Drought, Water Supply, and Western Agriculture
2023 USDA Ag Outlook Forum

WESTERN STATES
WATER COUNCIL

Crystal City, Virginia

February 23, 2023

Tony Willardson
Executive Director

Western States Water Council

- State government entity
- Advisory body to 18 western Governors on water issues
- Provides states collective voice
- Fosters state/state and federal/state collaboration
- Works with the Western Governors' Association (WGA)
- Western Federal Agency Support Team (WestFAST)

Our mission is to ensure that the West has an adequate, secure and sustainable supply of water of suitable quality to meet its diverse economic and environmental needs now and in the future

Water Planning Challenges

- Growth & related economic & environmental needs
- Limited data regarding water supplies and demands
- Competing or poorly defined water rights
- Aging and often inadequate infrastructure
- Unpredictable climate and extreme events

(little ability to predict seasonal/subseasonal supply)

- Constantly evolving regulatory landscape.

WSWC Vision Statement

Effectively addressing these challenges will require stronger collaboration and cooperation that transcends political and geographic boundaries between states, federal agencies, tribes, and local communities.

Western States Federal Agency Support Team

A Declaration of Cooperation

Working Together for the Sustainable and Efficient Use of Western Water Resources

We, as representatives of our respective Federal agencies, do hereby declare our intent to cooperate as members of a Western States Federal Agency Support Team (WESTFAST) partnership. We will work together whenever and wherever possible throughout the 17 Western States to promote and educate the public on the benefits of sustainable and efficient use of water resources.

We declare that WESTFAST supports a continued commitment on the part of Federal, and State organizations; working with local, Tribal, and other stakeholders; to improve the effectiveness of collaboration to seek watershed solutions to water issues in the Western States. This effort emphasizes proactive, voluntary, participatory and incentive-based approaches to water resource management and conservation assistance programs throughout the Western States.

We hereby declare that we as WESTFAST partners will collaborate with the Western States Water Council to guide the development of an appropriate action plan for this partnership.

We hereby declare to support, in concept, the establishment of a Federal liaison position to work with the WESTFAST members and the Western States Water Council in developing a collaborative work plan to carry forward joint water resource initiatives. Contributory cost-sharing such a position will be based on authorized and available funds.

Army Corps of Engineers

Bureau of Land Management

Bureau of Reclamation

Environmental Protection Agency

National Oceanic & Atmospheric Administration

Natural Resources Conservation Service

U.S. Fish & Wildlife Service

U.S. Forest Service

U.S. Geological Survey

U.S. Department of Energy

National Aeronautics and Space Administration

U.S. Dept. of Defense

National Park Service

STATES ARE NOT STAKEHOLDERS!

Western states have primary authority and responsibility for the appropriation, allocation, development, conservation and protection of water resources.

Water in the West is an increasingly scarce and precious resource.

Hoover Dam/Lake Mead

Lake Powell

WSWC Principles

- We must cultivate a western water conservation ethic through greater understanding of, and appreciation for, water's value.
- Water must be recognized as a critical public policy priority given the importance of the resource to our public health, economy, food security, environment, and western way of life.

Water Law 101

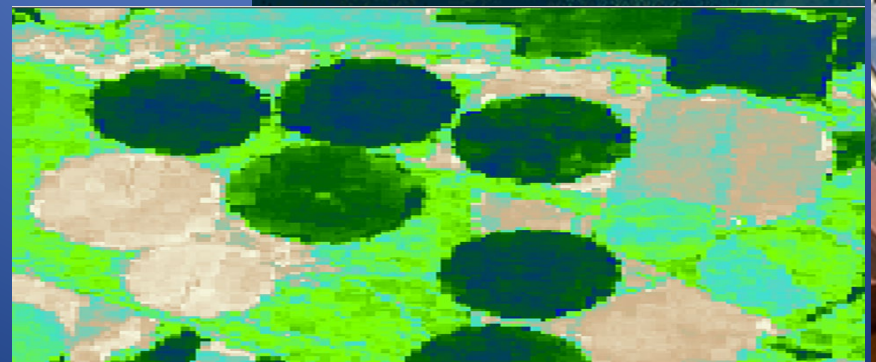
- Law of Prior Appropriation (well defined rights)
- First in Time, First in Use (protect Investments)
- Priority Dates and Consumptive Water Use
- Reasonable Beneficial Use - Water Duties
- Use it or Lose it! (non-speculation)
- Prohibits Waste (generally defined by custom)
- Forfeiture and Abandonment Statutes (flexibility)
- No Injury (new uses or changes in use)
- Water Rights Transfers (POD and POU changes)

Consumptive Use

- Uses may be consumptive or non-consumptive
- Recoverable losses and irrecoverable losses
- Most water rights based on consumptive use, not diversions or withdrawals
- Consumptive use not widely measured directly
- May require costly case-by-case analysis
- USGS 1995 national water use report dropped estimates of consumptive use as unreliable
- Agriculture is the predominant western water use measured both by diversions and consumption
- Basinwide v. individual water use efficiencies

NASA Data Related Initiatives

- Western Water Applications Office (JPL)
- Thermal Infrared Imagery (TIRS)
- LCDM/Landsat 8 & 9
- Evapotranspiration (ET)
- Consumptive Use
- Open ET Initiative
- Mapping ET

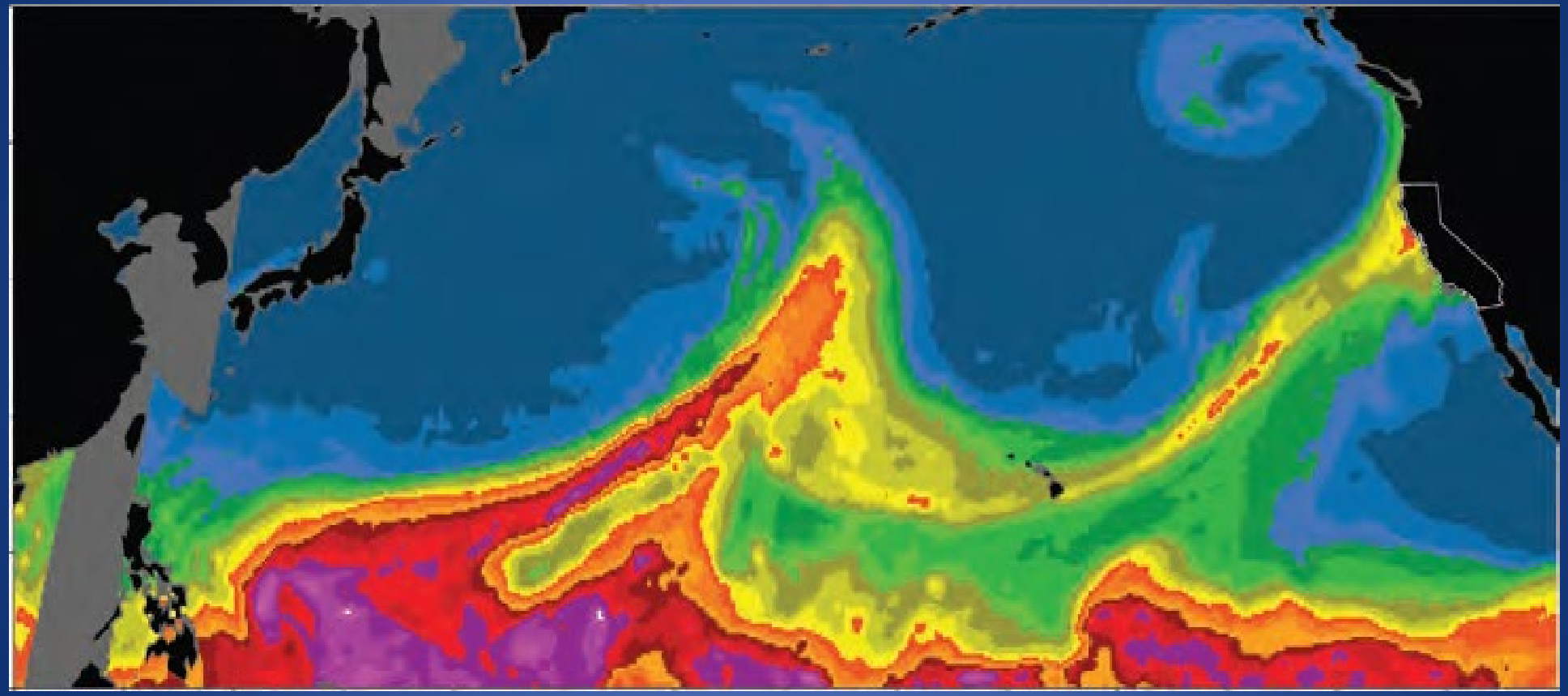


Imperial Valley, CA
via Landsat 7
Imperial Valley
ET (mm)
0
100
200
300
400
433
ET during January – March, 2003

WSWC Principle

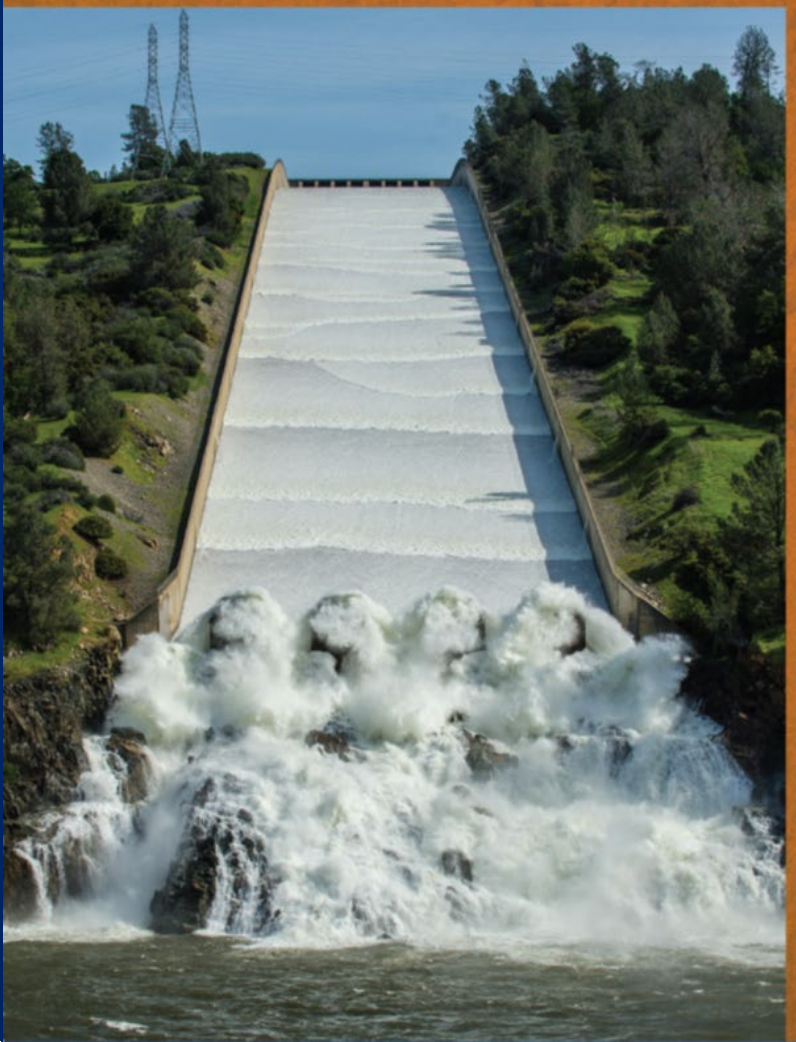
All levels of government must prioritize the collection, analysis and open sharing of reliable data regarding water availability, quality, and usage given its importance to research for sound science and data driven decision making.

Atmospheric Rivers

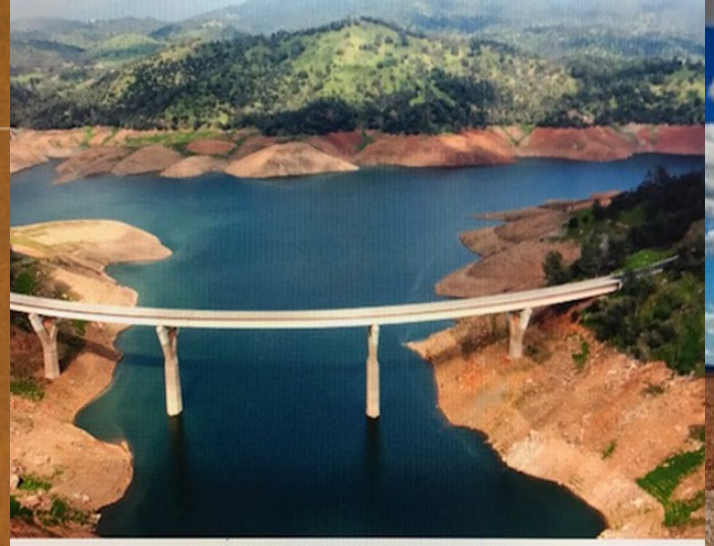


Importance of Longer Forecast Lead Times

Improving
Sub-Seasonal to Seasonal
Precipitation Forecasting for
Water Management



WESTERN
STATES
WATER
COUNCIL



Workshop on Improving Sub-Seasonal and Seasonal Precipitation Forecasting for Drought Preparedness

May 2015 | San Diego

IMPROVING SUB-SEASONAL TO SEASONAL PRECIPITATION FORECASTING FOR WATER MANAGEMENT

A Workshop Series | June 2016

TITLE II of PL 115-25: SUBSEASONAL AND SEASONAL FORECASTING INNOVATION

- (c) FUNCTIONS.—The Under Secretary, acting through the Director of the National Weather Service and the heads of such other programs of the National Oceanic and Atmospheric Administration as the Under Secretary considers appropriate, shall— ‘‘(1) collect and utilize information in order to make usable, reliable, and timely foundational forecasts of subseasonal and seasonal temperature and precipitation; ‘‘(2) leverage existing research and models from the weather enterprise to improve the forecasts under paragraph (1).

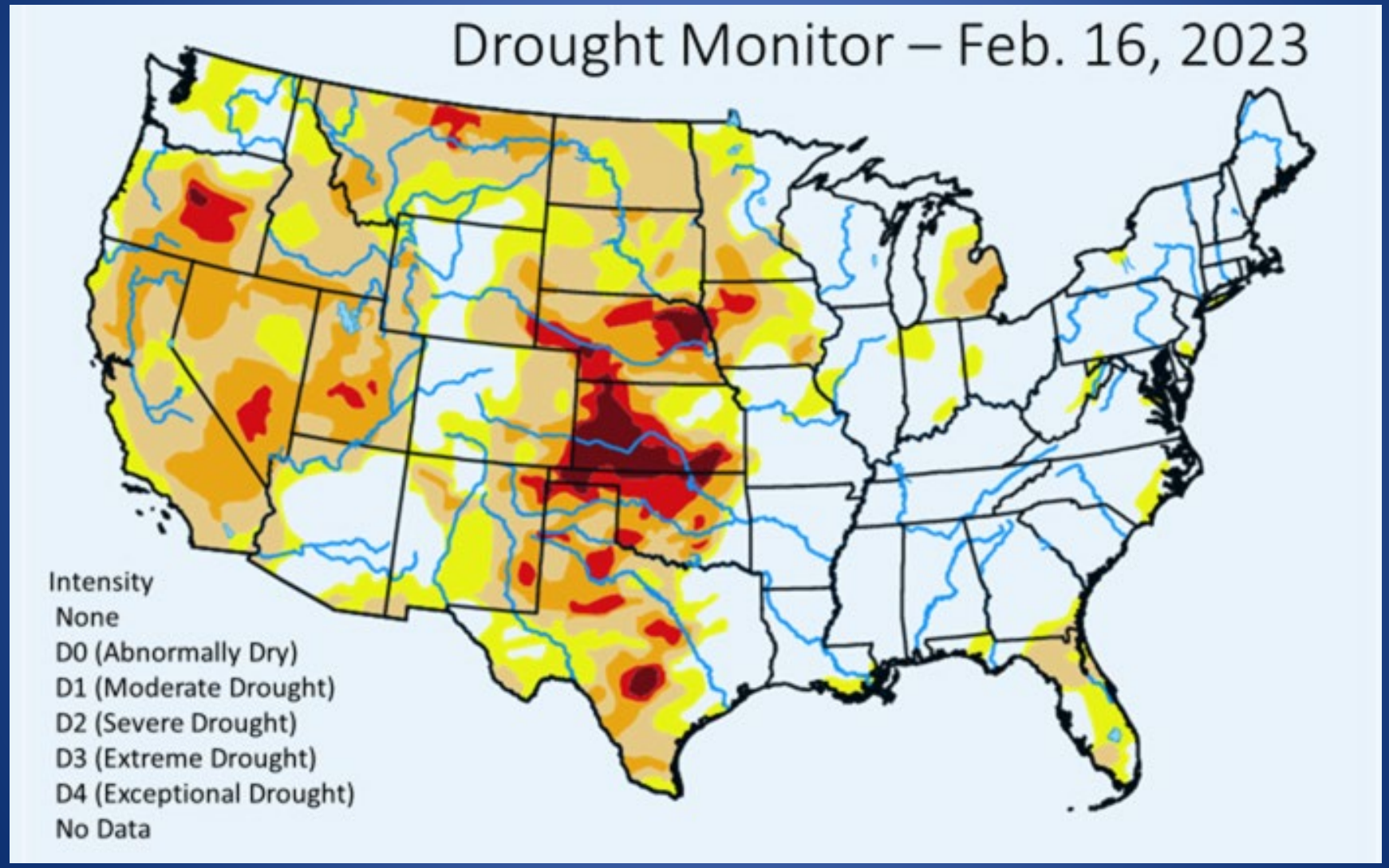
NOAA 2020 Report to Congress

Regional Pilot Projects to Accelerate S2S Predictive Skill Improvement

Winter S2S Precipitation Forecasts for Water Management in the Western U.S.

The dominant fraction of the annual mean precipitation along the west coast of the United States and in the mountain regions west of the Mississippi River occurs from October through April. In many regions, this precipitation falls as snow, and the mountains act as a natural reservoir. Key science challenges to improving these forecasts include: inadequate model resolution (horizontal and vertical) to resolve the mountainous terrain, which influences the intensity of precipitation and the relative fraction of precipitation that falls as rain versus snow; improved fidelity in modeling of the atmospheric boundary layer in mountainous regions; and an inability to predict periods of blocked versus unblocked flow over the eastern North Pacific Ocean and western U.S.

National Integrated Drought Information System



Floods Act

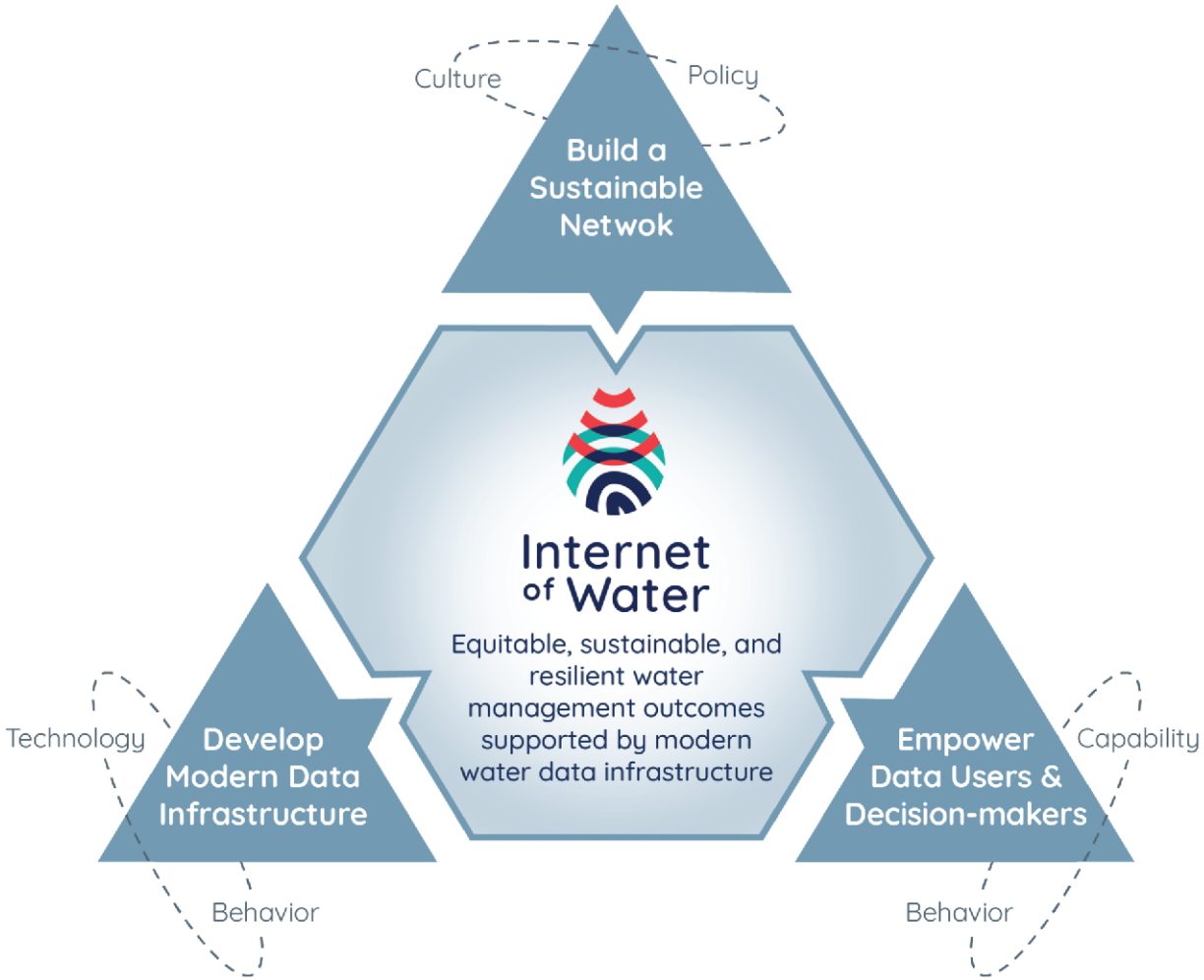
- Directs NOAA to establish a National Integrated Flood Information System (NIFIS, similar to NIDIS)
- Provide streamflow forecasts, reservoir releases, soil moisture, snow water equivalent, evaporative demand
- Improve seasonal & sub-seasonal precipitation and temperature forecasts
- Improve interoperability between models
- Advance geographic coverage, resolution, skill and efficiency

FLOODS Act

Flood Level Observation, Operations, and Decision Support Act

- Interagency Committee on Water Management and Infrastructure
  - Referred to as the Water Policy Committee (Water Subcabinet)
- Secretary of the Interior & EPA Administrator co-chairs
- Secretaries of USDA, Army, Commerce (NOAA Administrator), & Energy
- WPC priorities included:
  - increasing water storage, water supply reliability, and drought resiliency;
  - improving water quality, source water protection, and nutrient management;
  - promoting restoration activities;
  - improving water systems for drinking water, desalination, water reuse, wastewater, and flood control;
  - improving data management, research, modeling, and forecasting

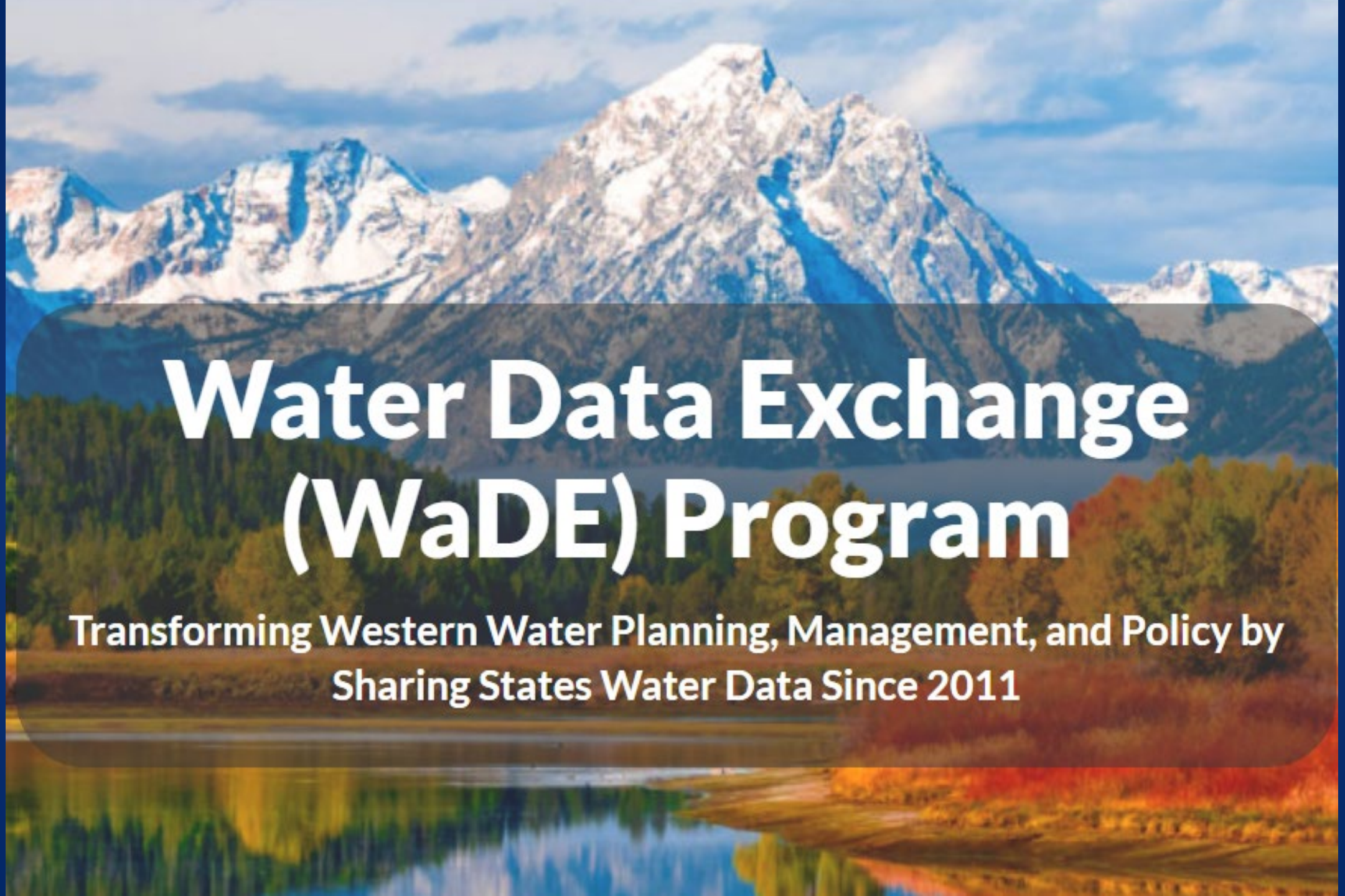
IoW Theory of Change



IF the IoW creates modern water data infrastructure across the U.S. and builds a diverse network of partners sharing standardized water data ;

THEN stakeholders will be empowered to collaborate and accelerate the development of novel water information tools that address equity and resilience in the face of serious threats to water availability and quality;

AND AS A RESULT, these stakeholders will improve decision-making about water management, ensuring equitable, sustainable, and resilient water management for the nation.

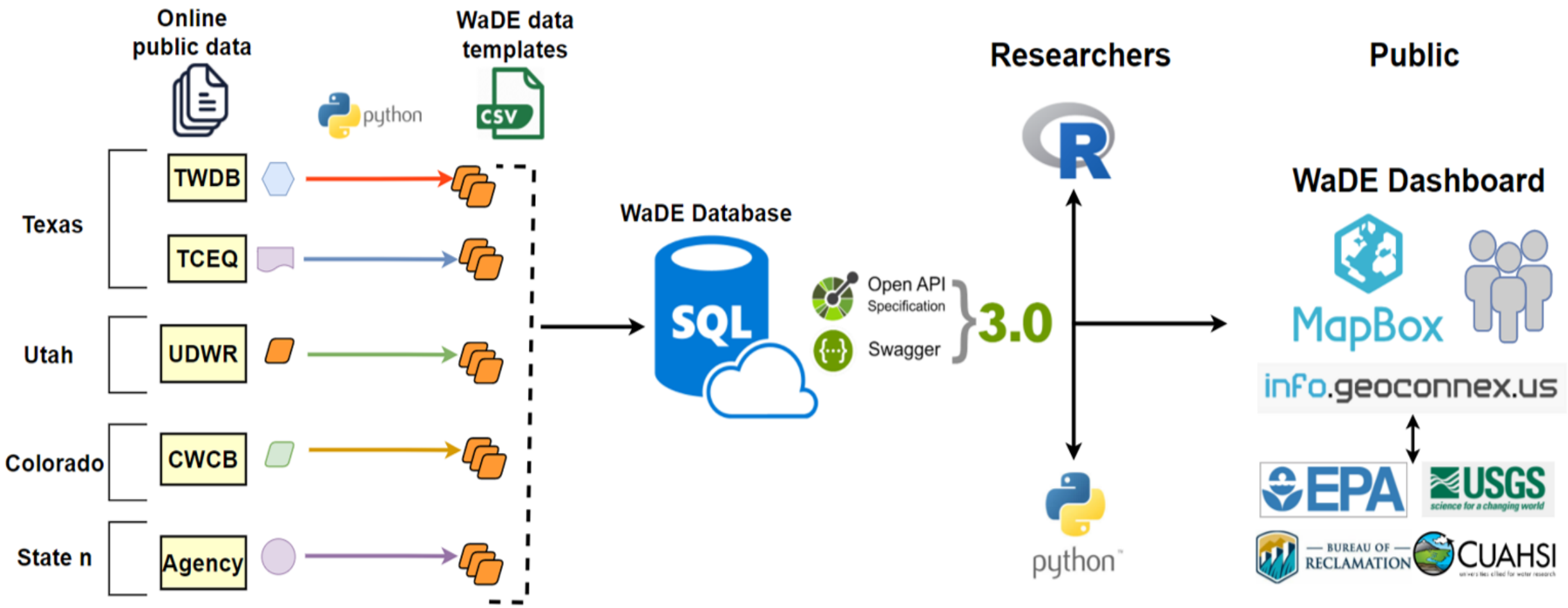


Water Data Exchange (WaDE) Program

Transforming Western Water Planning, Management, and Policy by Sharing States Water Data Since 2011

- Western Governors encourage the use of state water data in planning for both the public and private sectors.
- The Western States Water Council has worked together with state and federal agencies to create the Water Data Exchange, with philanthropic support.
- An online portal, called our Western States Water Data and Analysis Tools (WestDAAT), will enable states to share their water data with each other, federal agencies, and the public via a common platform.

WaDE 2.0 Architecture



GitHub https://github.com/WSWCWaterDataExchange

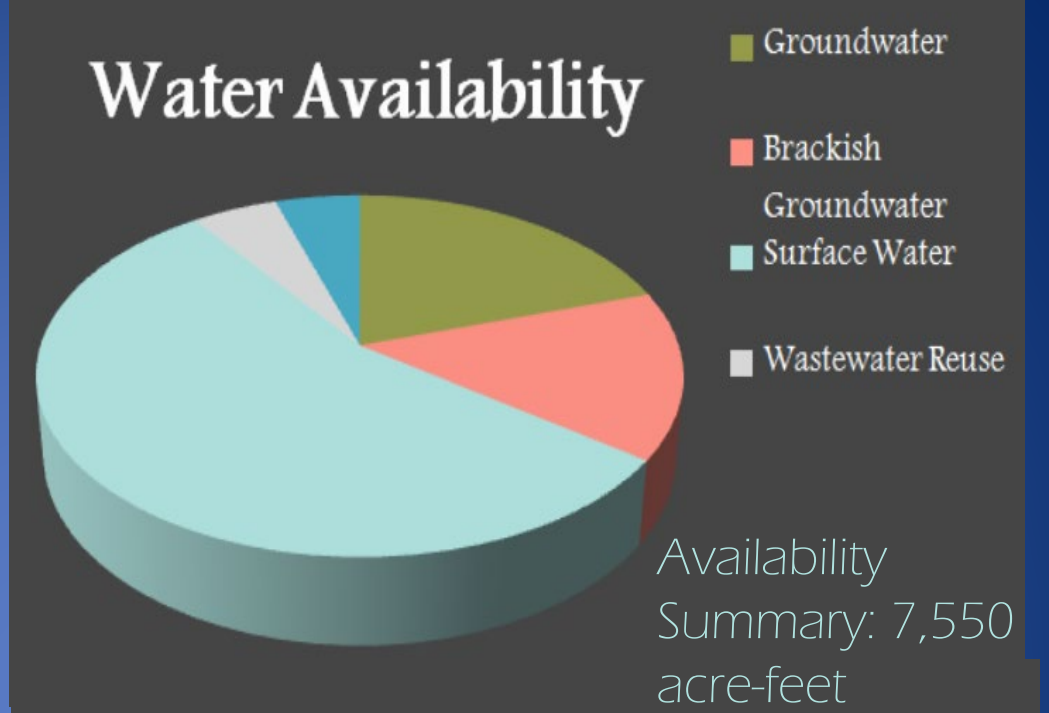
WHAT WILL IT PROVIDE?

Water Supply Summary:

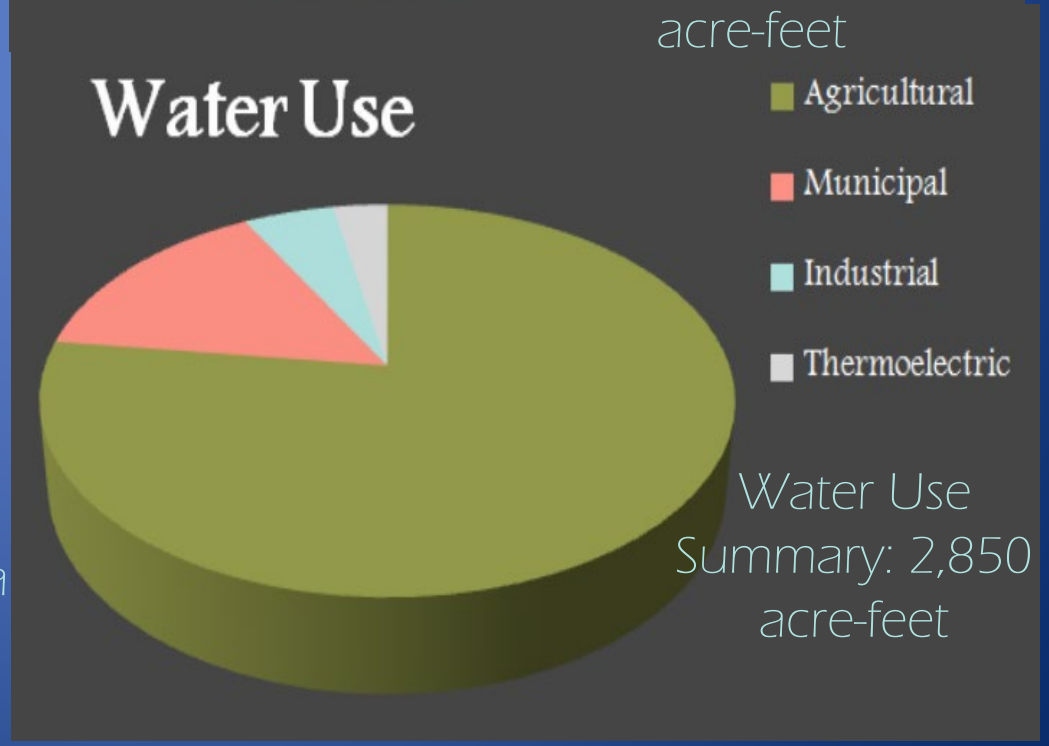
24,000 acre-feet

Regulatory Summary:

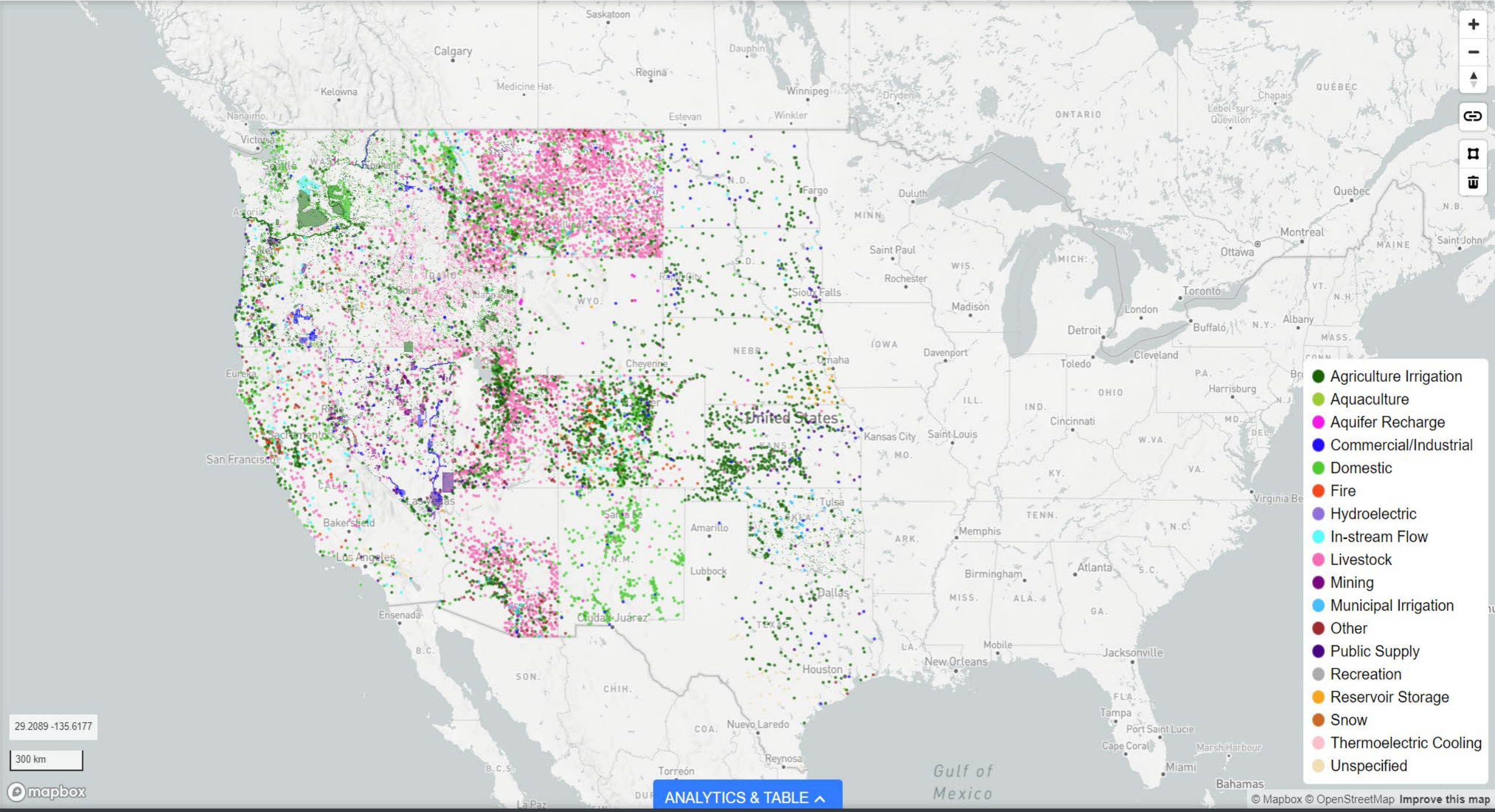
- Groundwater Management Area
- Minimum Instream Flow Requirements



Availability Summary: 7,550 acre-feet



Water Use Summary: 2,850 acre-feet


Agriculture Irrigation
Aquaculture
Aquifer Recharge
Commercial/Industrial
Domestic
Fire
Hydroelectric
In-stream Flow
Livestock
Mining
Municipal Irrigation
Other
Public Supply
Recreation
Reservoir Storage
Snow
Thermoelectric Cooling
Unspecified
29.2089 -135.6177
300 km
mapbox
ANALYTICS & TABLE
© Mapbox © OpenStreetMap Improve this map
United States
Gulf of Mexico
Saskatoon
Calgary
Regina
Winnipeg
Kelowna
Medicine Hat
Estevan
Winkler
Dauphin
Dryden
Nanaimo
Victoria
Seattle
Spokane
Astoria
Salem
Boise
Eureka
Reno
Sacramento
San Francisco
Las Vegas
Bakersfield
Los Angeles
Ensenada
Ciudad Juárez
Cheyenne
Rapid City
Fargo
Duluth
Saint Paul
Rochester
Sioux Falls
Madison
Omaha
Davenport
Kansas City
Saint Louis
Tulsa
Amarillo
Lubbock
Dallas
Houston
Nuevo Laredo
Reynosa
Torreón
La Paz
Memphis
Birmingham
Atlanta
Mobile
New Orleans
Jacksonville
Tampa
Port Saint Lucie
Cape Coral
Miami
Marsh Harbour
Bahamas
Detroit
Toledo
Cleveland
Cincinnati
London
Toronto
Buffalo
Ottawa
Montreal
Quebec
Chapais
Lebel-sur-Quévillon
Albany
Harrisburg
Saint John
ONTARIO
QUÉBEC
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NEBR.
S.D.
N.D.
WYO.
IDAHO
WASH.
OREG.
CALIF.
NEV.
UTAH
COLO.
N.M.
ARIZ.
MONT.
B.C.
SON.
CHIH.
COA.
B.C.S.
DUR.

“Reliable water data is almost as critical to farmers and water managers as the water supply itself. With added pressure from population growth and the uncertainty that climate change impacts have on existing and future water supply, OpenET allows planning for agricultural water needs in a way that just wasn't possible before.”

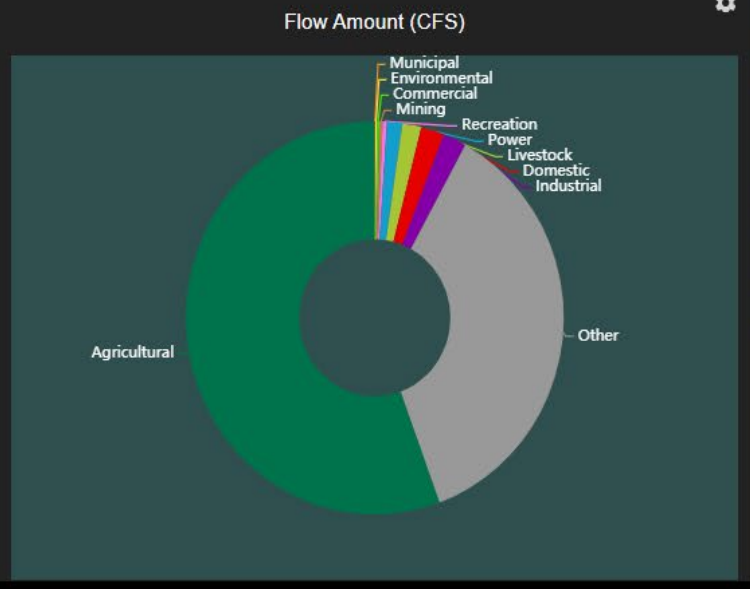
—E. Joaquin Esquivel, Chair of the California State Water Resources Control Board

- Albuquerque
- Denver
- Las Vegas
- Los Angeles
- Phoenix
- Salt Lake City
- San Diego
- Tucson

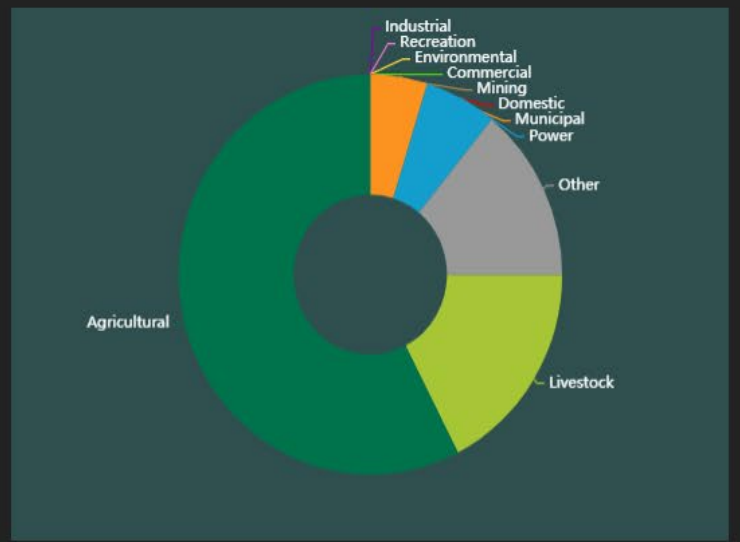
Water Rights Data

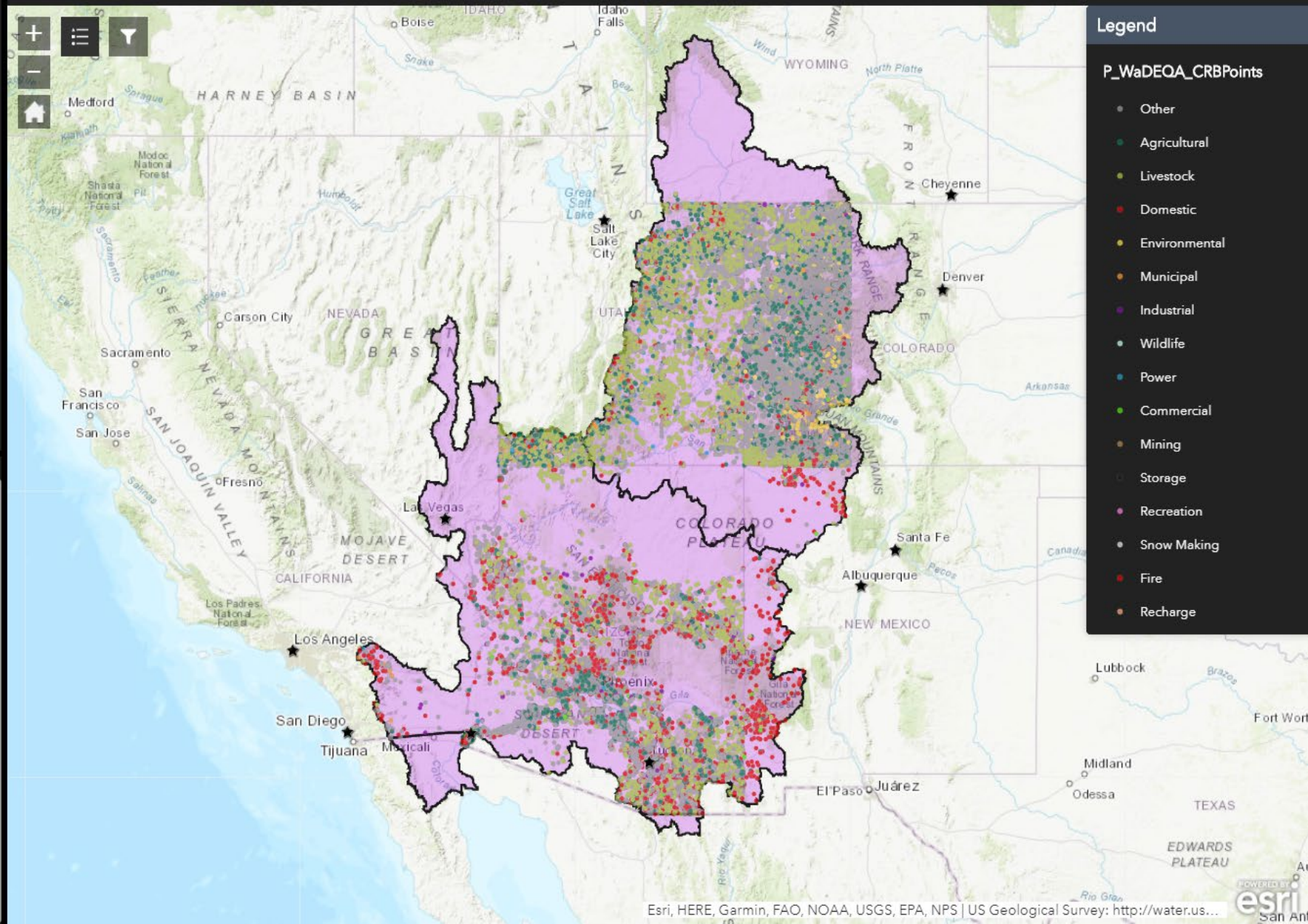
UNDER CONSTRUCTION

Infographic



Infographic_2



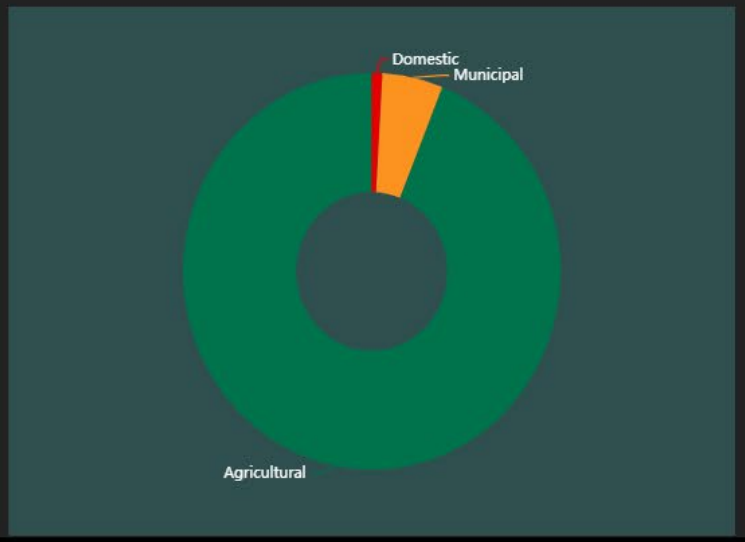


Irrigation Water Rights Prior 1922

UNDER CONSTRUCTION

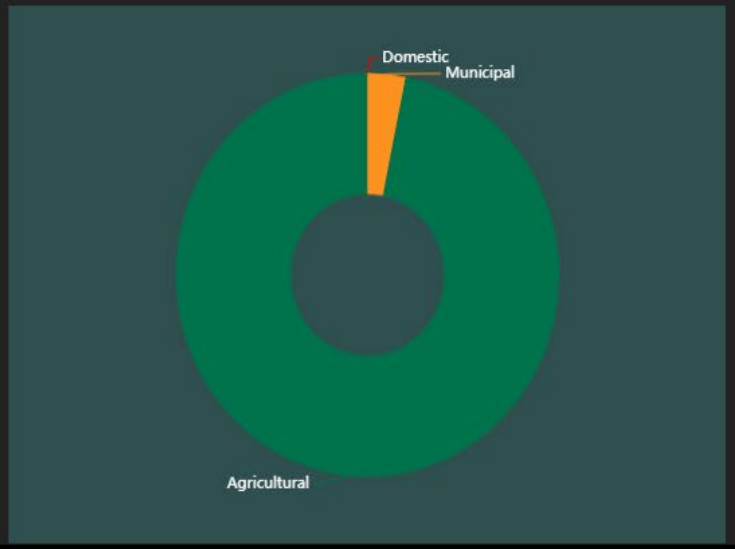
Infographic

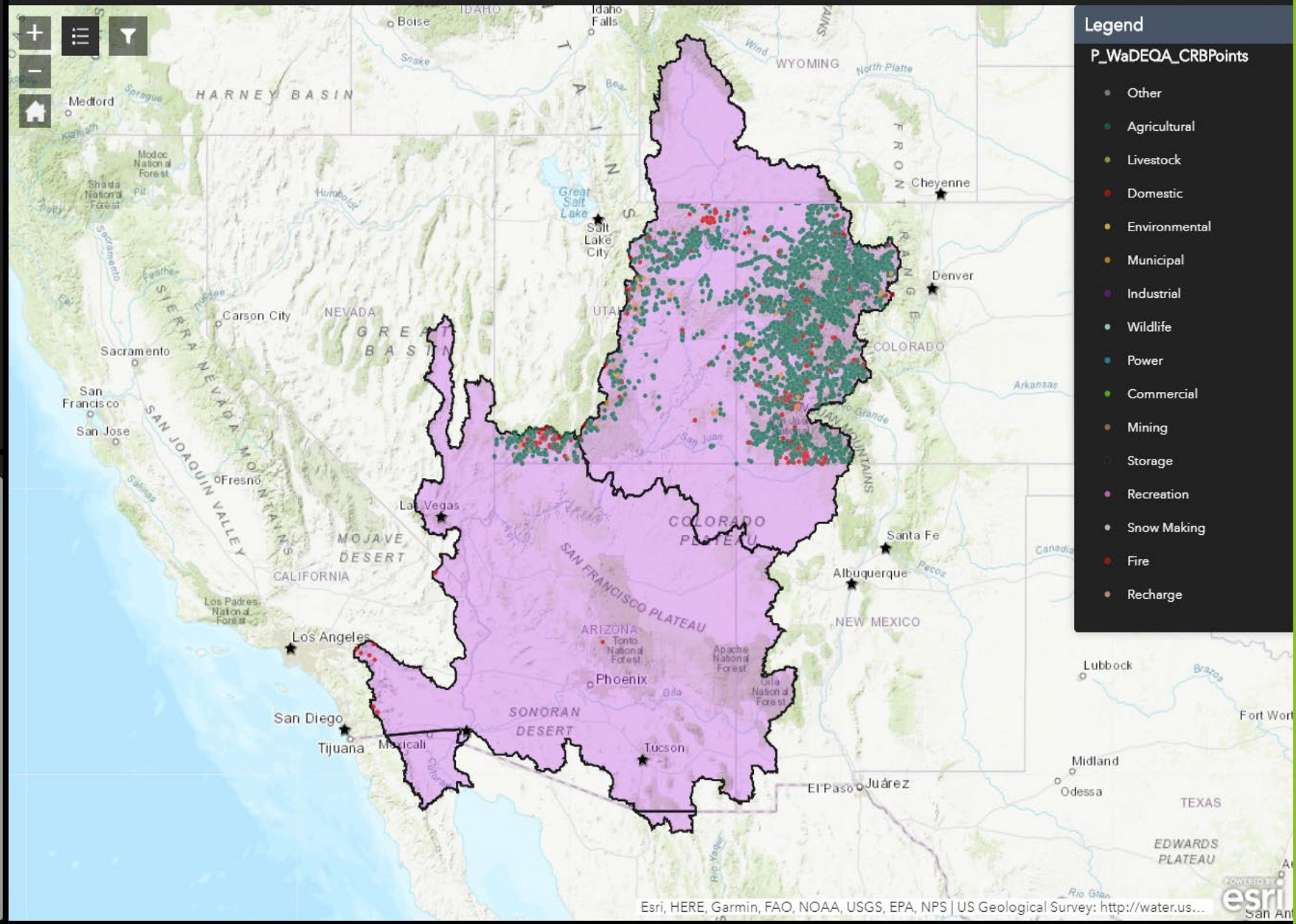
Flow Amount (CFS)



Infographic_2

Maximum Volume Limit (AF)

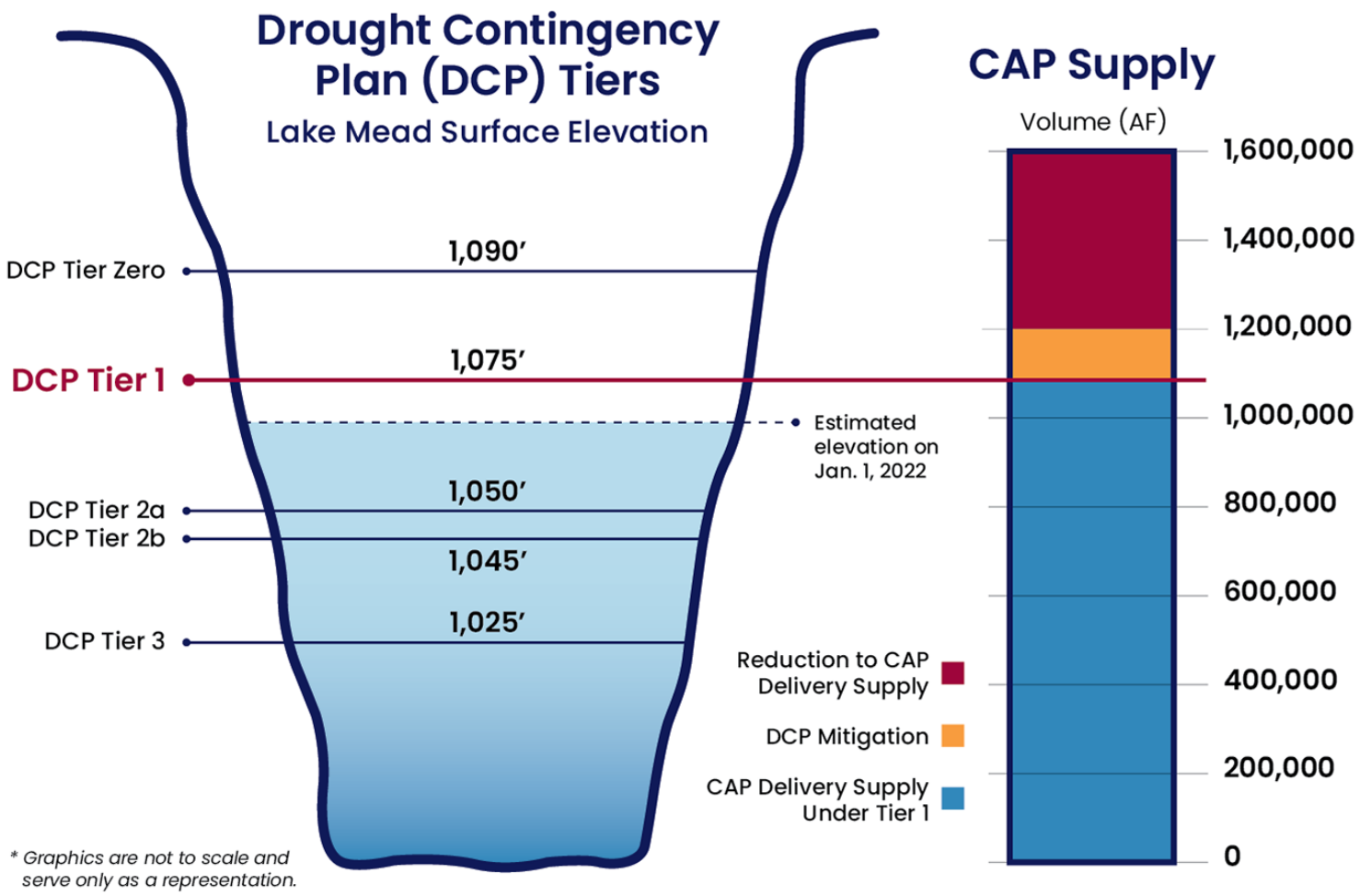




- Provide farmers and ranchers and other water right holders with information on their water rights
- Encourage and facilitate voluntary in-state water transfers
- Promote alternative transfer mechanisms
- Water banking, leasing and temporary transfers
- Protect rural communities and agricultural economies

Tier 1 Shortage:

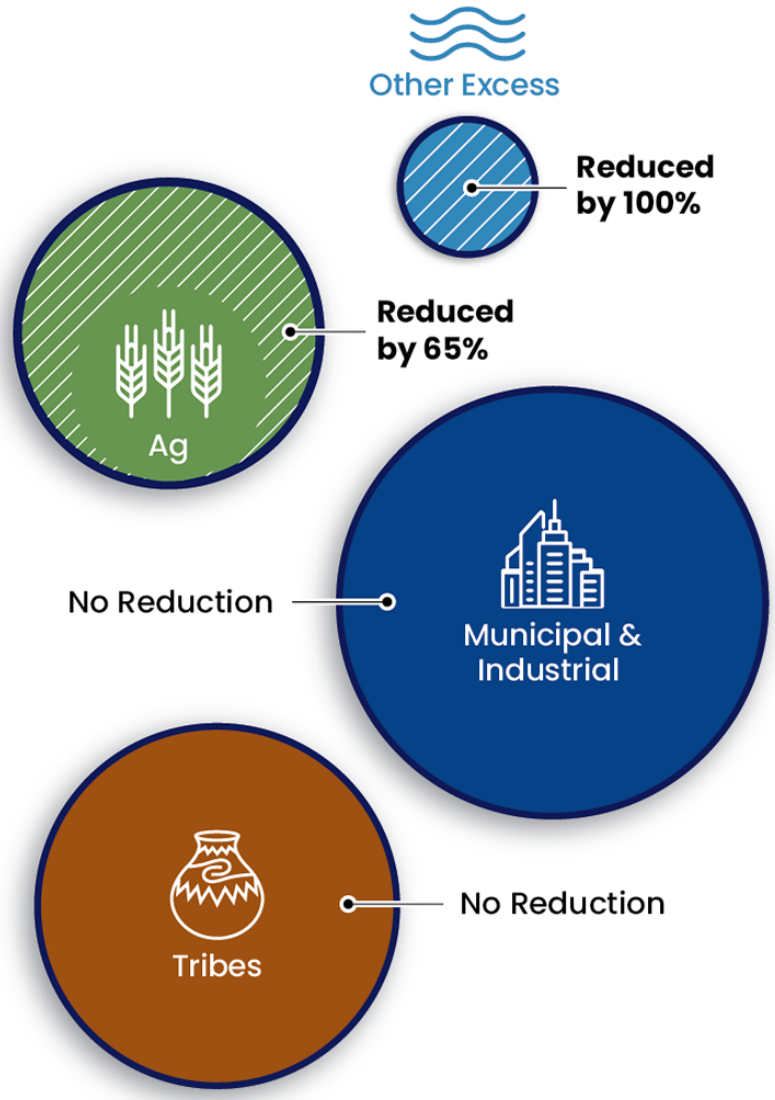
CAP Reductions



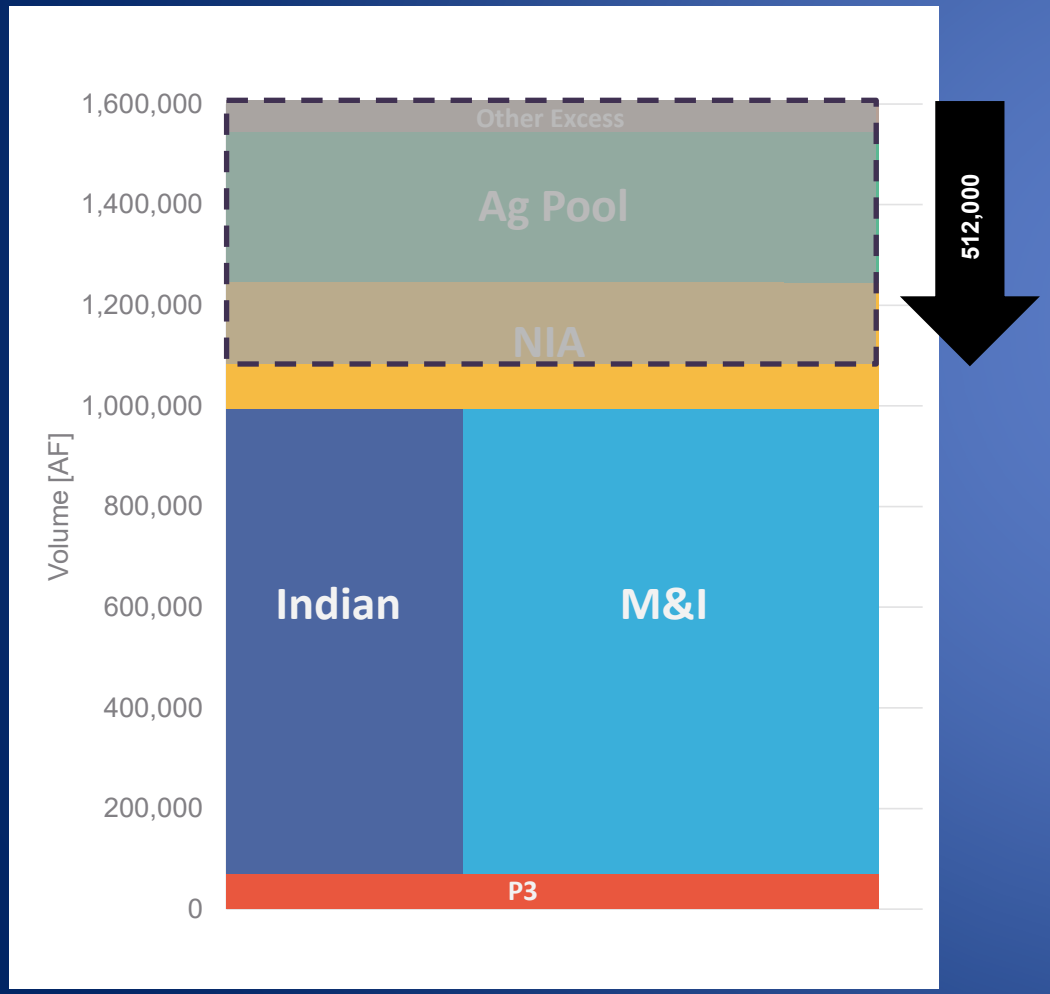
** Graphics are not to scale and serve only as a representation.*

To learn more, please visit: www.cap-az.com/colorado-river-shortage

2022 Reduction to CAP Users After DCP Mitigation



CAP Priorities – Tier 1 Shortage



- 512,000 AF* Reduction/Contribution
  - 320,000 AF per 2007 Guideline
  - 192,000 AF per LBDCP
- Pre-Mitigation Impacts
  - 100% Reduction to Ag Pool
  - ~60% Reduction to NIA Pool

* P5/6 reductions accounted for separately.

Six Colorado River States Propose Cuts

- The Colorado River and tributaries supply water to 40 million people and a $5 billion-a-year agricultural industry, now stressed by drought and overuse.
- States missed a mid-August deadline to address U.S. Bureau of Reclamation's call to propose ways to conserve 2 million to 4 million acre feet of water.
- Arizona, Nevada, New Mexico, Colorado, Utah and Wyoming recently sent a letter to Reclamation, which operates the major dams in the river system, to outline an alternative that builds on existing guidelines, deepens water cuts and factors in water that's lost through evaporation and transportation.
- The modeling would result in about 2 million acre-feet of cuts in the Lower Basin, with smaller reductions in the Upper Basin. Mexico and California are factored into the equations, but neither signed on to the letter.
- California released a proposal last October to cut 400,000 acre feet.

Great Salt Lake Drying

- Due to drought, climate change and continued demand
  - Great Salt Lake loses about 2Maf/year through evaporation
- Local and regional consequences that could result in
  - increased dust and poor air quality (toxic dust)
  - reduced snow (contributes 5-10% of Utah's snowpack)
  - reduced lake recreation (marina)
  - habitat loss (80% of Utah's valuable wetlands & migratory stopover)
    - Some 99% of North American Eared Grebes stage at the GSL or Mono Lake CA
  - negative economic consequences to the state ($1.9B & 7,700 jobs)
    - Sodium chloride (salt), boron, bromine, calcium, chlorine, iron chloride, lithium, magnesium, sulfur, & potassium - for batteries, fertilizer, metals

Gov. Cox closes GSL Basin to new water right appropriations
SALT LAKE CITY (Nov. 3, 2022) – With Utah's Great Salt Lake reaching new record lows, Gov. Spencer Cox has issued a proclamation suspending new water appropriations within the Great Salt Lake Basin, including the Bear, Weber, and Jordan River basins and the body of the Great Salt Lake.

FIGURE 15: Great Salt Lake near its average elevation of 4202.2 feet compared to recent aerial imagery

SOURCE: Esri, Utah's Geographic Information Database, and the Division of Water Resources. Prepared by the Governor's Office of Planning & Budget.

Governor's 2022 conservation call

- Utahns conserved 28,000 acre-feet
  - Drawing 23.5% less from reservoirs

Governor's FY2024 Budget

- $561M for water & conservation
- $243M implement Utah Coordinated Action Plan
  - $760k for state & local coordination
- $200M for ag water "optimization"
  - $8.2M Ag Voluntary Incentive Program
- $5M for turf replacement
- $1M for water education
- $132.9M for the Great Salt Lake
  - $100M for short-term ag water rights leases (shepherding)
  - $25M addition to Great Salt Lake Water Trust
- $1.6M for air quality monitoring ($160k GSL dust)
- $12.7M leveraging $164M DWSRF
- $5.8M leverage $85M CWSRF
- $75M for water reuse infrastructure
- $50M for dam safety
- $50M for aqueduct seismic safety
- $5.6M for cloud seeding
- $5M for water research
- $1.3M for surface & groundwater research

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