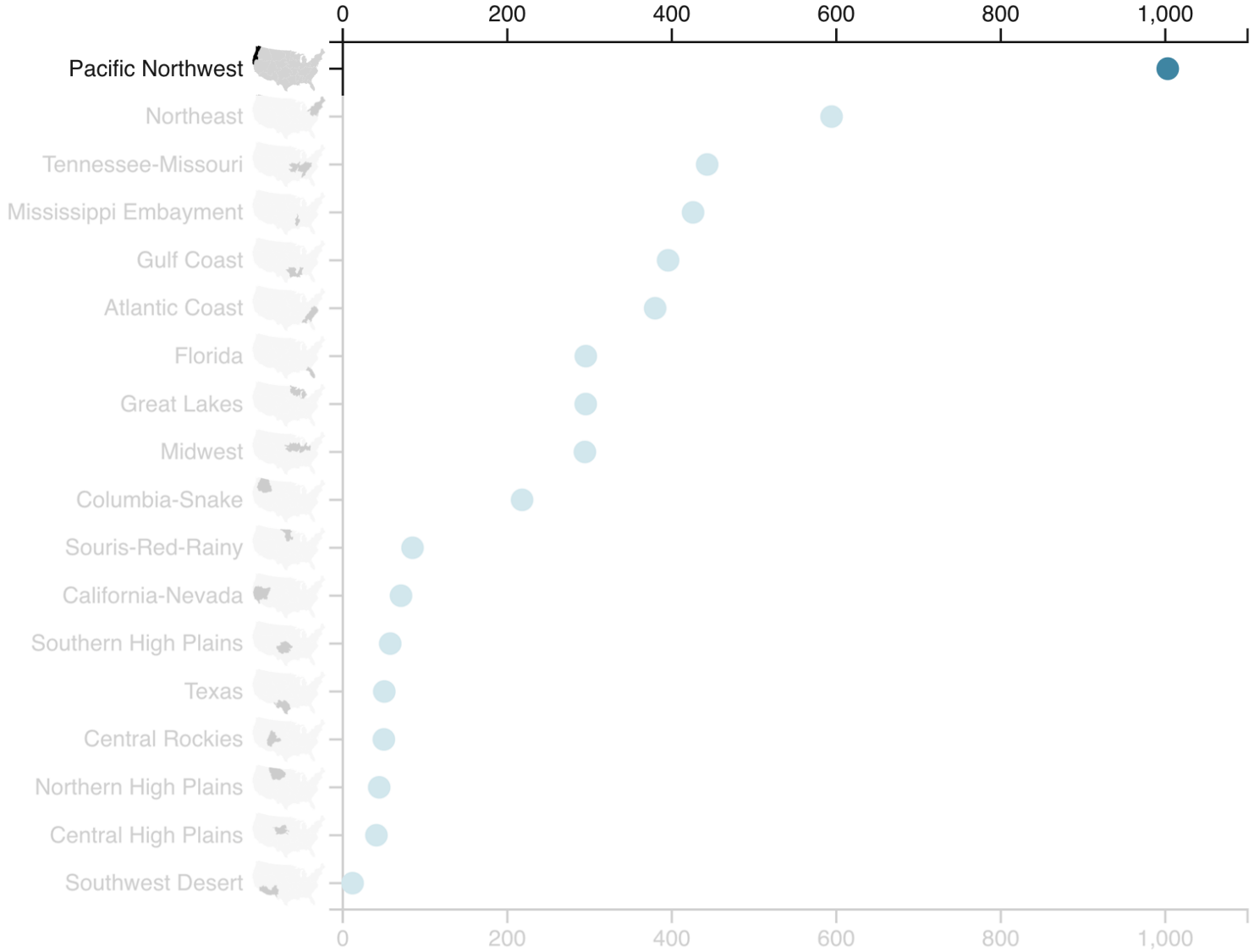
Average surface runoff, mm yr^{-1}



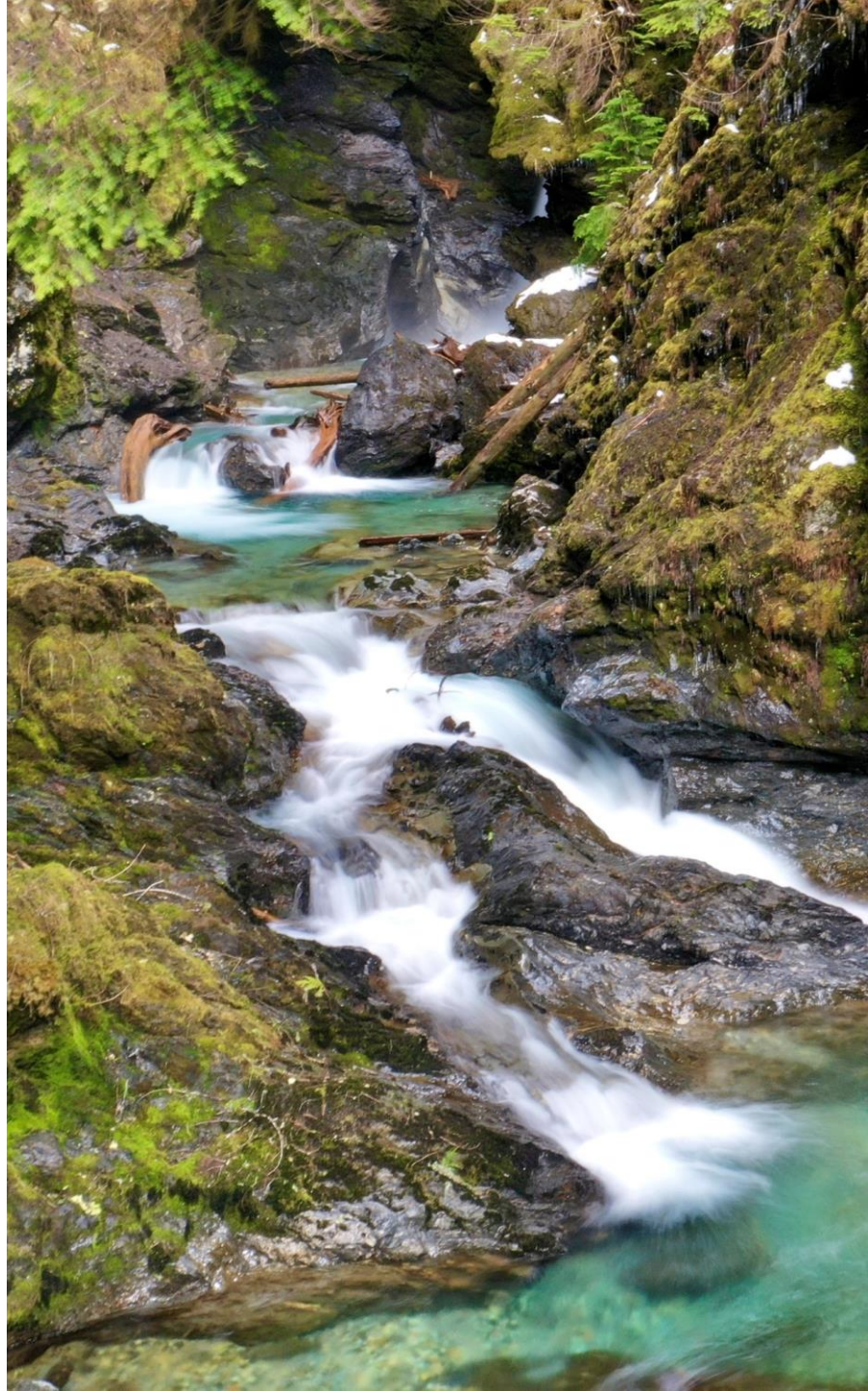
USGS

Surface water supply

Average surface runoff, mm yr^{-1}

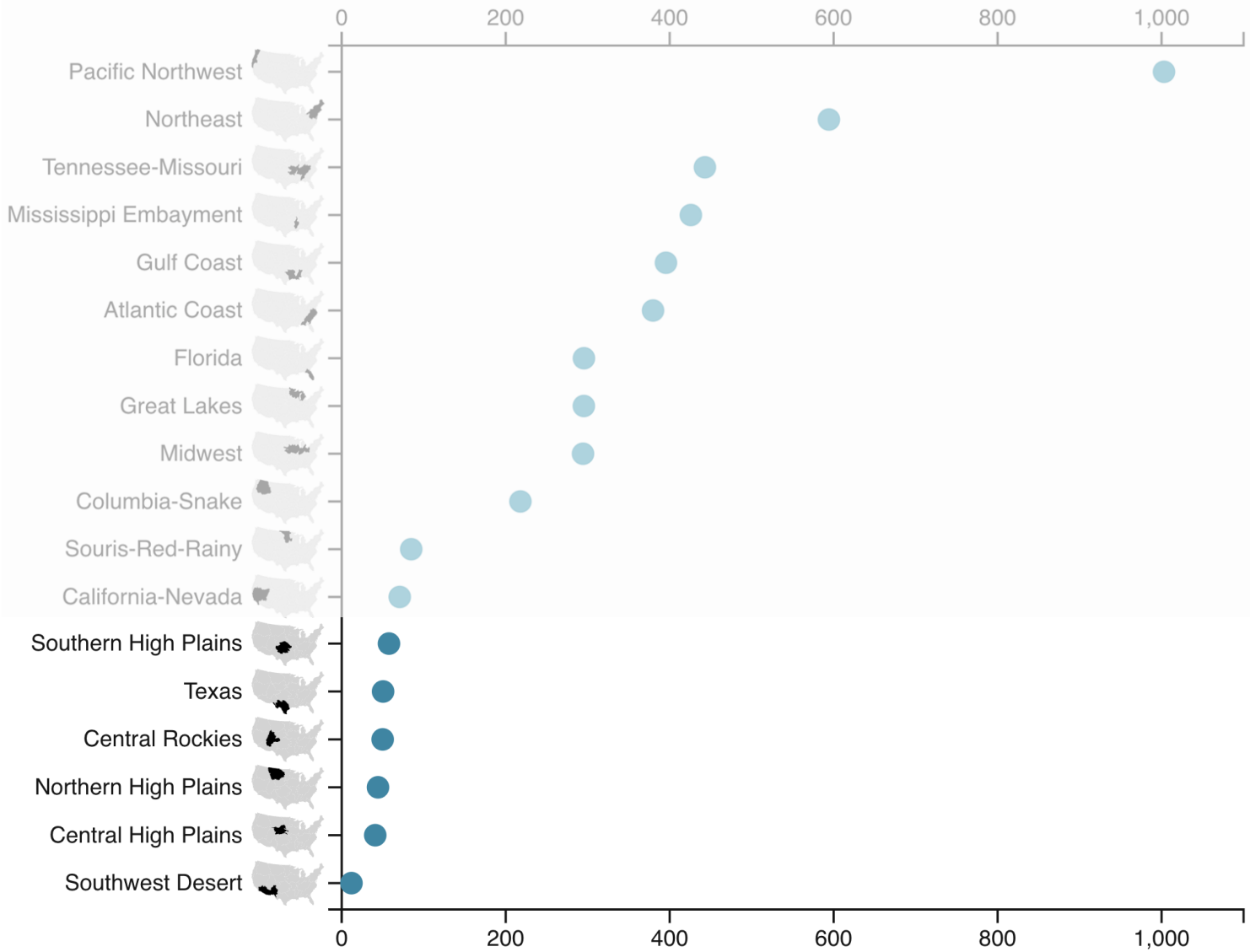


USGS



Surface water supply

Average surface runoff, mm yr^{-1}



USGS

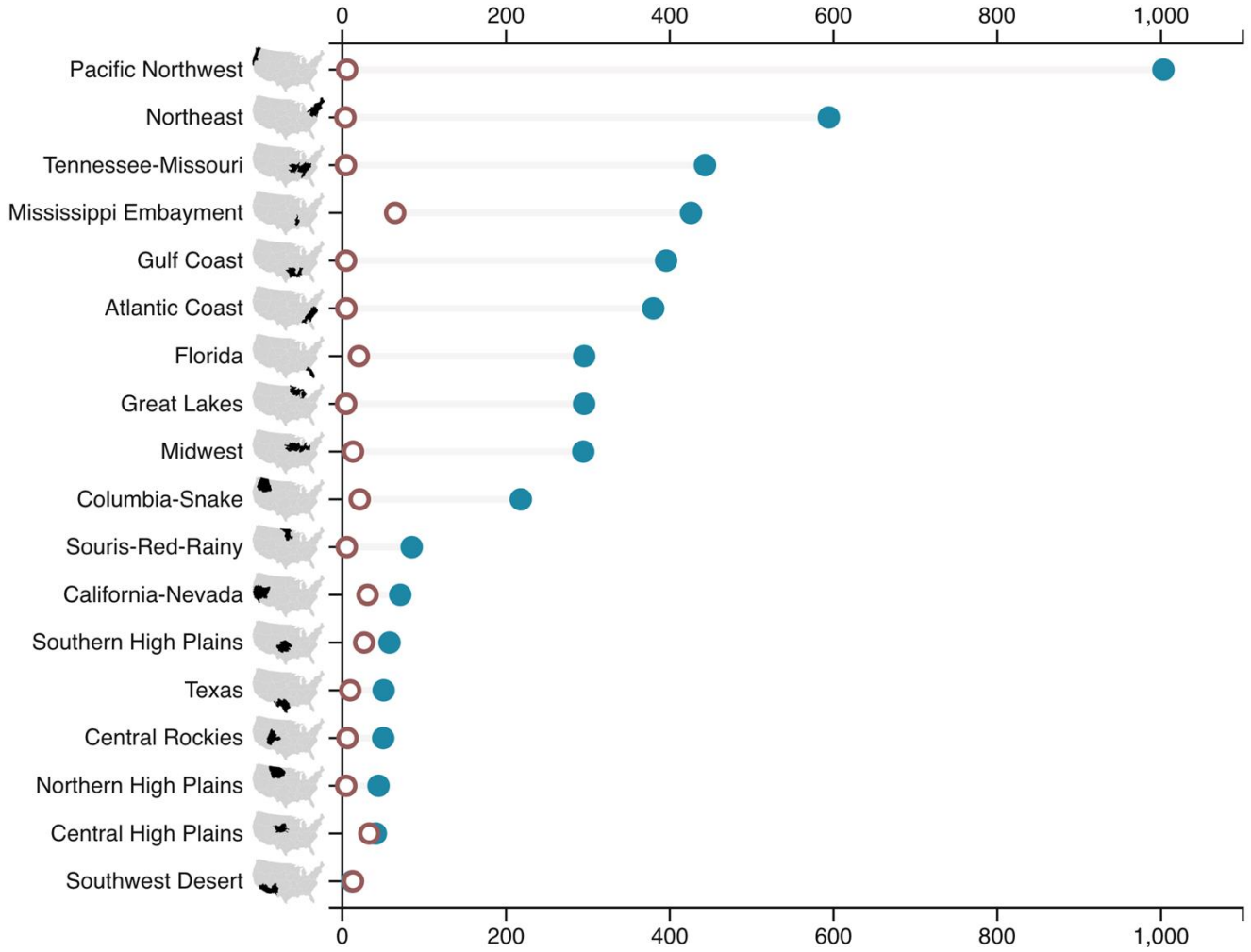
How much water do we use?

USGS

Water demand vs water supply

Surface water supply

Average surface runoff, mm yr^{-1}

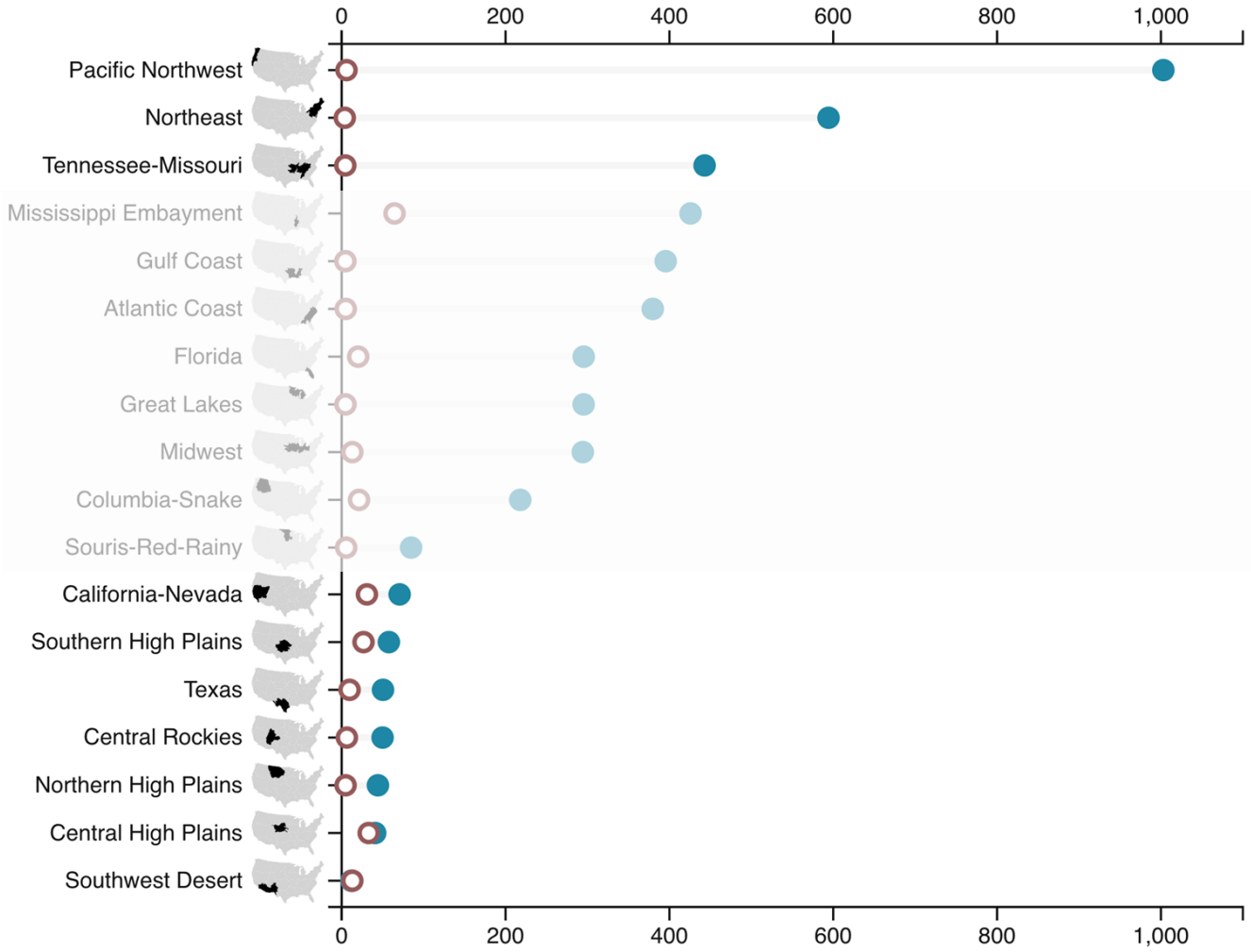


USGS

Water demand vs water supply

Surface water supply

Average surface runoff, mm yr^{-1}



USGS

90% of water withdrawals are for

Public supply

Thermoelectric power

Crop irrigation

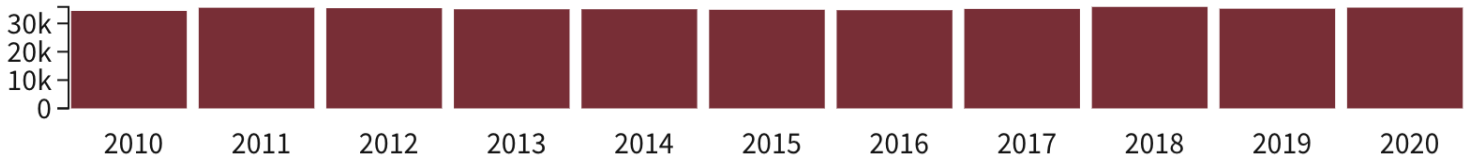
USGS

Average daily water use

Millions of gallons used per day

Public supply

Public use is constant but per capita use is decreasing



USGS

Average daily water use

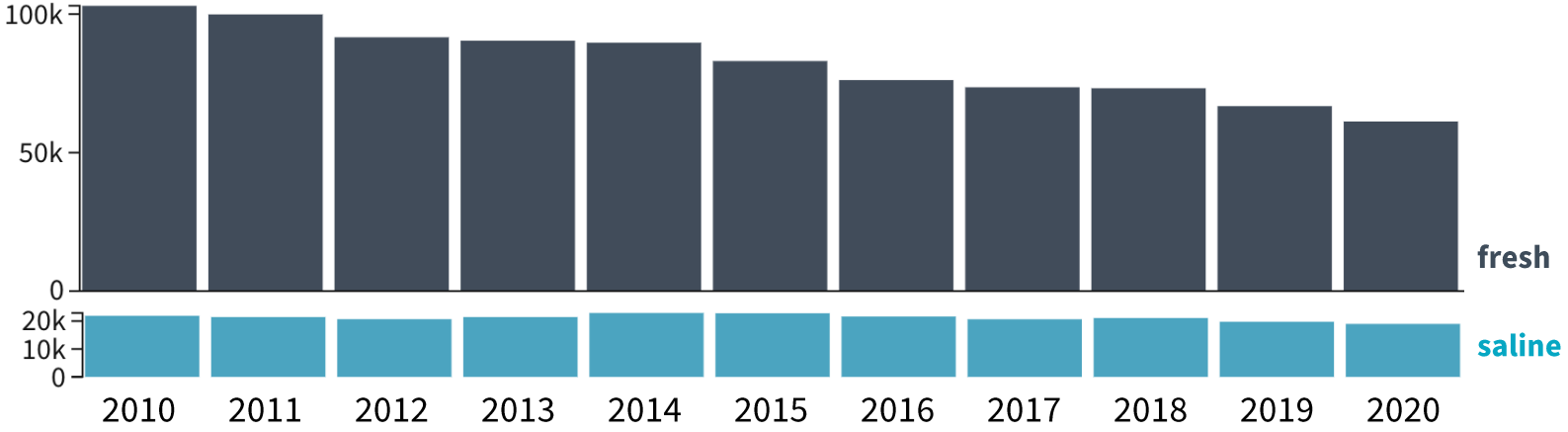
Millions of gallons used per day

Public supply

Public use is constant but per capita use is decreasing

Thermoelectric power

Thermoelectric use is decreasing



USGS

Average daily water use

Millions of gallons used per day

Public supply

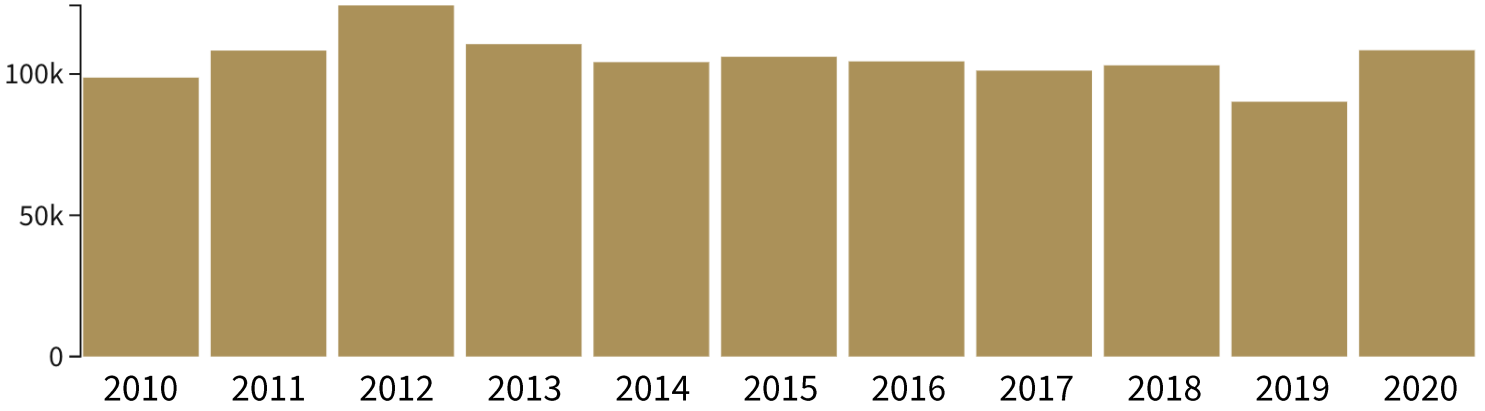
Public use is constant but per capita use is decreasing

Thermoelectric power

Thermoelectric use is decreasing

Crop irrigation

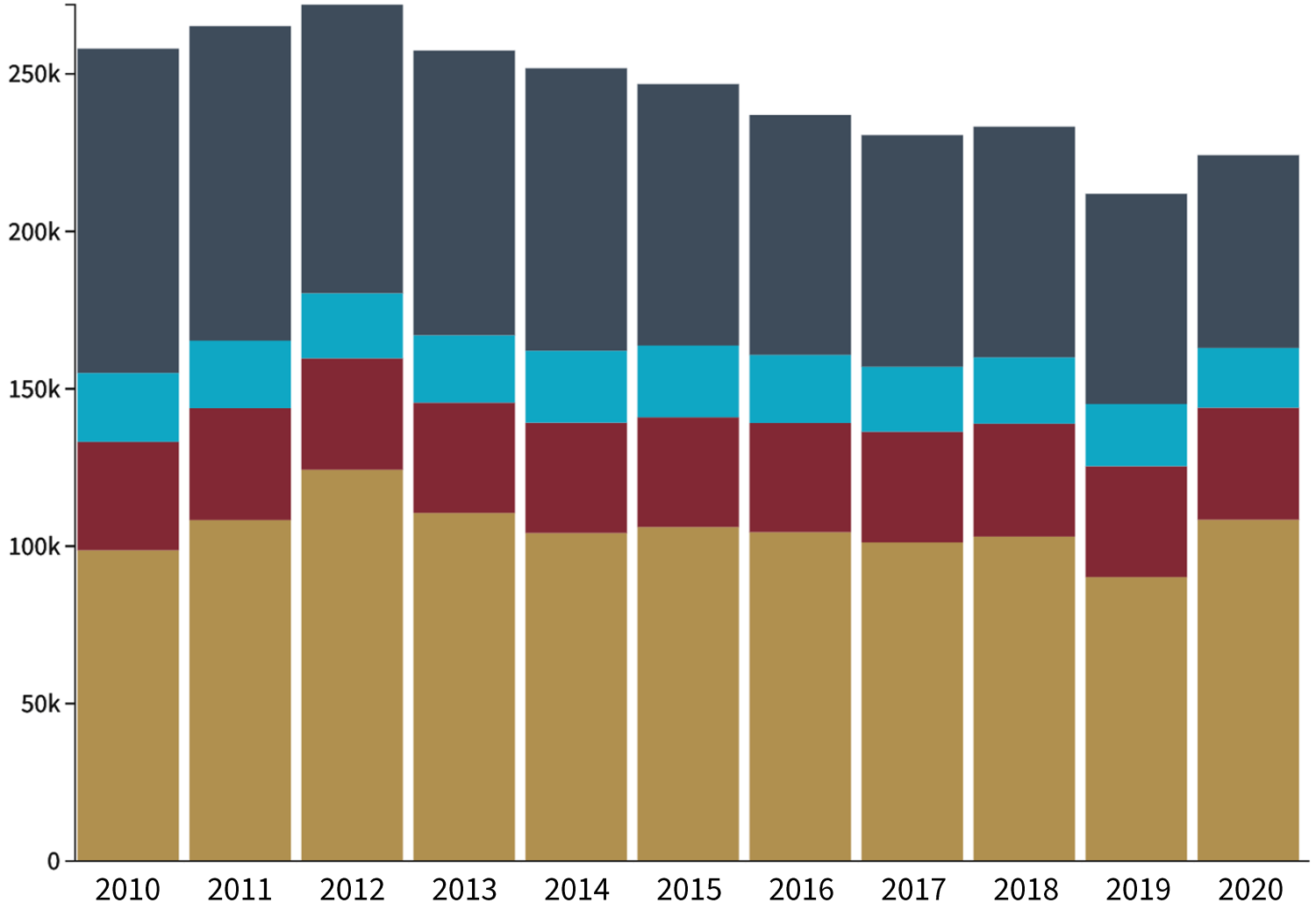
Irrigation increases in years of drought



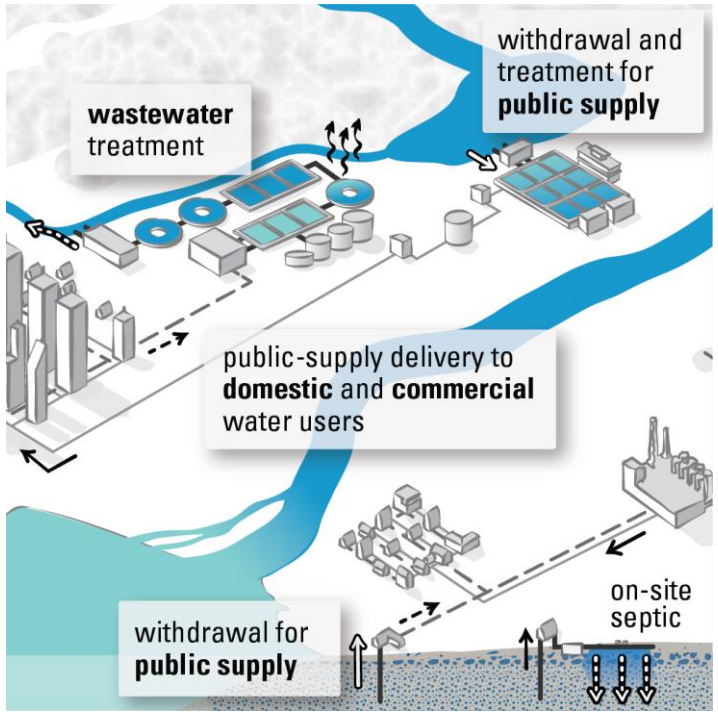
USGS

Average daily water use

Millions of gallons used per day

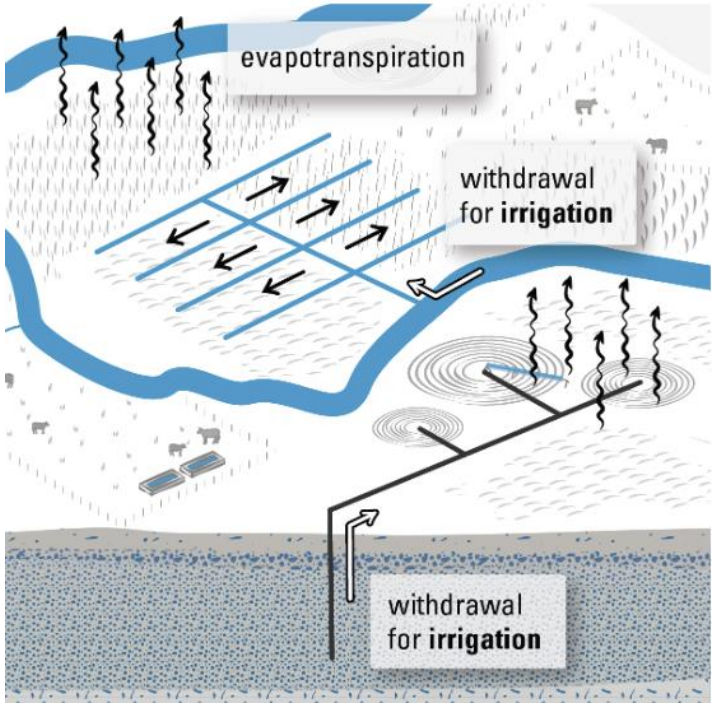


USGS



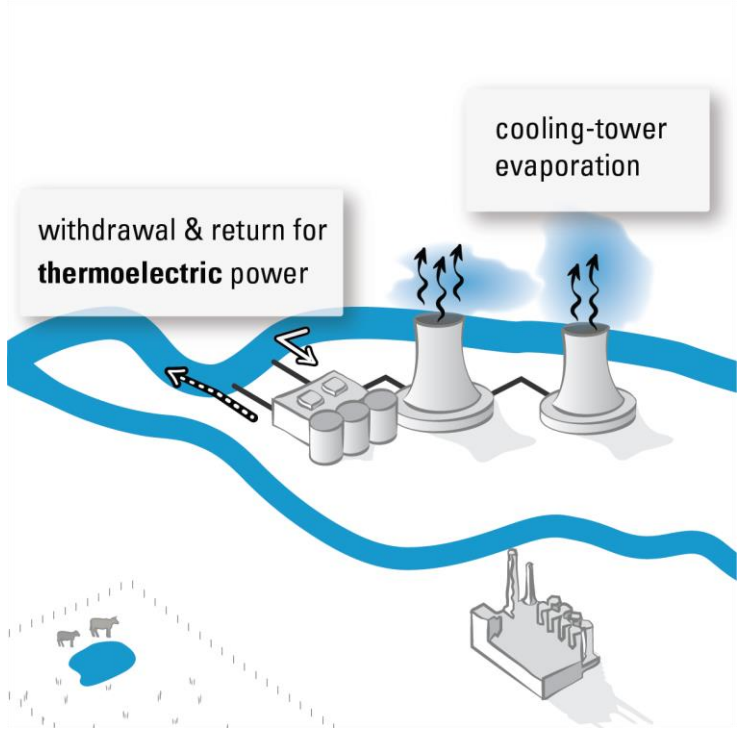
Public supply

7% of water consumptive water use



Crop irrigation

90% of consumptive water use



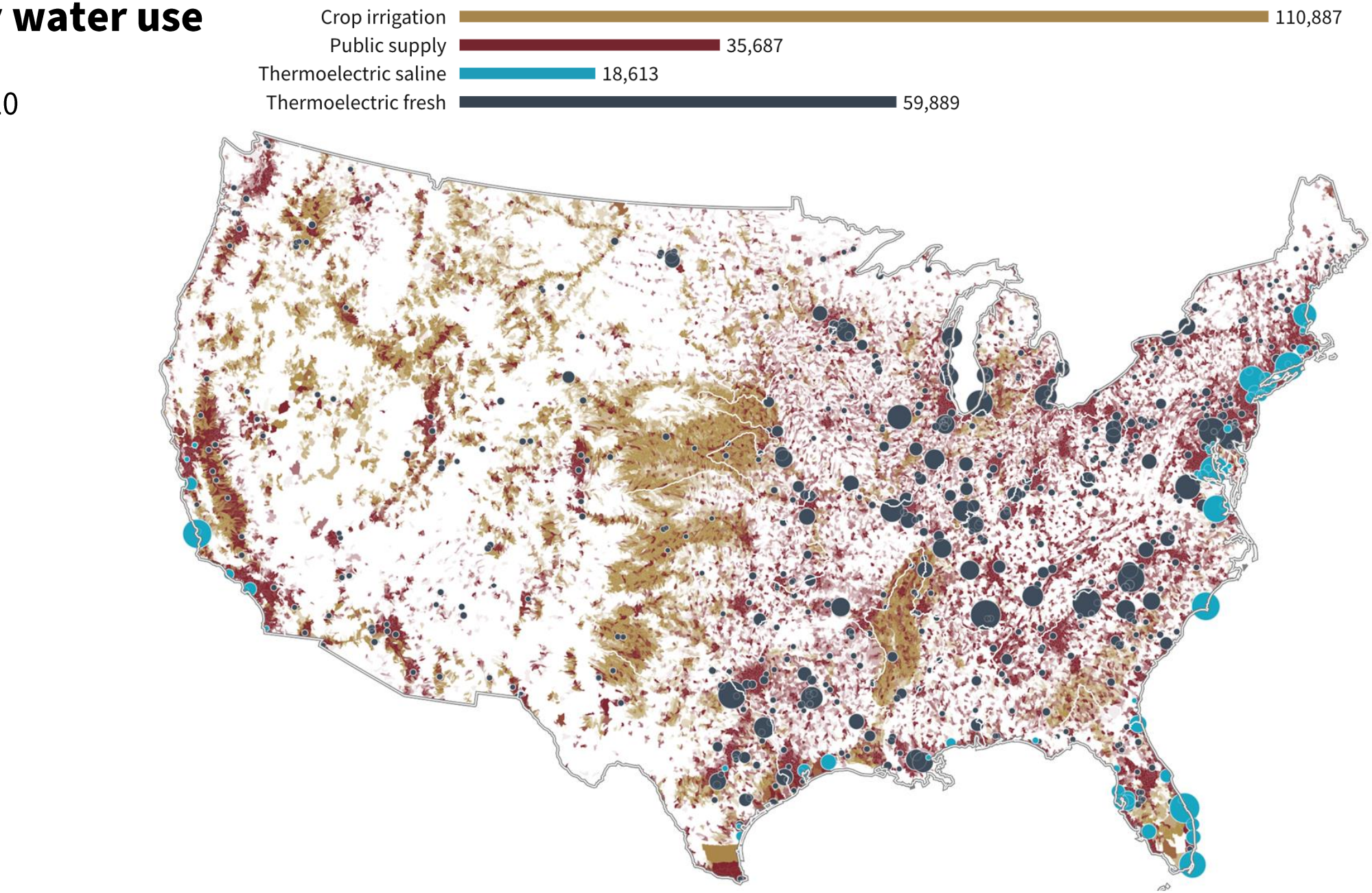
Thermoelectric power

3% of consumptive water use

USGS

Average daily water use

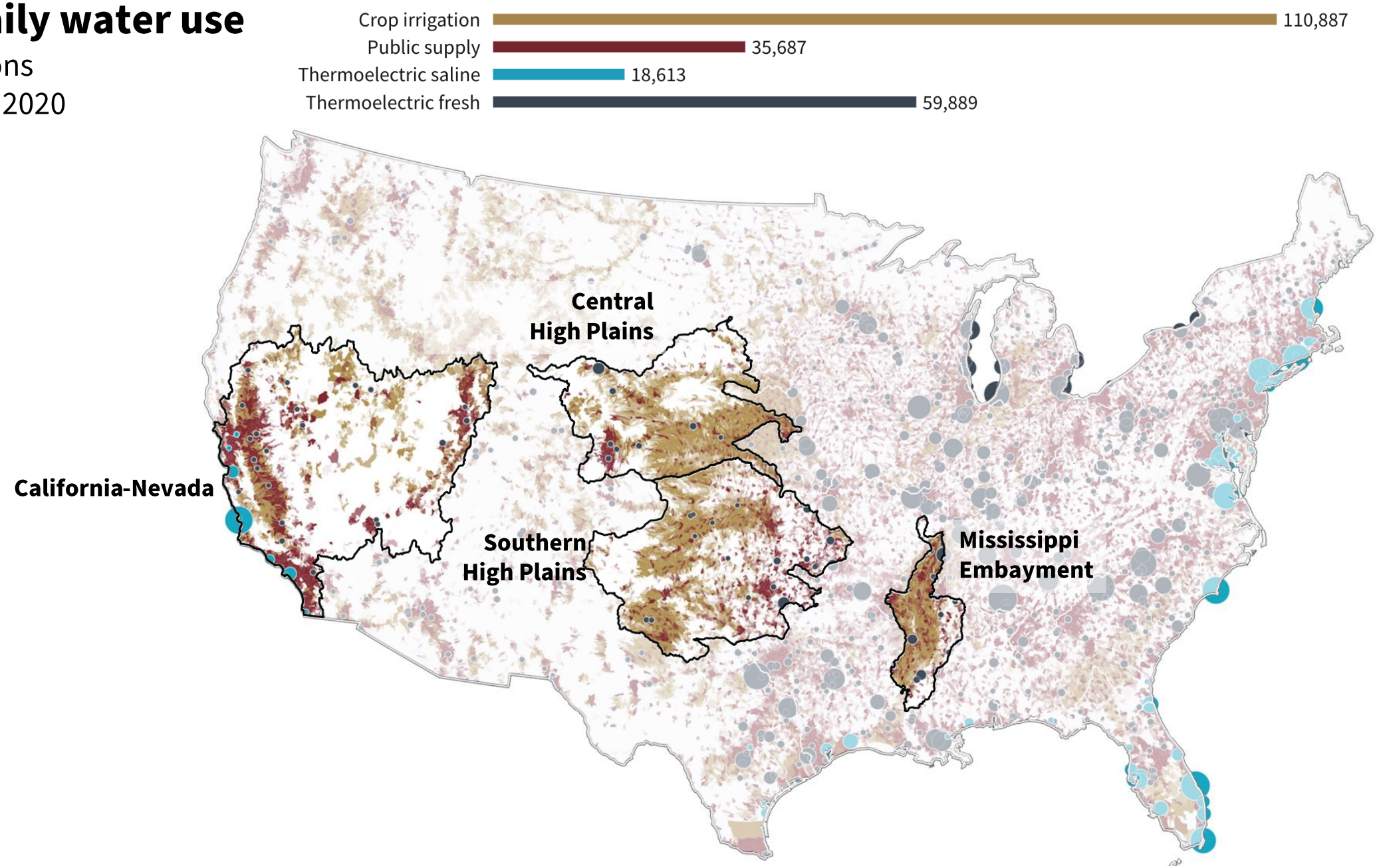
Millions of gallons
used per day in 2020



USGS

Average daily water use

Millions of gallons
used per day in 2020



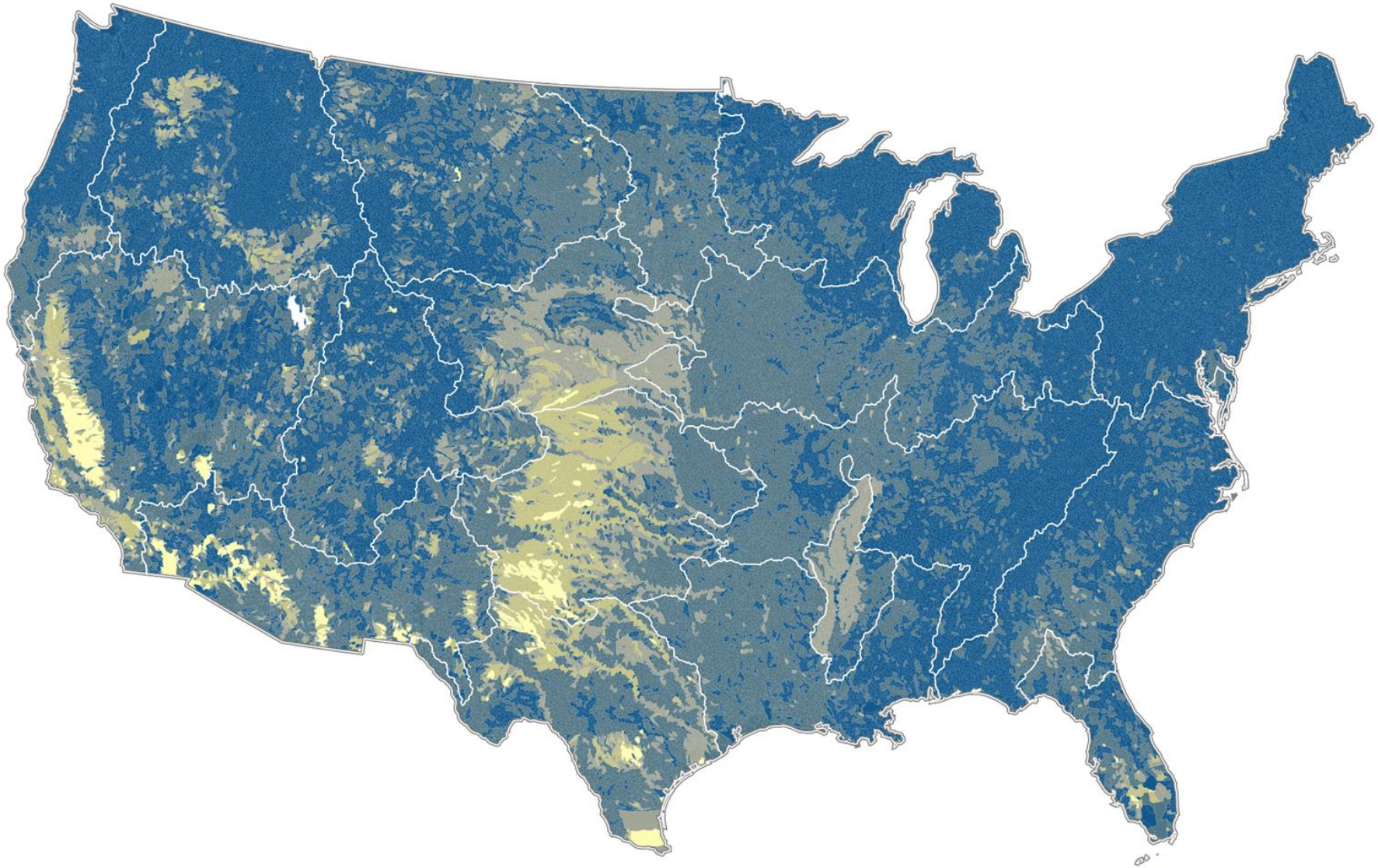
USGS

Water limitation

Supply and Use Index (SUI)

- Severe (0.8-1)
- High (0.6-0.8)
- Moderate (0.4-0.6)
- Low (0.2-0.4)
- Very low (0-0.2)

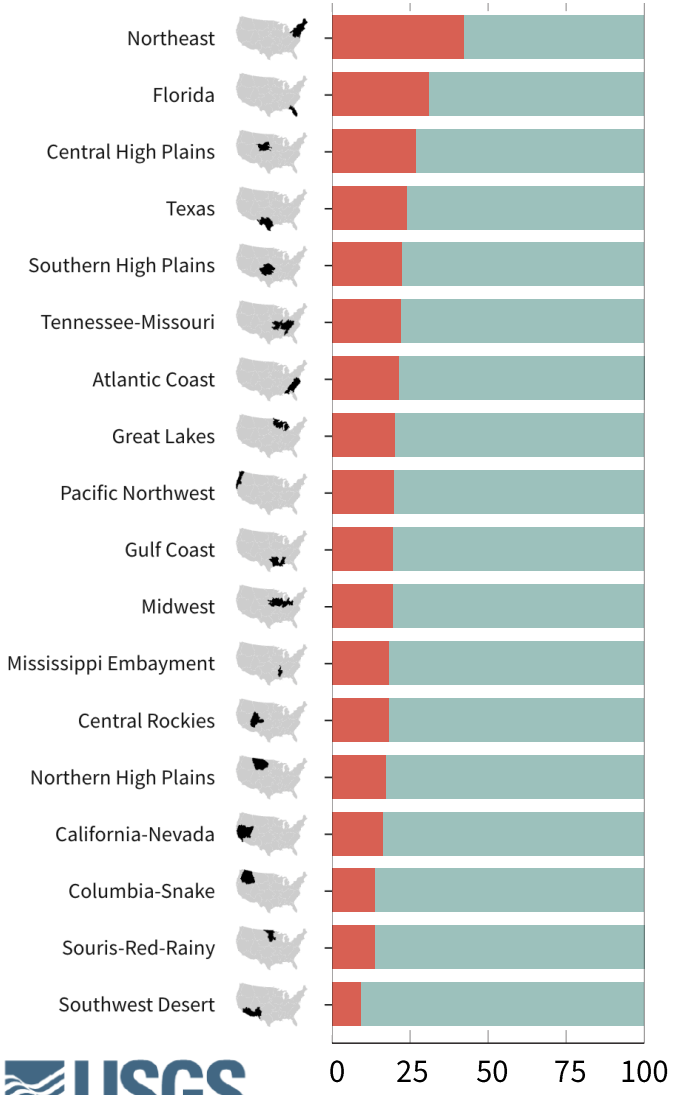
SUI is the imbalance between surface water supply and water use.

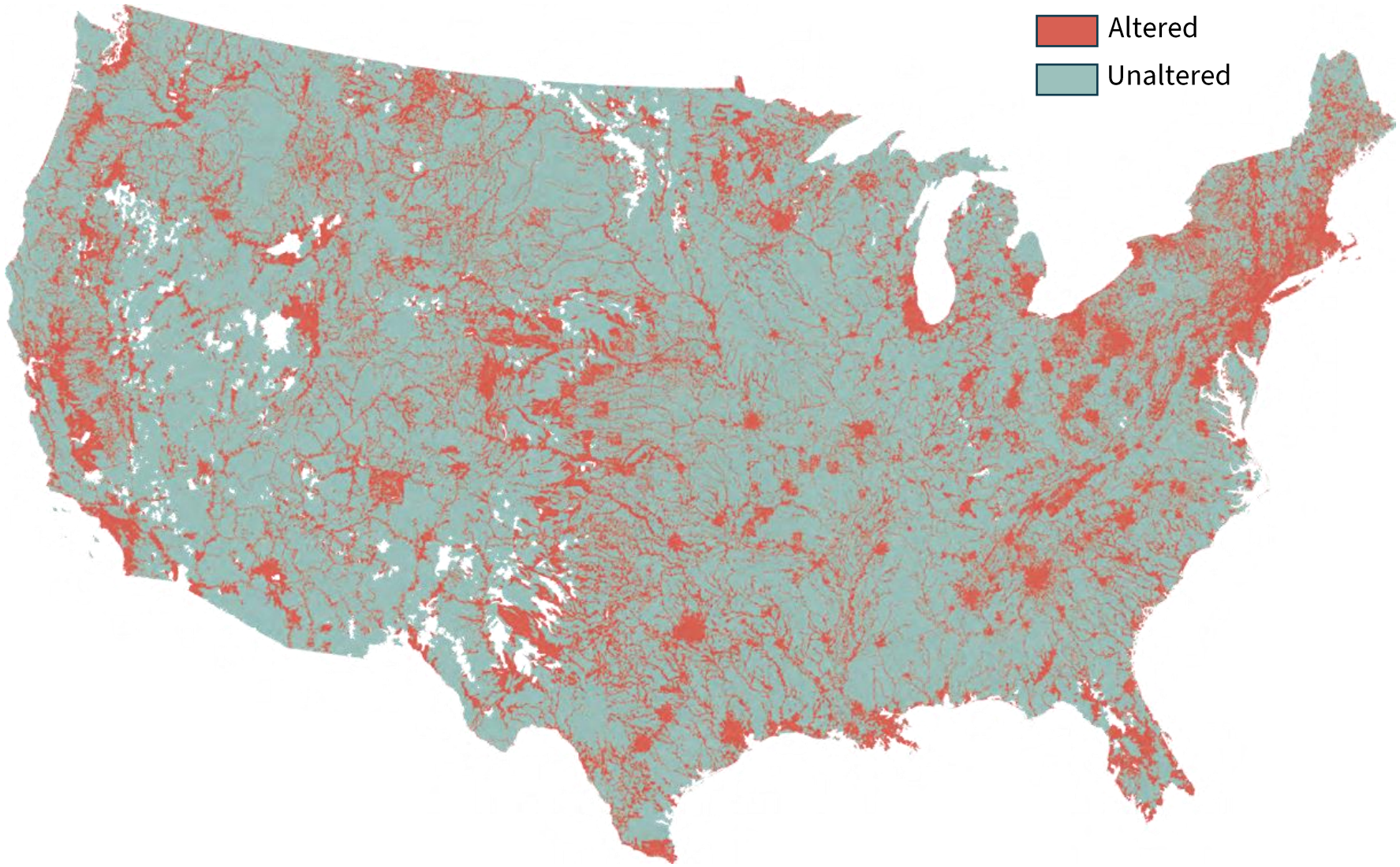


USGS

Ecoflow alteration

River miles (%)

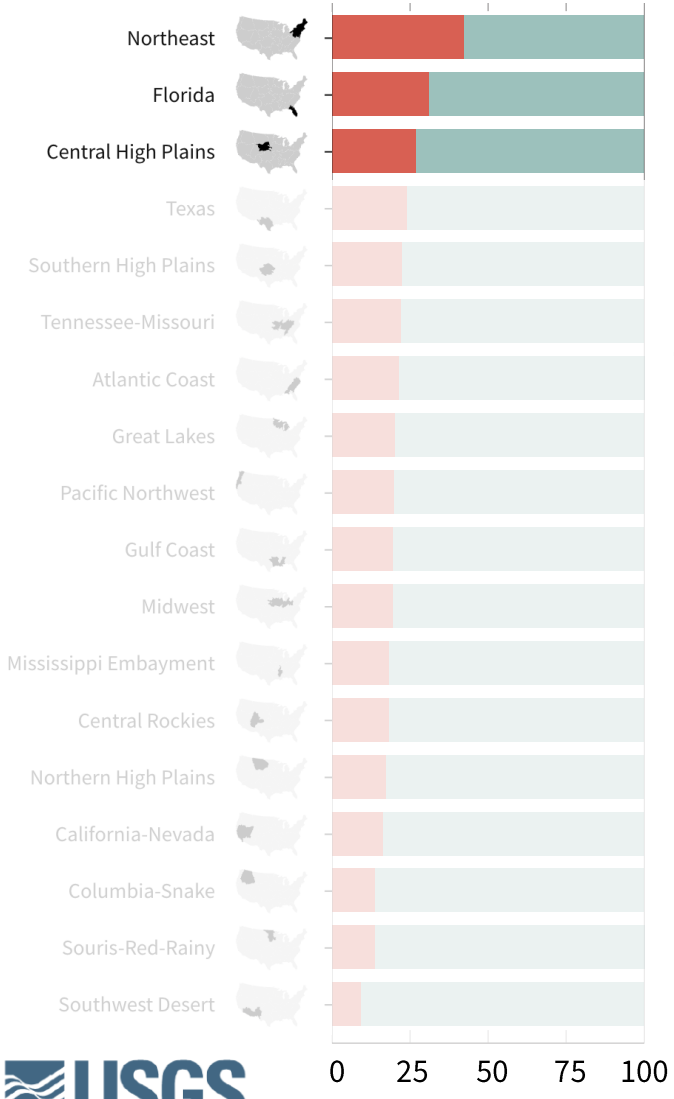


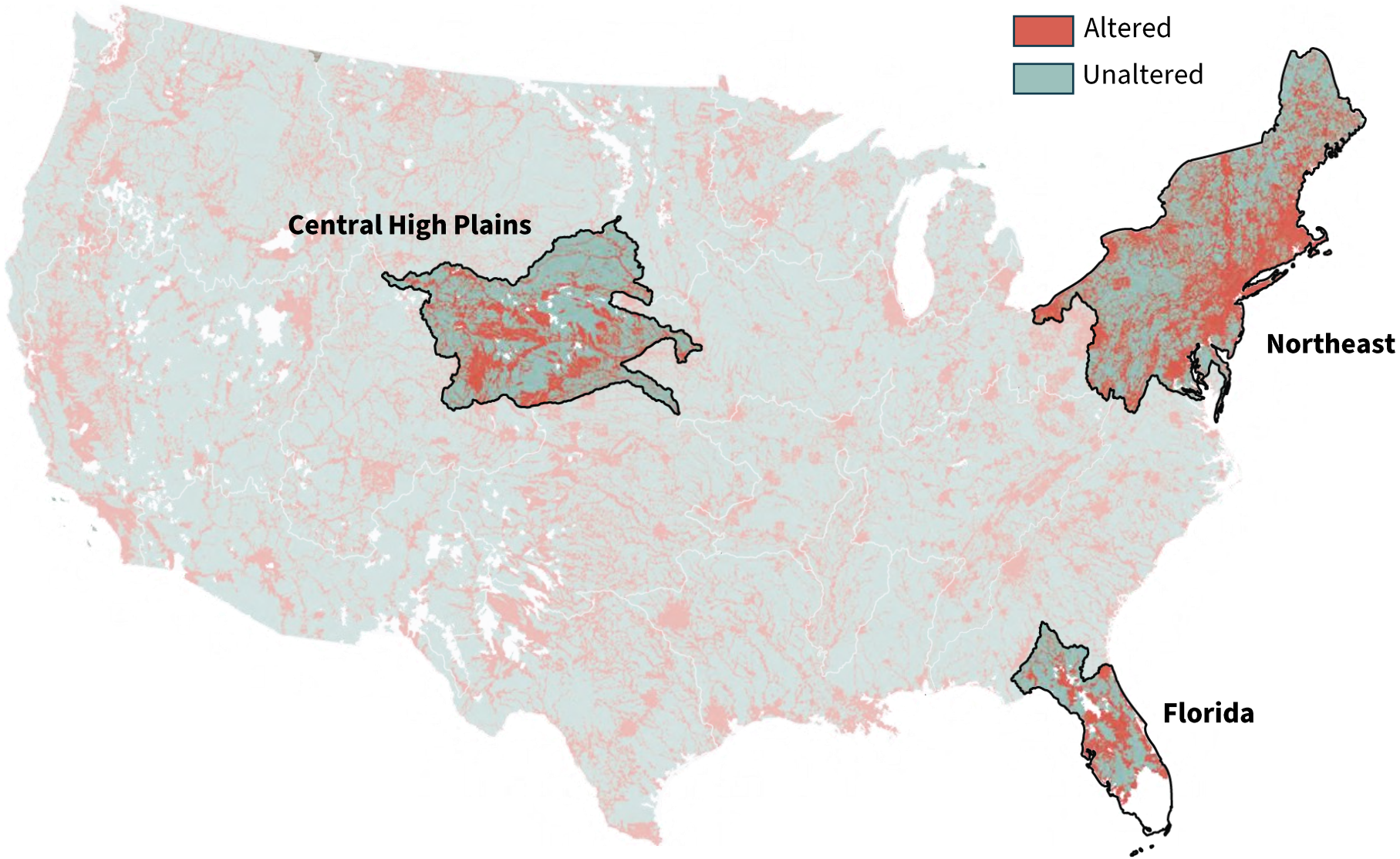


USGS

Ecoflow alteration

River miles (%)



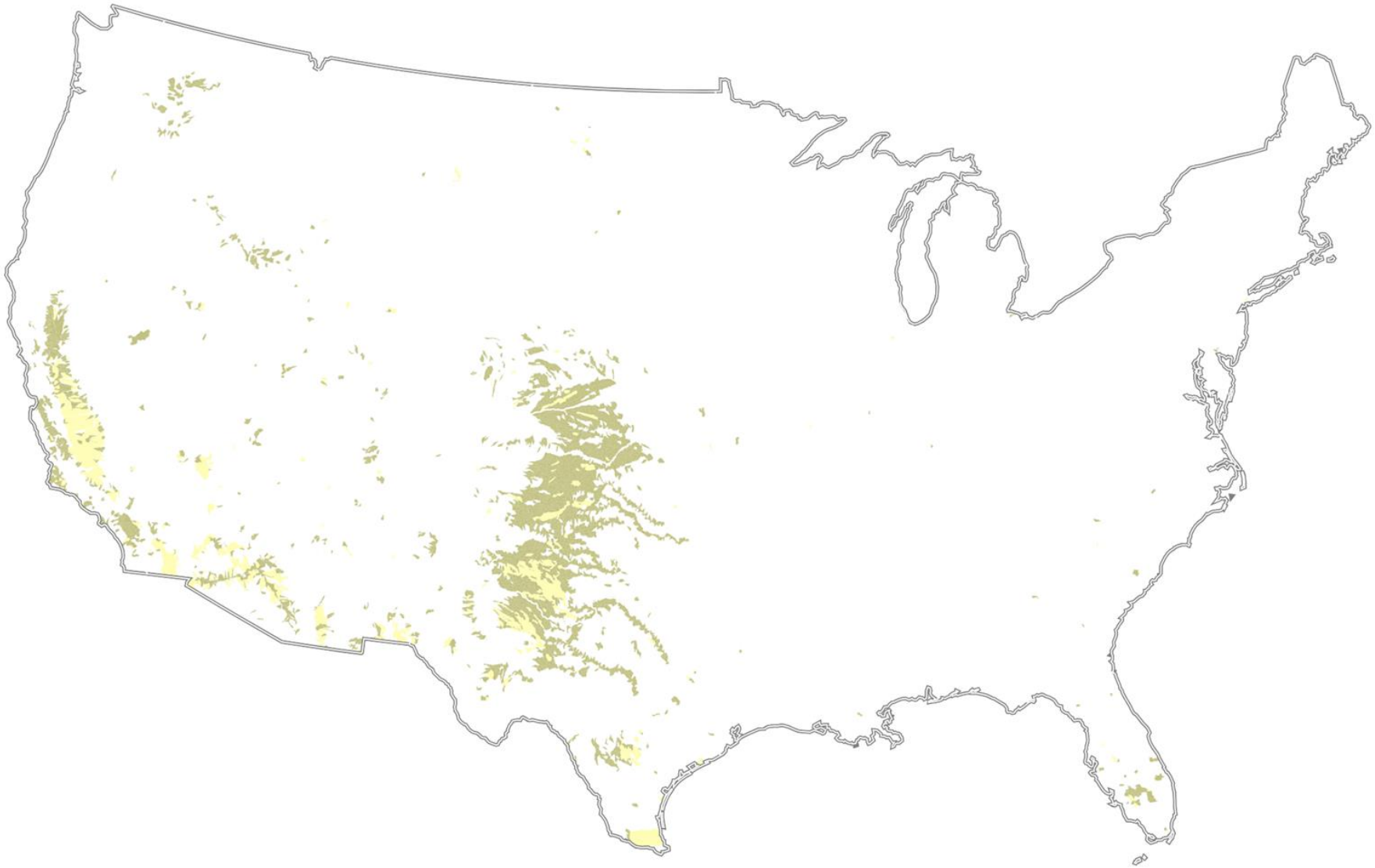


USGS

Water limitation

Supply and Use Index (SUI)

- Severe (0.8-1)
- High (0.6-0.8)
- Moderate (0.4-0.6)
- Low (0.2-0.4)
- Very low (0-0.2)



Water limitation disproportionately affects socially vulnerable populations in the U.S., creating problems for equitable access to clean water.

USGS

What is your top concern about water?

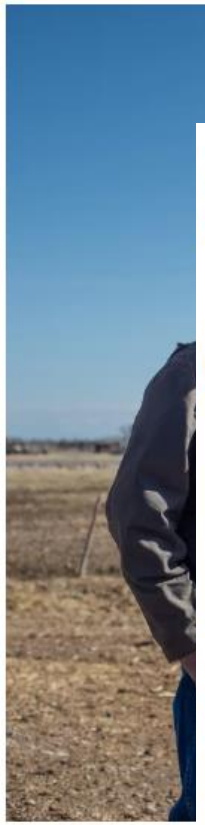
USGS

Once 'paradise,' parched Colorado valley grapples with arsenic in water

MAY 22, 2023 · 5:01 AM ET

FROM KFF Health News

By Melissa Bailey



Farming in a 20-yea
Rising levels of arse
Melissa Bailey/KFF Hea

Health department says 22 Minnesota water systems have PFAS above federal limits

Salt water creeping up Delaware River in worrying sign for big fresh water source

Source of Philadelphia's drinking water sees salt line pushed closer to city by drought and sea level rise

The Delaware River between New Jersey and Pennsylvania on Monday. Photograph: Mike Catalini/AP

Farm fertilizer runoff is impacting drinking water in the Midwest, not just the Gulf's 'dead zone'

ıtinel and Mississippi River Basin Ag & Water Desk

ı veterans' home a
ı new federal limit

Texas Regulators Report More Than 250 New Cases of Groundwater Contamination

An annual report documents 2,870 active cases of groundwater contamination around the state. Groundwater provides more than half of the state's water supply.

By Martha Pskowski
December 16, 2024

A Blanco resident pulls a water sample from their contaminated well, to compare it to bottled water in 2020 near Austin. Credit: Brett Coomer/Houston Chronicle via Getty Images

Water Supply

Water quantity

Water quality

Water Demand

Water use

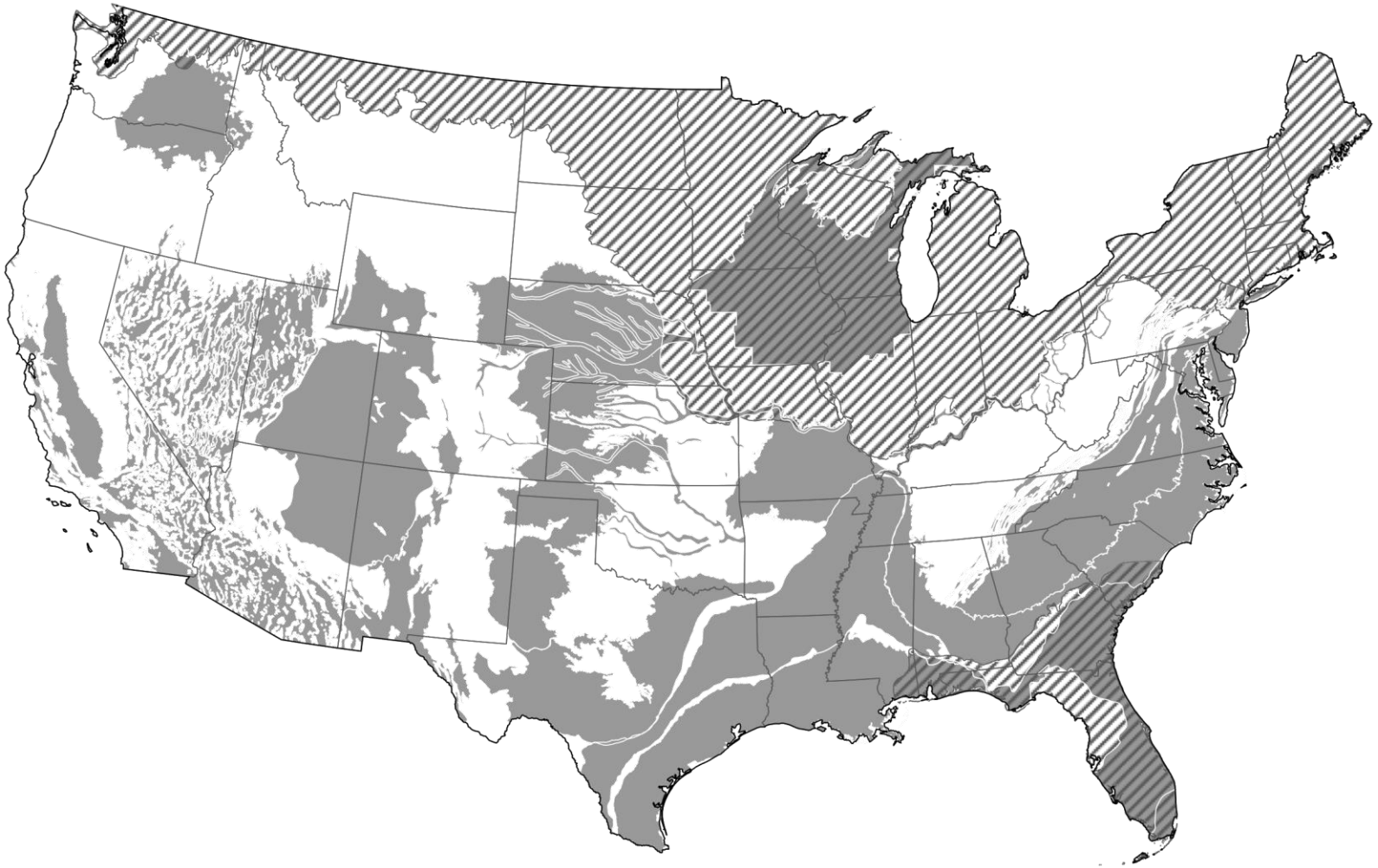
Ecosystem health

USGS

How does water quality impact water availability?

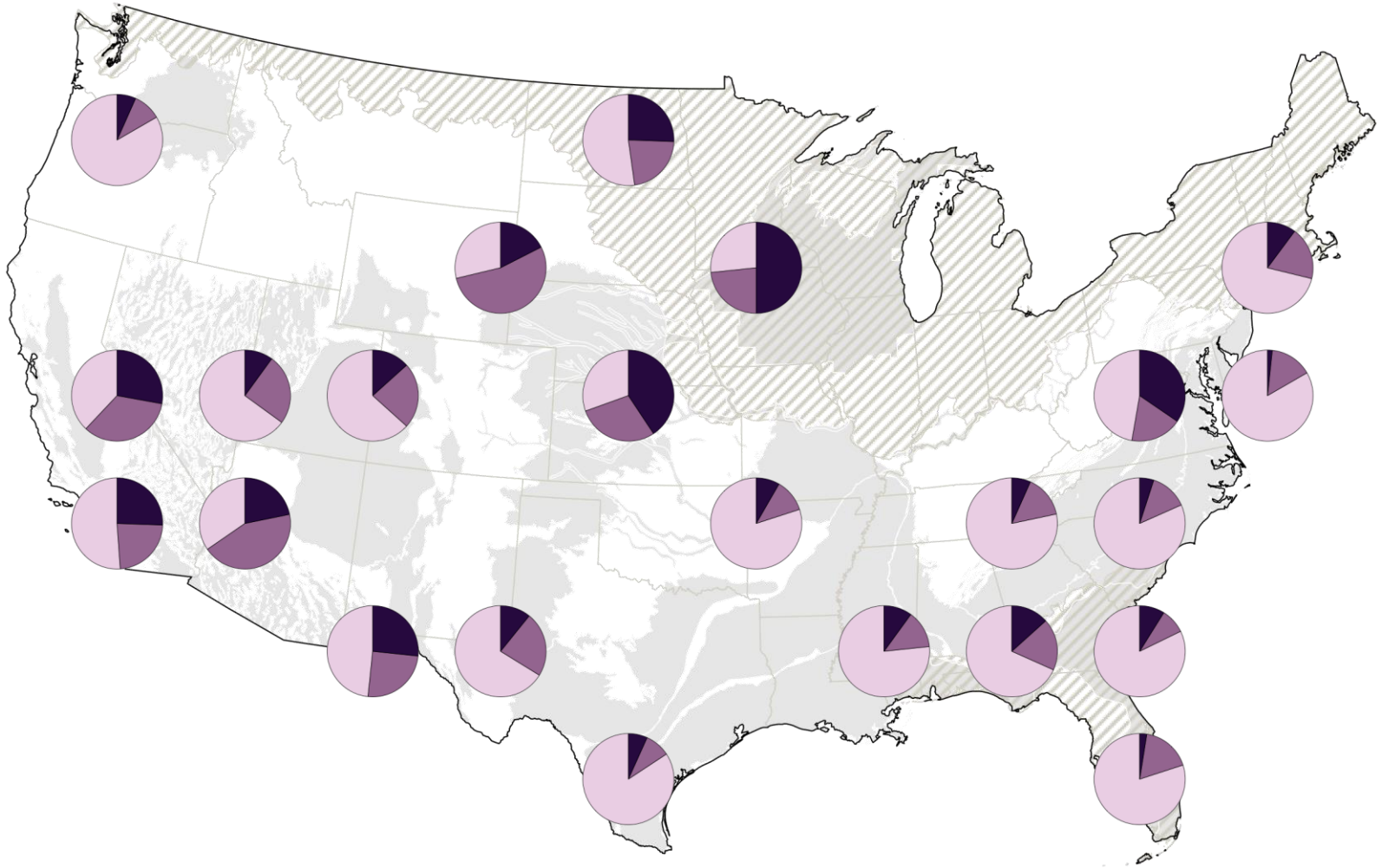
USGS

Drinking water aquifers

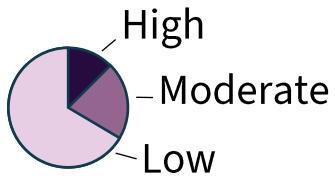


USGS

Drinking water aquifer contaminants



Percent of study area



Contaminants of concern

Geologic source

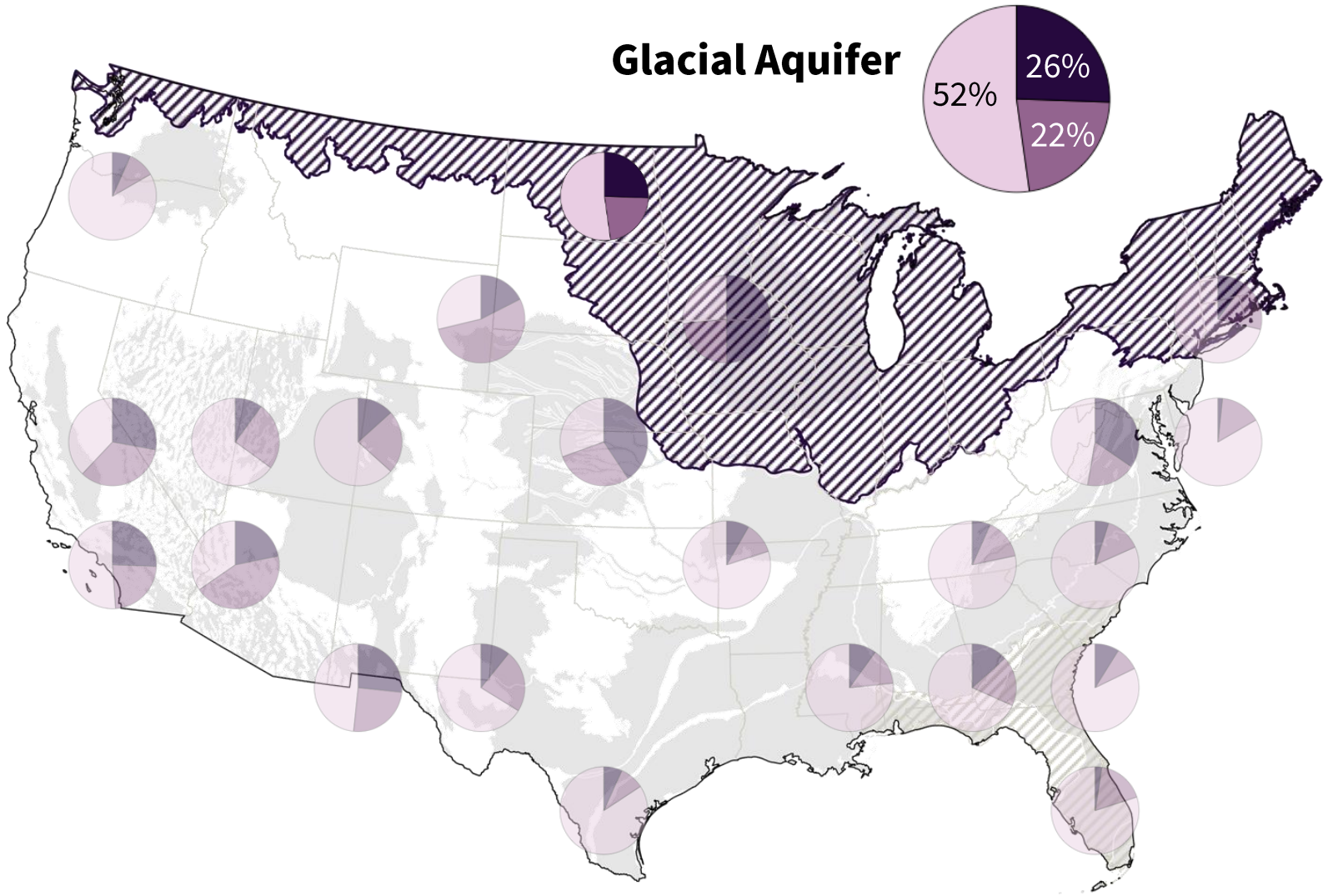
- *Arsenic*
- *Manganese*
- *Strontium*
- *Radionuclides*

Human source

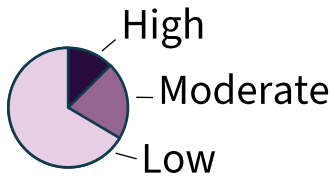
- *Nitrate*

USGS

Drinking water aquifer contaminants



Percent of study area



Contaminants of concern

Geologic source

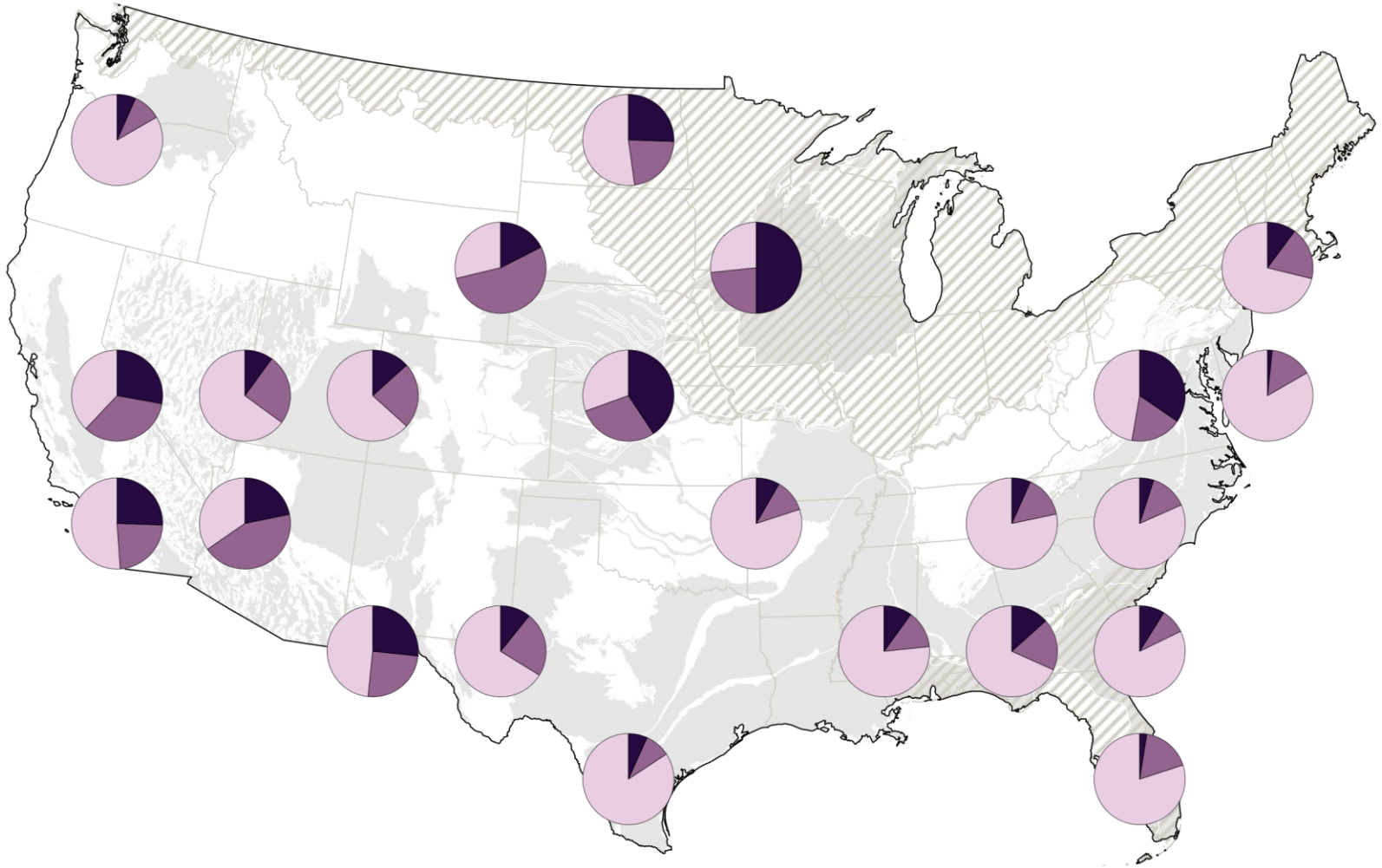
- *Arsenic*
- *Manganese*
- *Strontium*
- *Radionuclides*

Human source

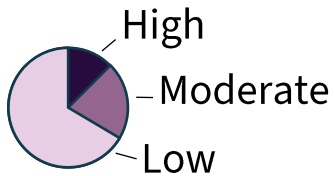
- *Nitrate*

USGS

Drinking water aquifer contaminants



Percent of study area



Contaminants of concern

Geologic source

- *Arsenic*
- *Manganese*
- *Strontium*
- *Radionuclides*

Human source

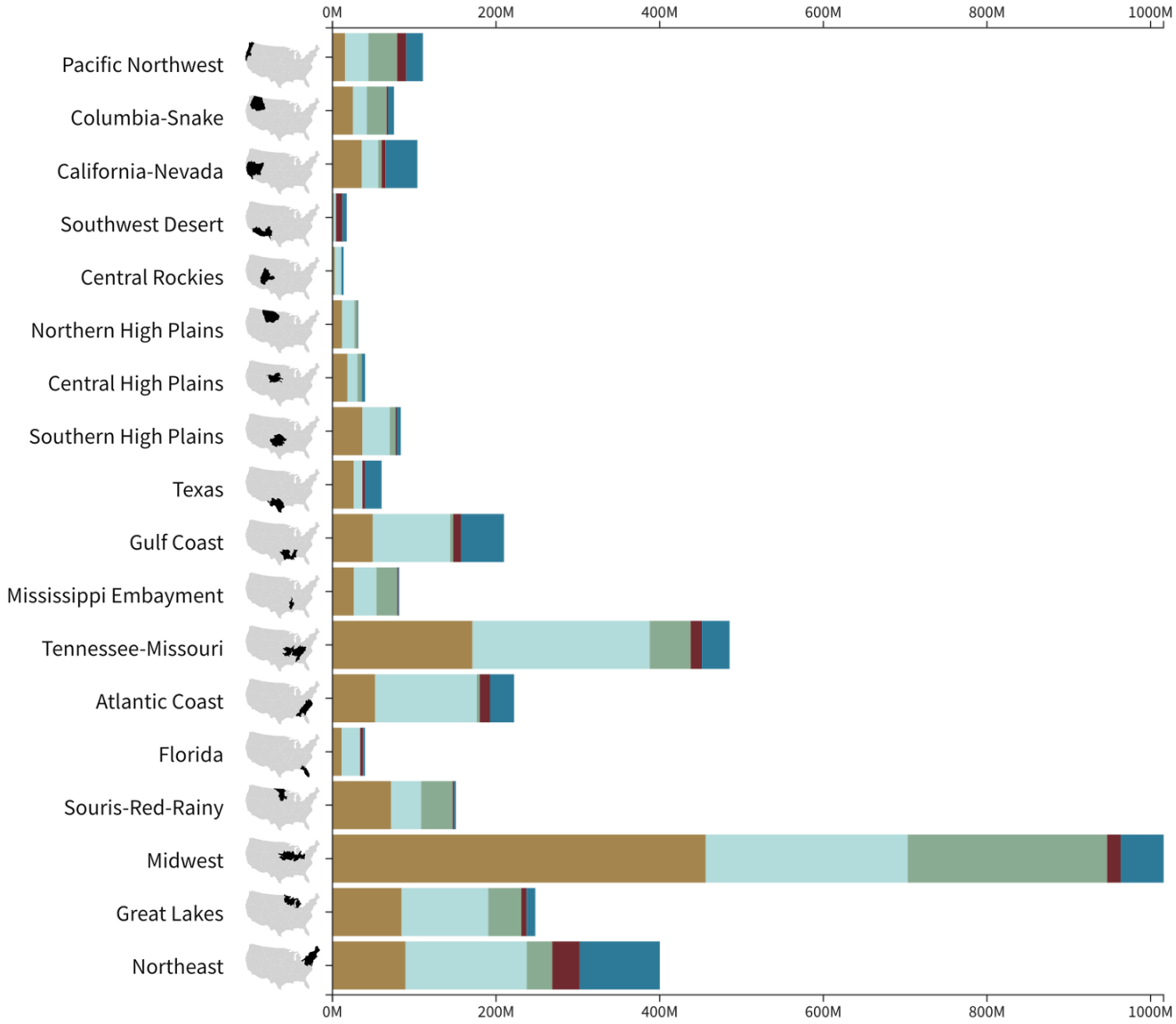
- *Nitrate*

USGS

MERCURY
MERCURY
USGS

Sources of Nitrogen in surface water

Nutrient loads by source in kg/year



Agriculture

Atmospheric deposition

Natural sources

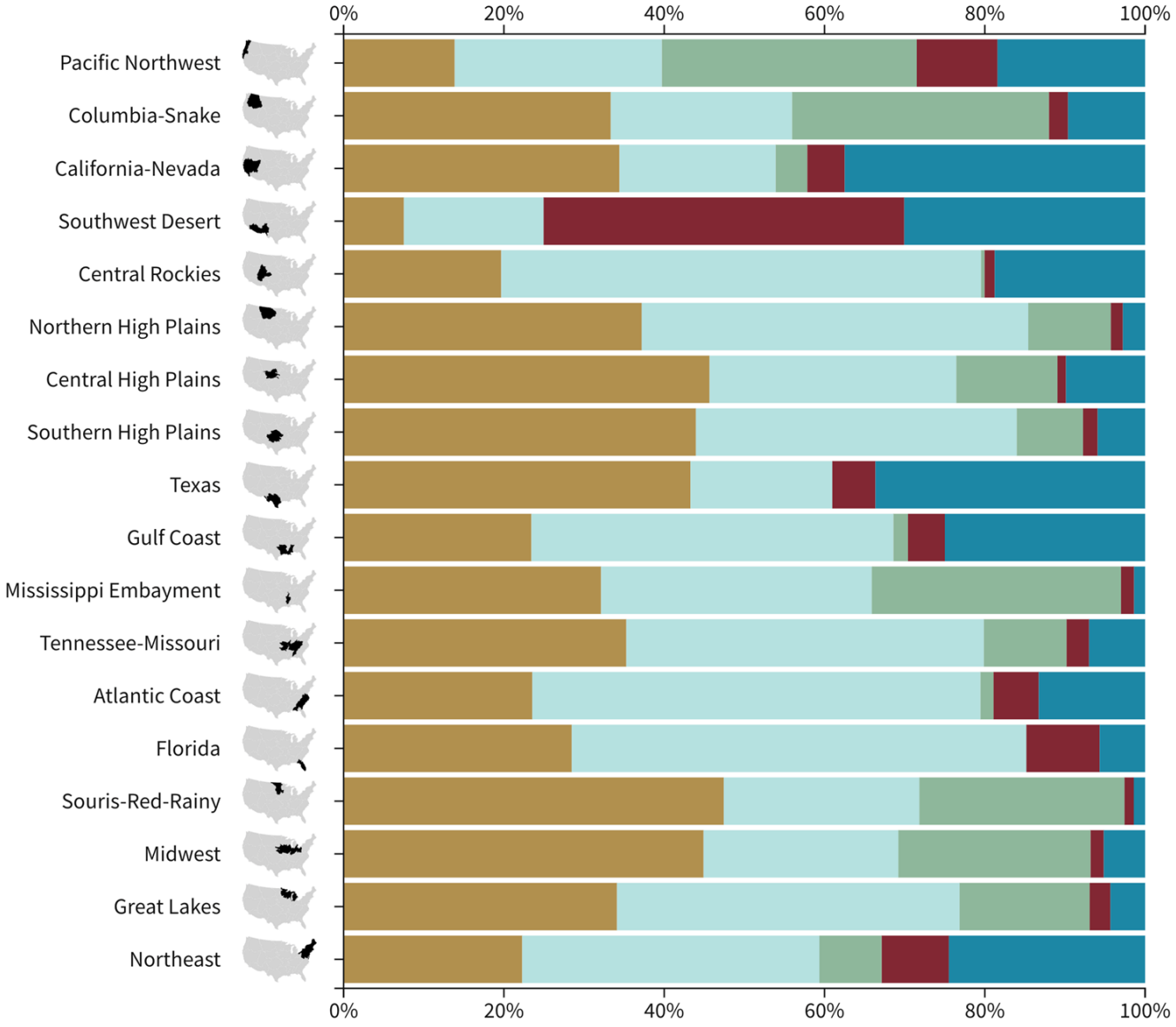
Other human sources

Wastewater

USGS

Sources of Nitrogen in surface water

Nutrient loads by source as a percent of total load



Agriculture

Atmospheric deposition

Natural sources

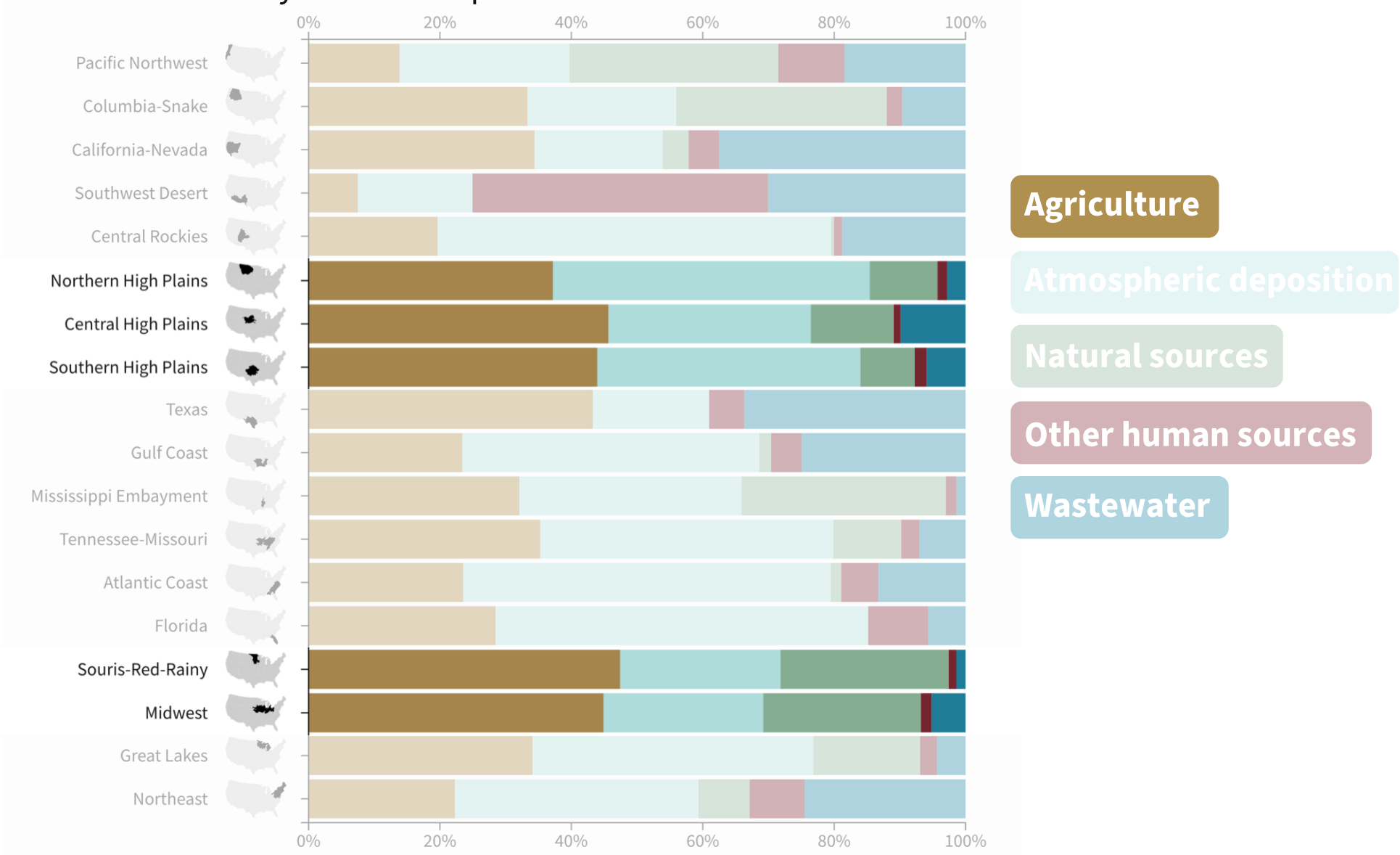
Other human sources

Wastewater

USGS

Sources of Nitrogen in surface water

Nutrient loads by source as a percent of total load



Agriculture

Atmospheric deposition

Natural sources

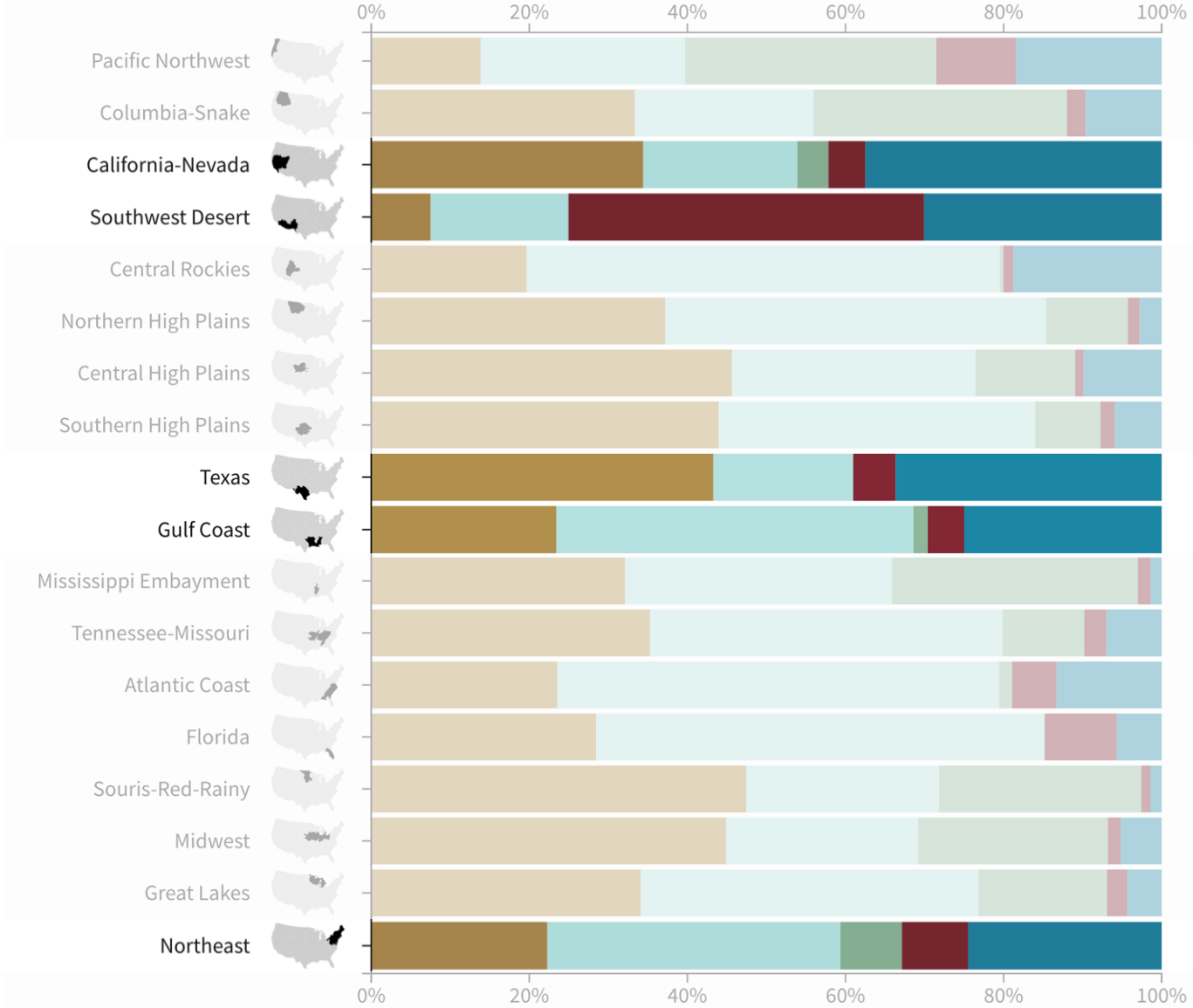
Other human sources

Wastewater

USGS

Sources of Nitrogen in surface water

Nutrient loads by source as a percent of total load



Agriculture

Atmospheric deposition

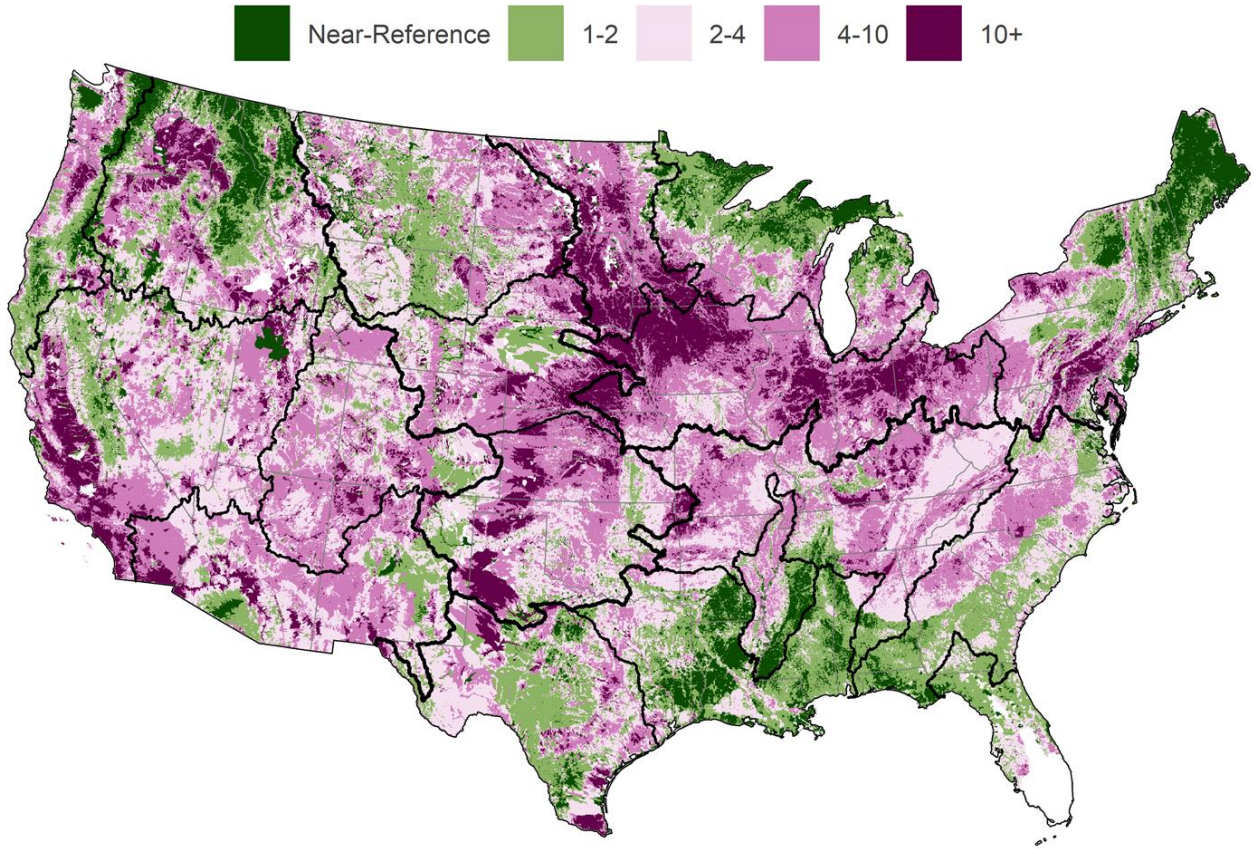
Natural sources

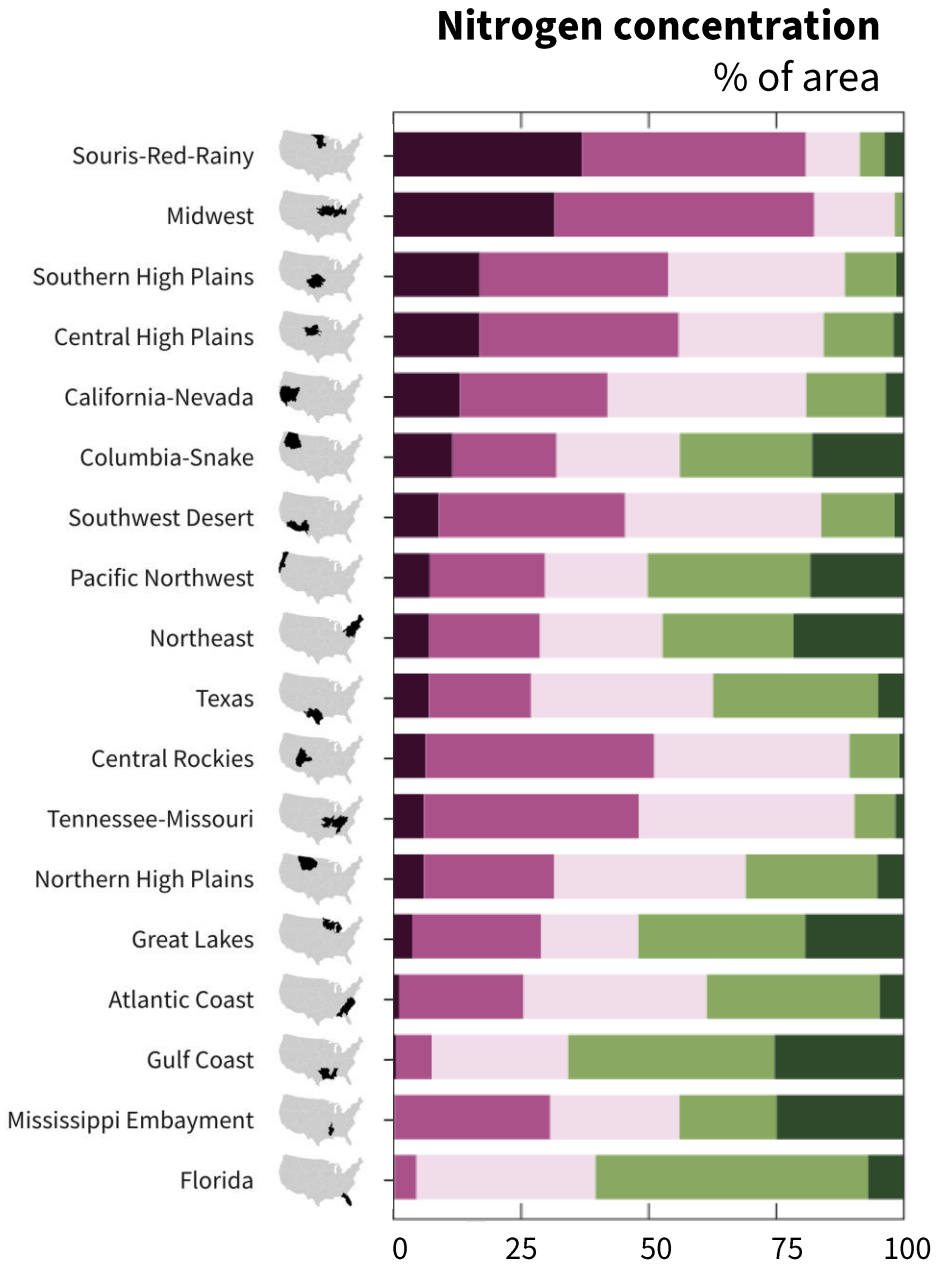
Other human sources

Wastewater

USGS

Nitrogen concentration compared to EPA National Rivers and Streams Assessment Regional Benchmarks





USGS

Other contaminants and interactive maps

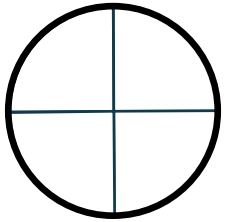
USGS

A more complete definition of water availability

USGS

Surface-water quality

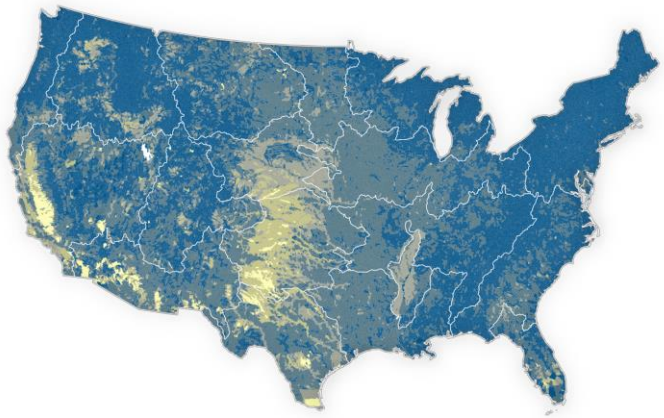
Water quantity



Groundwater quality

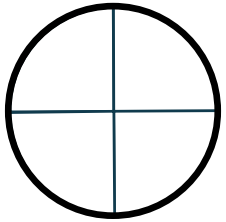
Ecoflow alteration

USGS



Surface-water quality

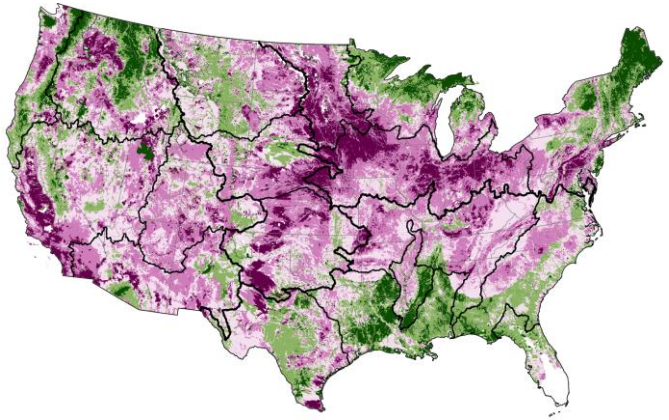
Water quantity
Supply and Use Index



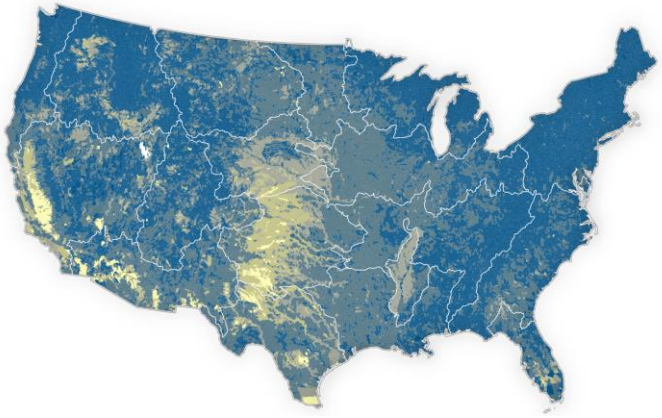
Groundwater quality

Ecoflow alteration

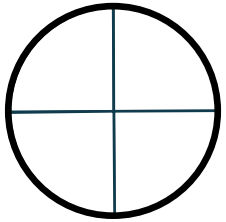
USGS



Surface-water quality
Stream nitrogen and phosphorus



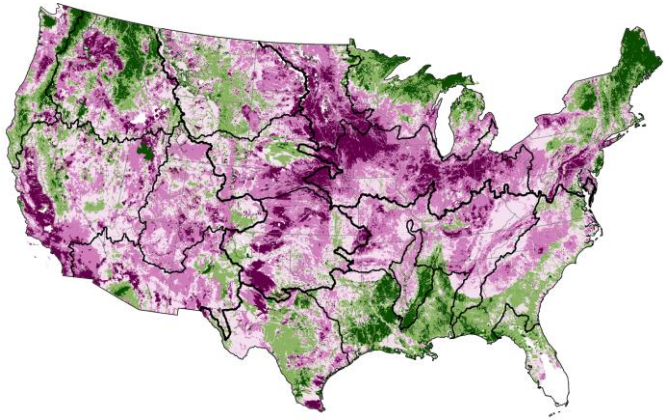
Water quantity
Supply and Use Index



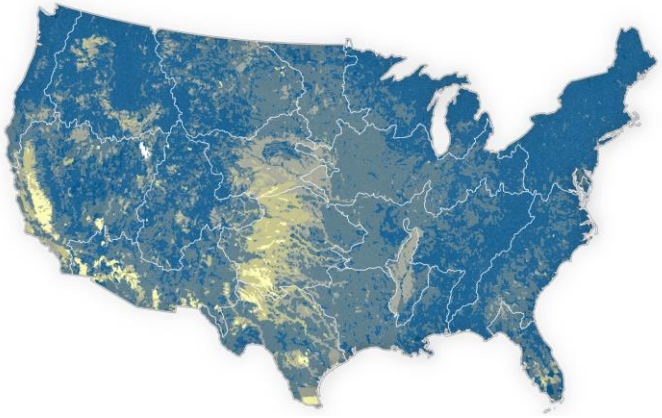
Groundwater quality

Ecoflow alteration

USGS



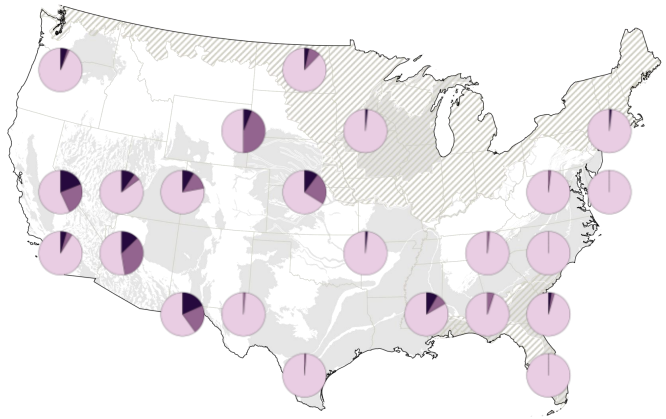
Surface-water quality
Stream nitrogen and phosphorus



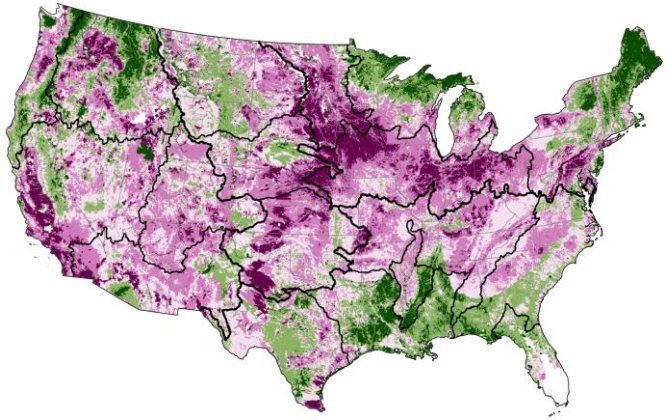
Water quantity
Supply and Use Index

Groundwater quality
Groundwater arsenic and nitrate

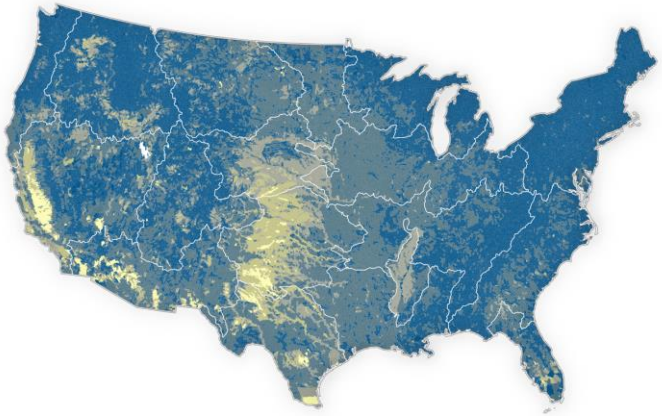
Ecoflow alteration



USGS

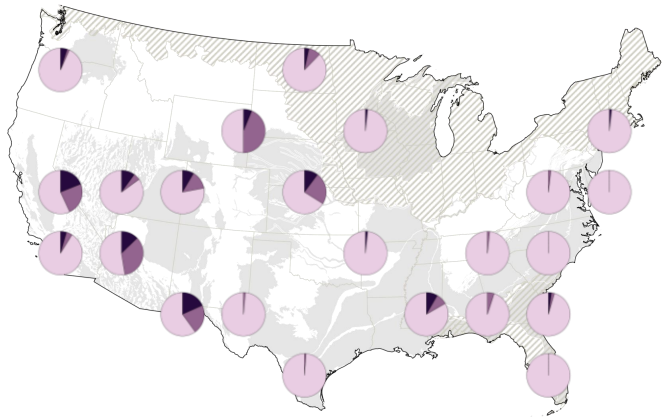


Surface-water quality
Stream nitrogen and phosphorus

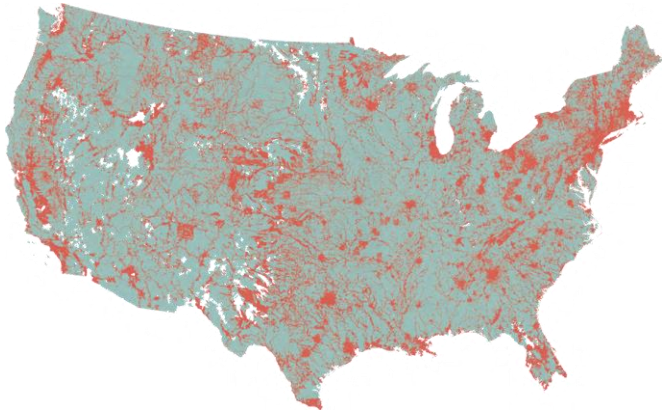


Water quantity
Supply and Use Index

Groundwater quality
Groundwater arsenic and nitrate

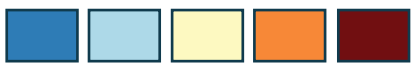


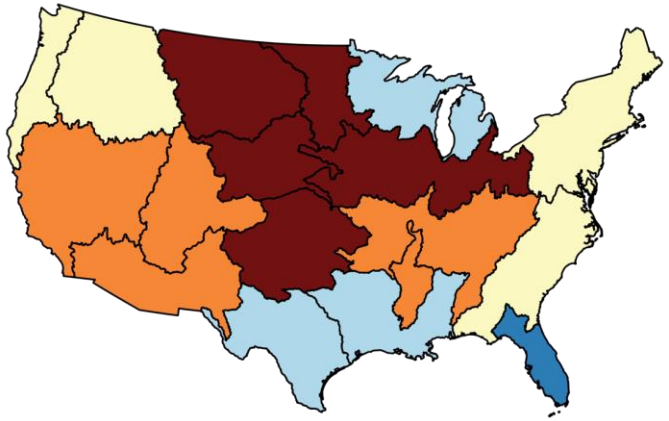
Ecoflow alteration
Compatibility with ecological needs



USGS

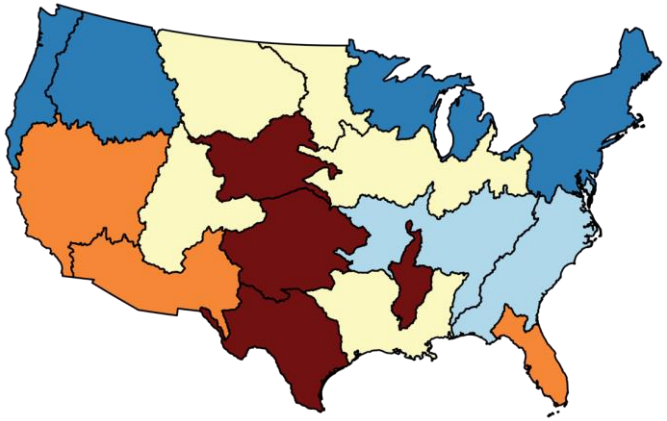
Increasing stress





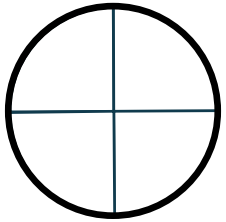
Surface-water quality

Stream nitrogen and phosphorus



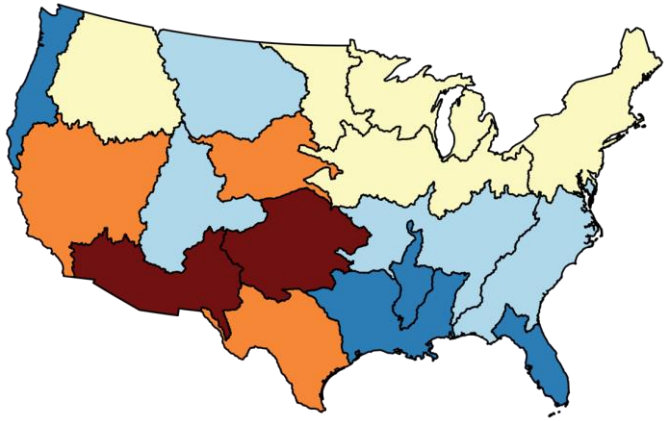
Water quantity

Supply and Use Index



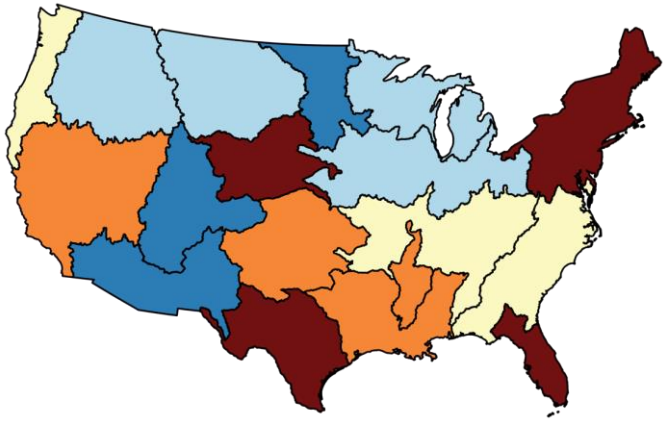
Groundwater quality

Groundwater arsenic and nitrate



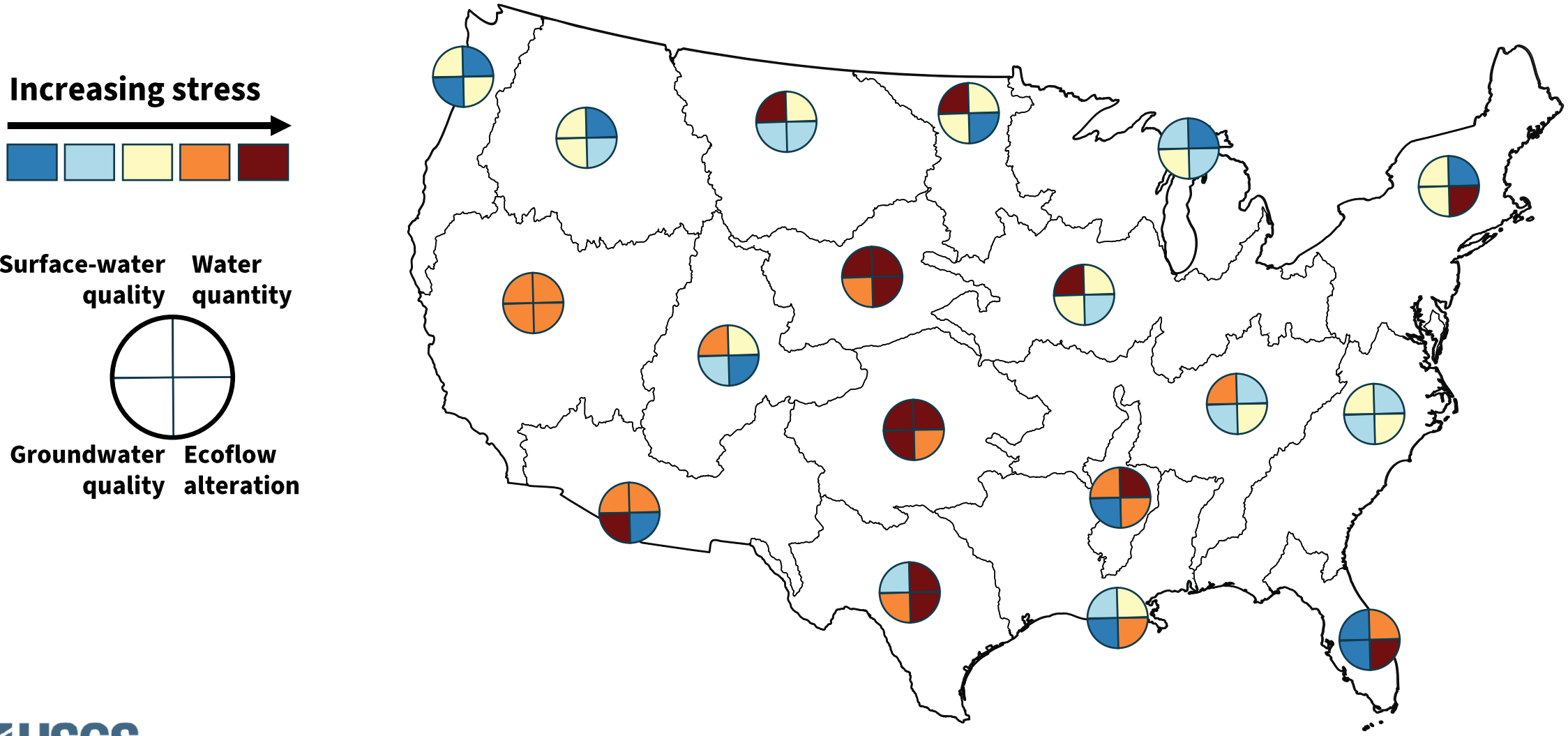
Ecoflow alteration

Compatibility with ecological needs



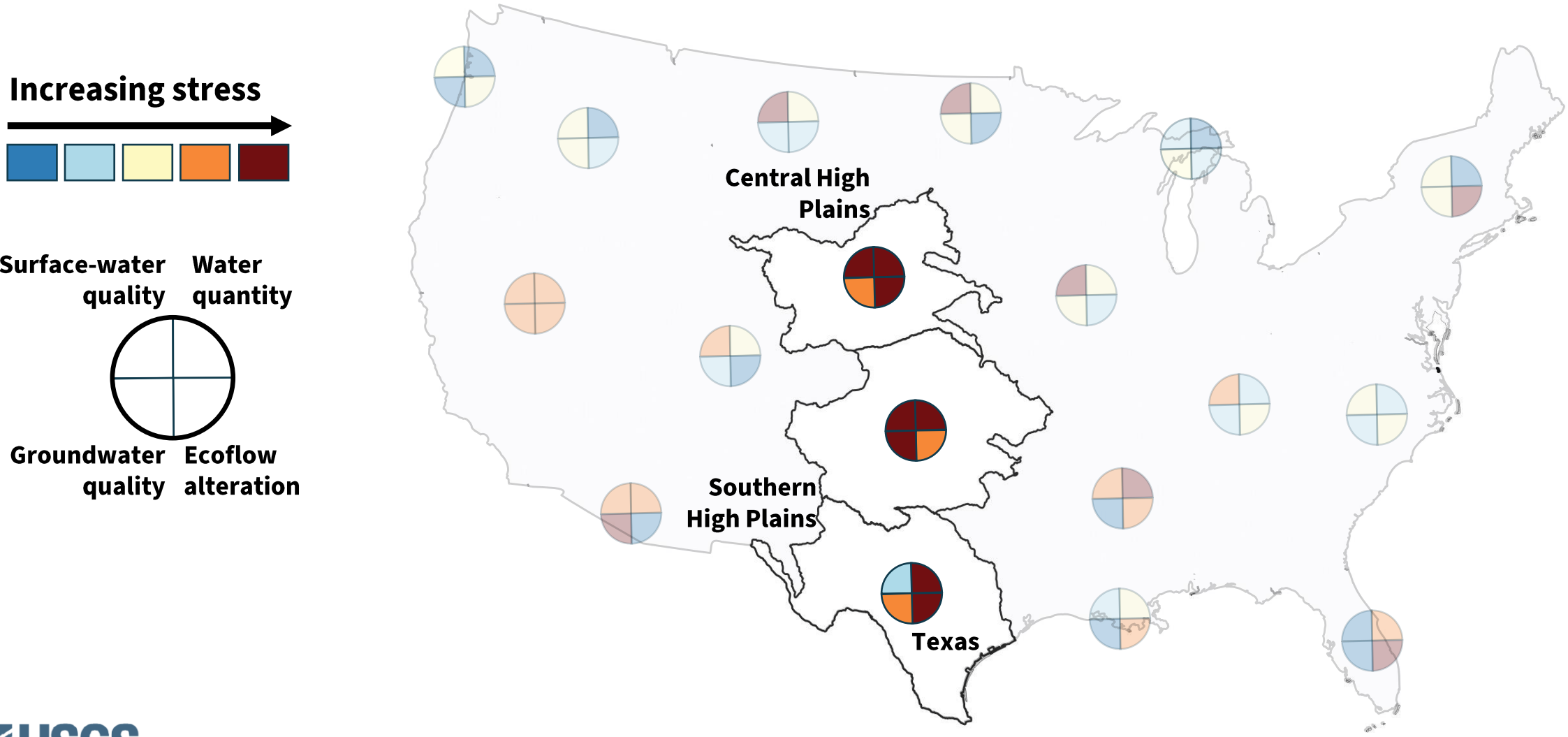
USGS

Integrated Water Availability



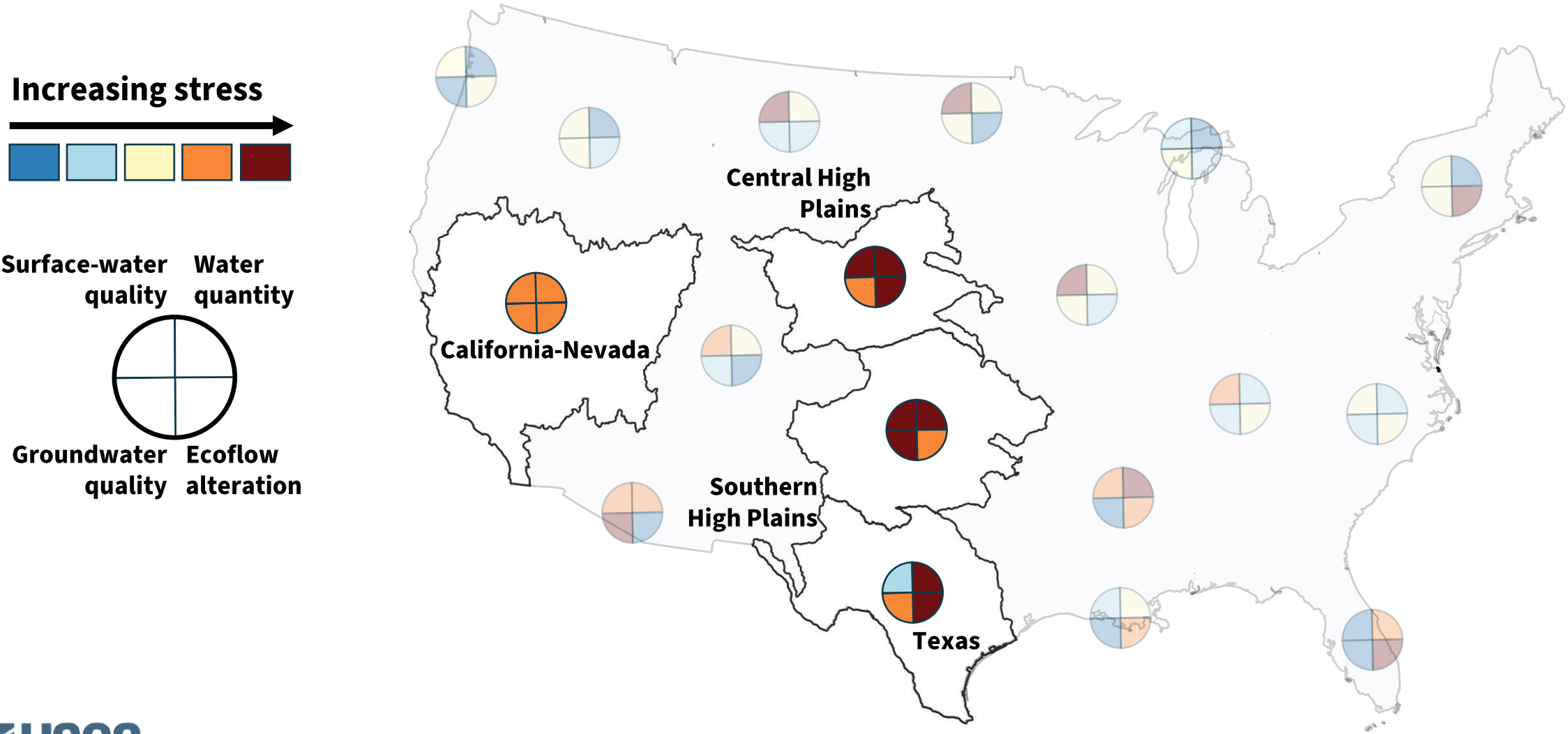
USGS

Integrated Water Availability



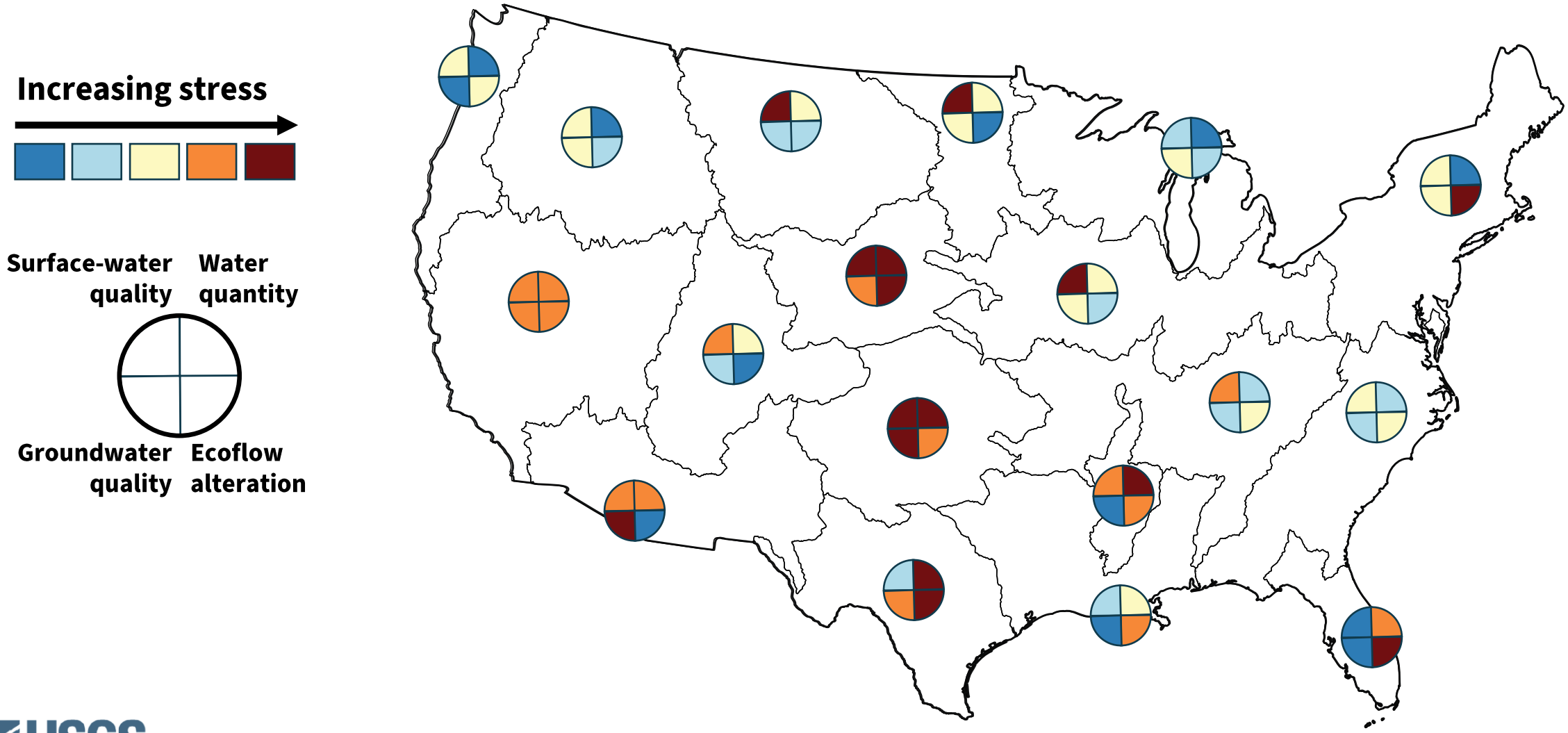
USGS

Integrated Water Availability



USGS

Integrated Water Availability



USGS

USGS

Which results are the most relevant for you?

USGS

How can you learn more?

USGS

Read the report:
doi.org/10.3133/pp1894

See the data viz:
water.usgs.gov/vizlab/water-availability

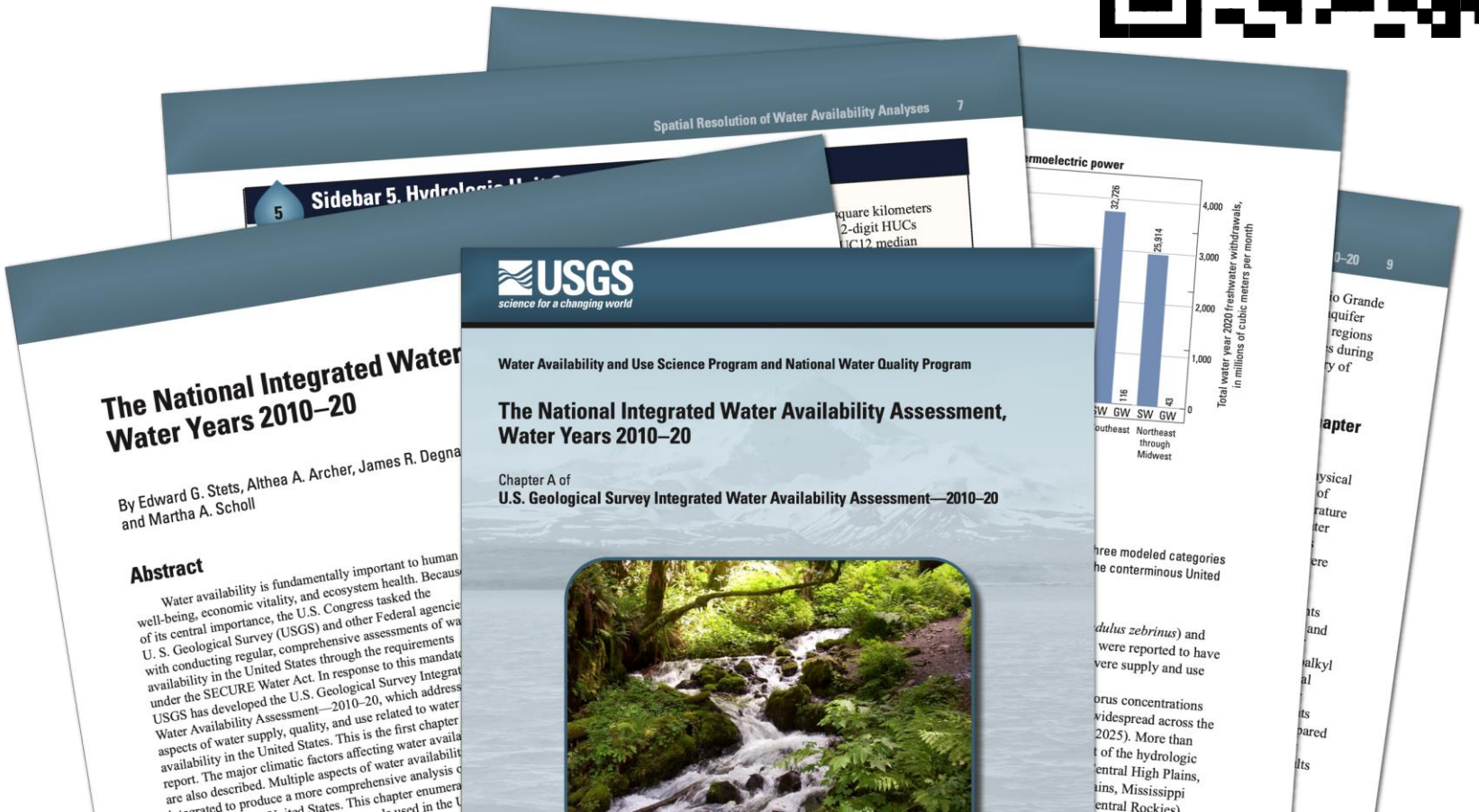
Get the data:
water.usgs.gov/nwaa-data

USGS

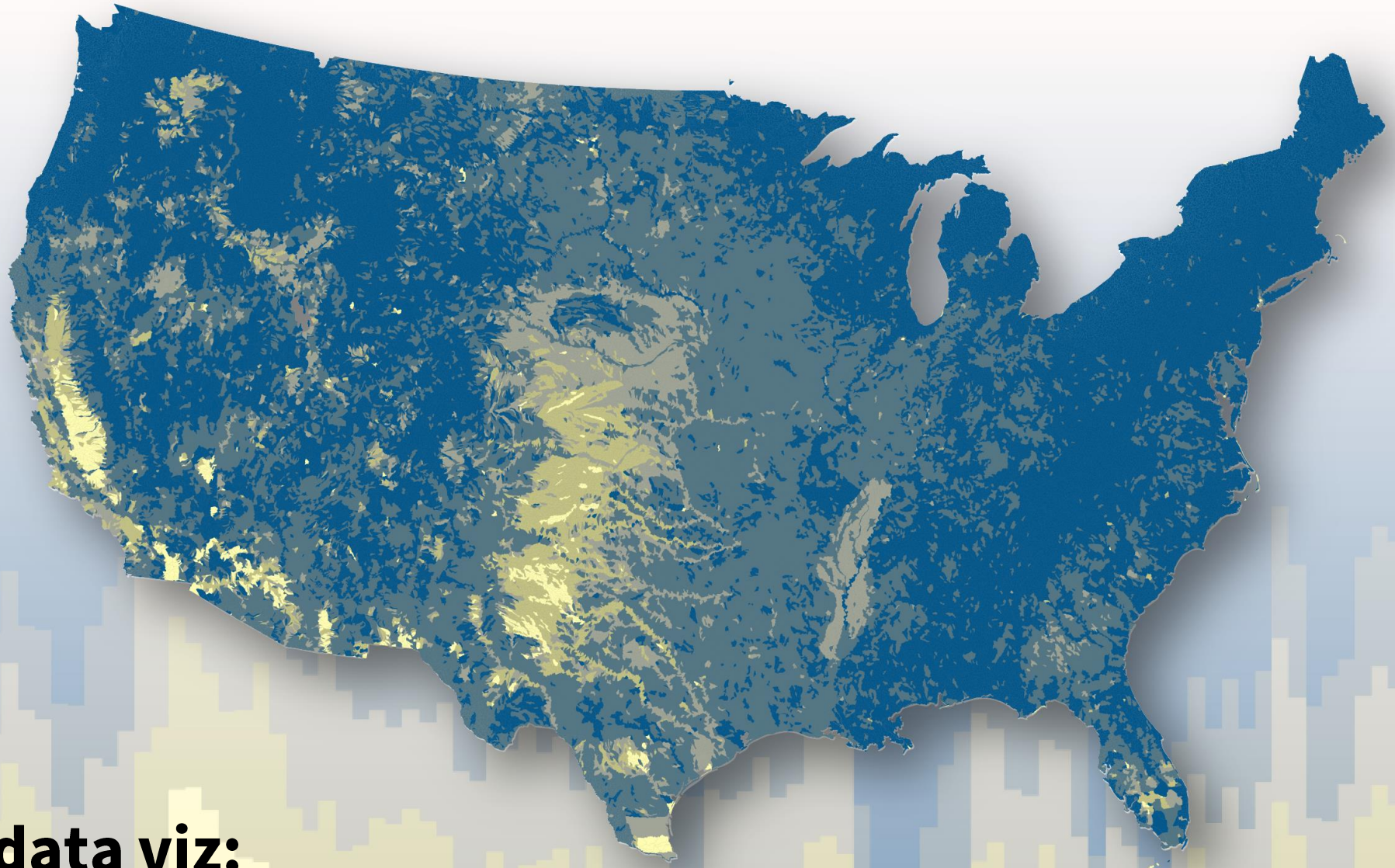
Read the report:
doi.org/10.3133/pp1894

Chapters

A. Executive Summary
B. Water Supply
C. Water Quality
D. Water Use
E. Future Water Availability
F. Integrated Water Availability



USGS



See the data viz:
water.usgs.gov/vizlab/water-availability

Get the data:

water.usgs.gov/nwaa-data

Home | Access Data | About the Data | Help | About Us | Contact Us

U.S. Geological Survey

National Water Availability Assessment Data Companion

Water Supply and Demand Estimates in your Watershed Through Time

The National Water Availability Assessment Data Companion (NWDC) provides regularly updated, model-based estimates of water availability and use, derived from U.S. Geological Survey (USGS) scientific models. This modeled information underlies the National Water Availability Assessment.

Learn More

USGS

What's next for water availability assessments?

Version 1a
Water Availability in the United States: Current Status

2025

2026

Version 1b
Water Availability in the United States: Historical Trends and Regional Perspectives on Water Availability

Version 2
Water Availability in the United States (Regional and National): Trends, Status, and Projections

2030

2035

Version 3
Water Availability in the United States (Regional and National): Trends, Status, and Projections

Version 4
Water Availability in the United States (Regional and National): Trends, Status, and Projections

2040

USGS

Contributors and acknowledgements

Report authors
Althea Archer
Elmera Azadpour
Matthew Cashman
Hayley Corson-Dosch
James Degnan
Melinda Erickson
Amy Galanter
Galen Gorski
Melissa Harris
Jonathan Haynes
Jacob Lafontaine
Carol Luukkonen
Anthony Martinez
Gregory McCabe
Laura Medalie
Olivia Miller
John Mullaney
Carolyn Olson
Julie Padilla
Kathryn Powlen
James Reddy
Martha Scholl
Allen Shapiro
Ted Stets
Kaysa Vaare-Lamoureux
Joe Zemmels

Water Use
Ayman Alzraiee
Cheryl Buchwald
Cathy Chamberlin
Alish Chan
Alexe DaCurro
Cheryl Dieter
Lauren Eng
Amy Galanter
Lillian Gorman Sanisaca
Andrew Halper
Melissa Harris
Jonathan Haynes
Wesley Henson
Judy Horwatich
Natalie Houston
Matthew Kearns
James Kennedy
Joshua Larsen
Melissa Lombard
Russell Ludlow
Donald Martin
Gary Martin
Brendan McCarthy
Patrick McCarthy
Jeremy McDowell
Ryan McShane
Lisa Miller
Richard Niswonger
Scott Paulinski
Rebecca Ransom
Amy Read
Robert Regan
Celia Rosecrans
Dina Saleh
Malia Scott
Kenneth Skinner
Jana Stewart
Vincent White
Erik Wojtylk
Stefan Voss

Data Companion
Katrina Alger
Rachel Bryan
Ethan Carrell
Blake Draper
Kaycee Faunce
Megan Hines
Jesse Klotz
Camille Lake
Sung Lee
Shirley Leung
Alice McCarthy
Chitra Natarajan
Jennifer Rapp
Diana Restrepo-Osorio
Kathy Schoephoester
Leah Young
Dionne Zoanni

Water budget modeling
Theodore Barnhart
Jason Bellino
Dave Blodgett
Andy Bock
Fei Chen
Sisi Chen
Aiguo Dai
Jesse Dickinson
Erin Dougherty
Jimmy Dudhia
Aubrey Dugger
Krista Dunne
Tom Enzminger
Sydney Foks
David Gochis
Joe Grim
Andrew Halper
Michelle Harrold
Cinlin He
Tim Hodson
Mike Ieradi
Kyoko Ikeda
Abby Jaye
Ju-Hye Kim
Kathryn Koczot
Katharine Kolb
Jacob LaFontaine
Andrew LaMotte
Changhai Liu
Yuqiong Liu
Nicholas Lybarger
Steven Markstrom
Amir Mazrooei
Richard McDonald
Gonzalo Miguez-Macho
Andrew Newman
Parker Norton
Nina Omani
Andreas Prein
Arezoo Rafieeinasab
Kristen Rasmussen
Roy Rasmussen
Robert Regan
Sarah Rosa
Ronnie Abolafia-Rozenzweig
Kevin Sampson
Marilyn Santiago
Timothy Schneider
Katie Skalak
Amelia Snyder
Ishita Srivastava
Eric Swain
Roland Viger
Mike Wieczorek
David Wolock
Lulin Xue
Yongxin Zhang

Vizlab
Mandie Carr
Maggie Jaenicke
Cee Nell

Interagency review
Bureau of Reclamation
Christopher Frans
Sean Kimbrel
Avra Morgan

Colleague reviewers
Nancy Barber
Hedeff Essaid
Kara Garvin
Lauren Koenig-Snyder
Melissa Masbruch
Trevor Partridge
Howard Reeves
Jared Smith
Sarah Stackpoole
Jim Tesoriero
Ellie White
Dan Wise

Management
John Brakebill
Daren Carlisle
Brian Clark
Don Cline
Mindi Dalton
Sandy Eberts
Jennifer Keisman
David Lesmes
Joe Nielsen
Elena Nilsen
Jaime Painter
Emily Read
Sachin Shah
Meg Shoda
Lori Sprague
Roland Viger

Other partners
Chris Green
Bruce Lindsey
Gretchen Oelsner

USGS

Questions and discussion

Learn more at www.usgs.gov/iwaas

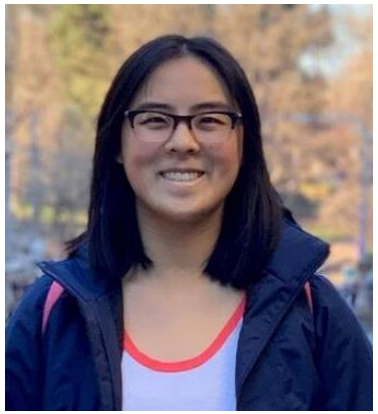
National_IWAAs@usgs.gov

USGS

Panelists

Lori Sprague (she/her)
Program Manager, IWAAs
Water Mission Area

Ted Stets
Research Ecologist
Water Mission Area



Shirley Leung (she/her)
Product Owner
Data Companion

Mindy Erickson (she/her)
Research Hydrologist
Water Quality

Galen Gorski (he/him)
Machine Learning Specialist
Water Supply

Laura Medalie (she/her)
Hydrologist
Water Use

Martha Scholl
Research Hydrologist
Climate Change and Water Availability

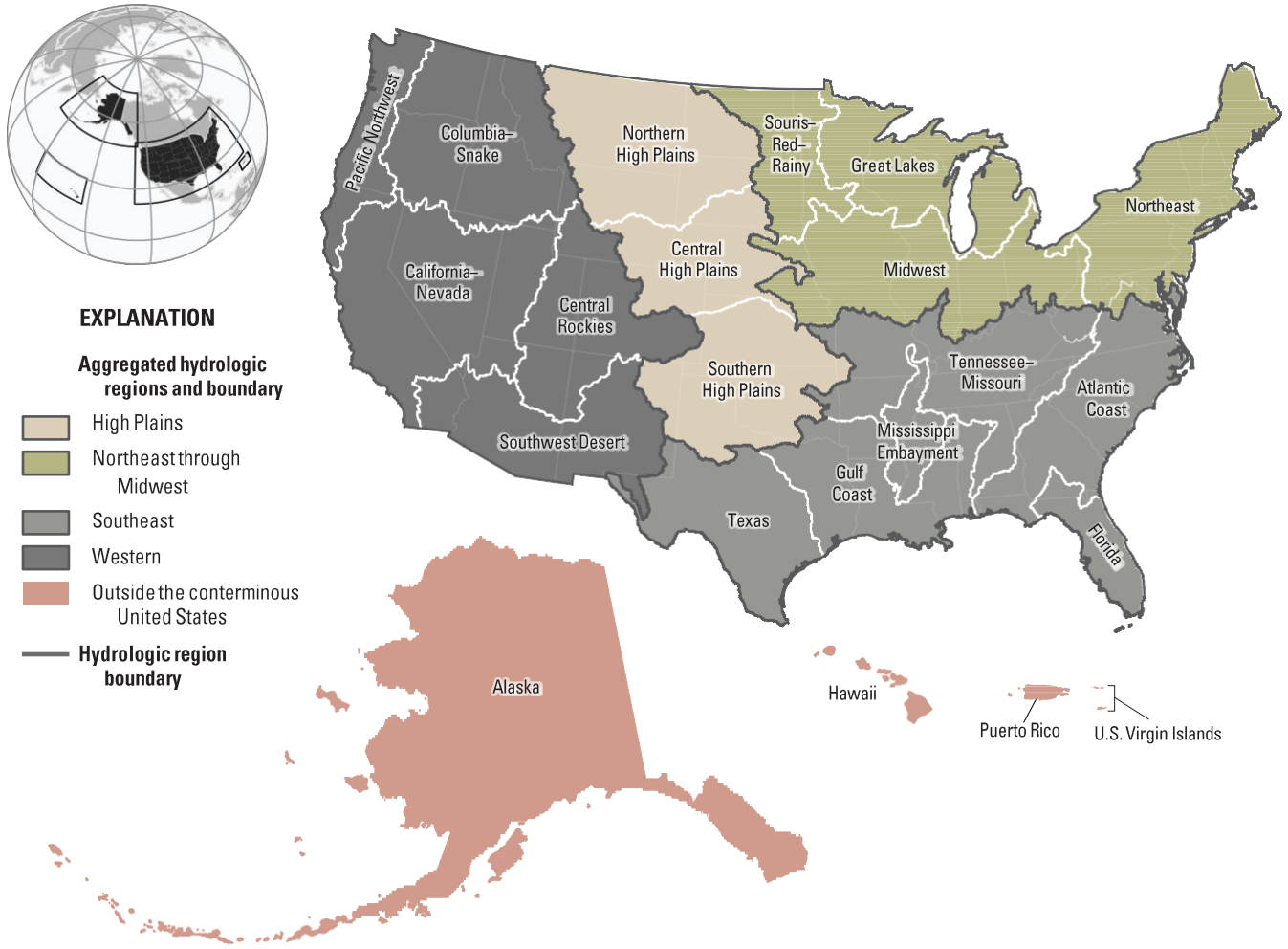
USGS

Questions and discussion

Learn more at www.usgs.gov/iwaas

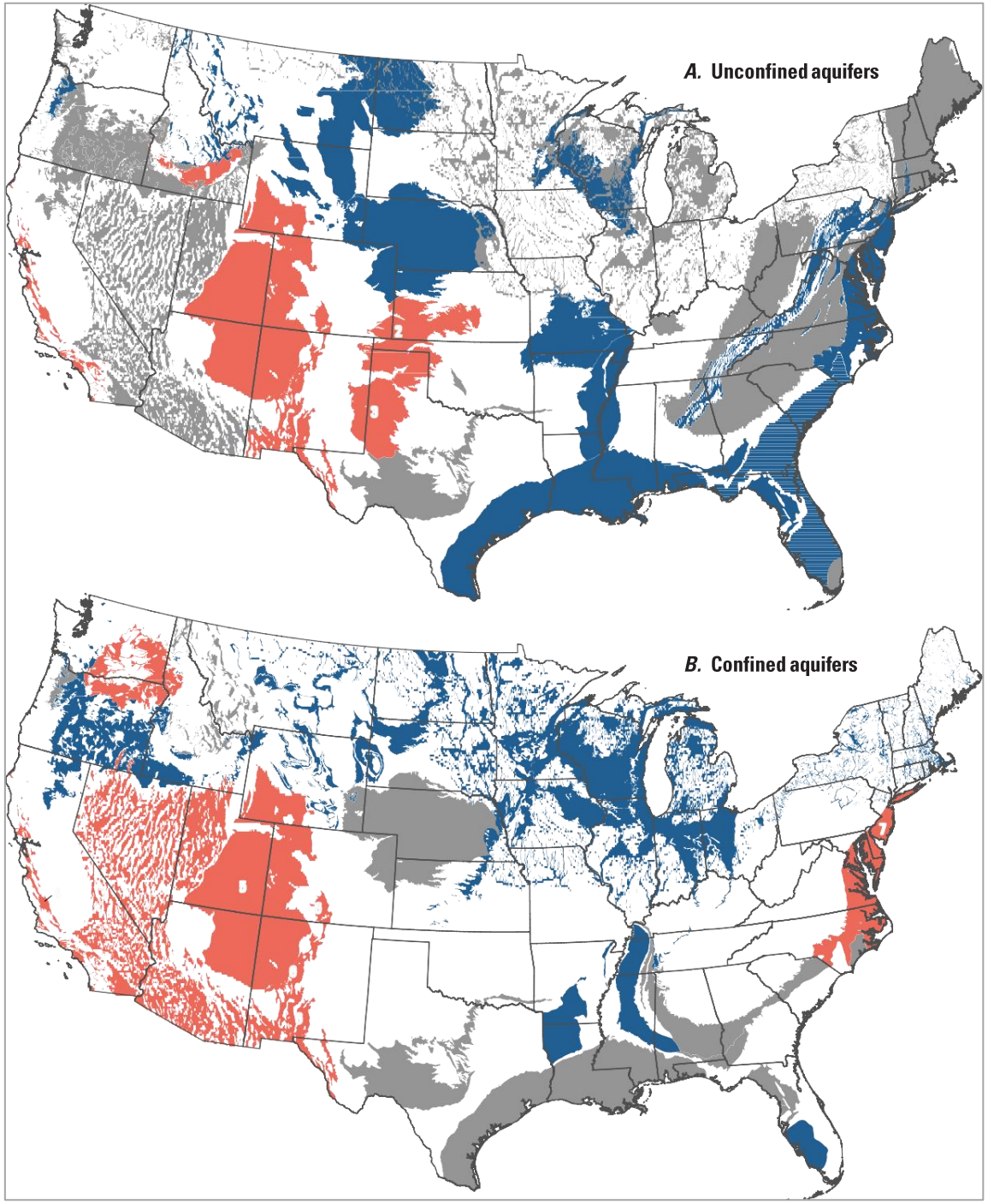
National_IWAAs@usgs.gov

USGS


EXPLANATION
Aggregated hydrologic regions and boundary
High Plains
Northeast through Midwest
Southeast
Western
Outside the conterminous United States
Hydrologic region boundary
Pacific Northwest
Columbia–Snake
Northern High Plains
Souris–Red–Rainy
Great Lakes
Northeast
California–Nevada
Central High Plains
Midwest
Central Rockies
Southern High Plains
Tennessee–Missouri
Atlantic Coast
Southwest Desert
Mississippi Embayment
Gulf Coast
Texas
Florida
Alaska
Hawaii
Puerto Rico
U.S. Virgin Islands

USGS

Chapter B: Water Supply in the U.S.



Median groundwater-level percentiles, by regional aquifer, for (A) unconfined aquifers and (B) confined aquifers, in the conterminous United States, 2010-2020

USGS

slido

Please download and install the Slido app on all computers you use

Where are you from?

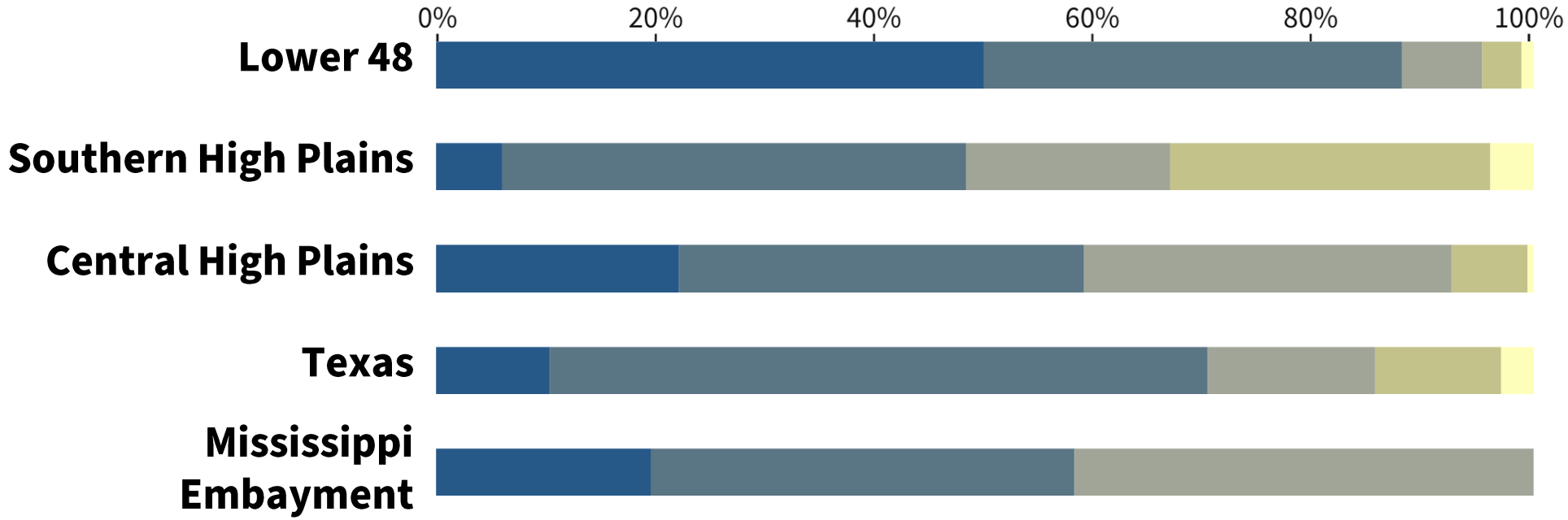
ⓘ Start presenting to display the poll results on this slide.

Water limitation

Supply and Use Index (SUI)

- Severe (0.8-1)
- High (0.6-0.8)
- Moderate (0.4-0.6)
- Low (0.2-0.4)
- Very low (0-0.2)

SUI is the imbalance between surface water supply and water use.



USGS

Learn more about the National Water Availability Assessment at

www.usgs.gov/iwaas

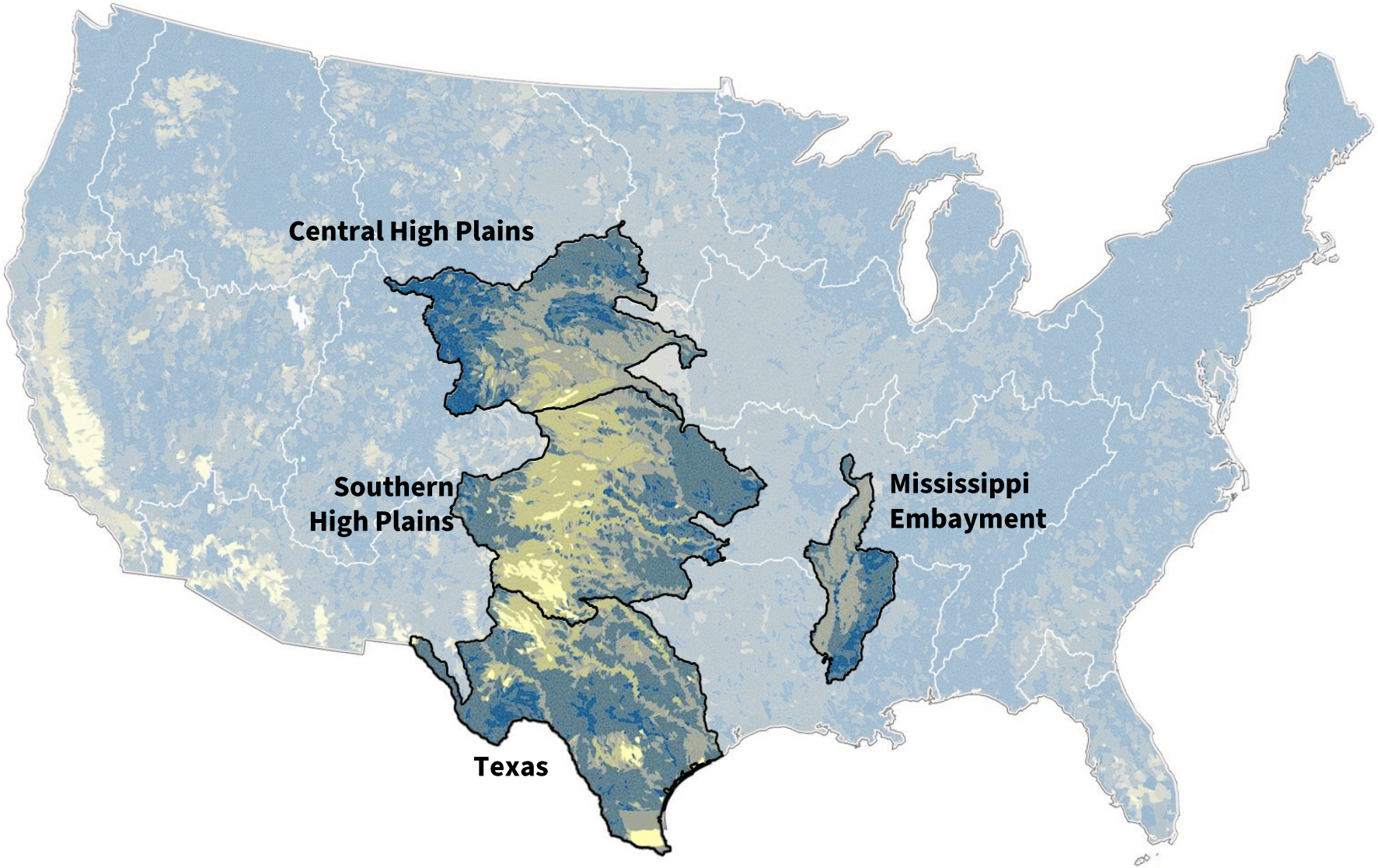
USGS

Water limitation

Supply and Use Index (SUI)

- Severe (0.8-1)
- High (0.6-0.8)
- Moderate (0.4-0.6)
- Low (0.2-0.4)
- Very low (0-0.2)

SUI is the imbalance between surface water supply and water use.



USGS