

AGENDA

WATER RESOURCES COMMITTEE

Courtyard by Marriott
Lincoln, Nebraska

April 24, 2025

Call to Order at: 8:45 a.m. (Central Daylight Time)
Conducting: Candice Hasenyager

Scarlet

TABS

1. **Welcome and Introductions**
2. **Approval of Minutes**
- C 3. **Sunsetting Resolutions –**
Position #478 - supporting Rural Water Infrastructure Needs and Projects
Position #479 - supporting Renewable Hydropower Development
- I 4. **National Drought Mitigation Center –** Mark Svoboda, Director
- J 5. **Workforce Development –** Sarita Nair, New Mexico
- K 6. **NWCC Snow Survey & Water Supply Forecasting Program –** Heather Hoffman, NRCS
7. **Seasonal to Subseasonal Forecasting –** Jeanine Jones
- L 8. **OpenET Automated Methodology for Computing Effective Precipitation –** Forrest Melton, NASA Ames Research Center & Conor Doherty, Cal State University Monterey Bay
- M 9. **WaDE/WestDAAT/WestCAT Update –** Ryan James and DPL
- N 10. **USGS Water Use Availability –** Brian Clark, USGS
- H 11. **FY2025-2026 Committee Work Plan**
- XYZ 12. **Sunsetting Positions for Summer 2025 Meetings:**
Position #482 - Preservation of Radio Frequencies necessary for Weather forecasting and Water Management

Position #483 - supporting Strengthening the Resiliency of Our Nation to the Impacts of Extreme Weather Events

Position #485 - urging the Administration and Congress to Support Water Research and Development Programs at the Department of Energy National Laboratories
13. **Other Matters**

Adjourn by 11:45 a.m.

Tab C – WSWC Policy Positions



POSITION STATEMENT
of the
WESTERN STATES WATER COUNCIL
in support of
RURAL WATER INFRASTRUCTURE NEEDS & PROJECTS
Arlington, VirginiaLincoln, Nebraska
April 6, 2022April 25, 2025

WHEREAS, the Western States Water Council (WSWC) is a government entity representing eighteen states, with members appointed by their respective governors; and

WHEREAS, the WSWC's 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; and

WHEREAS, much of the West is characterized by its aridity and drought which highlights the fact that water availability is an ever present constraint defining our economic and environmental well-being and quality of life; and

WHEREAS, this is particularly true for many small rural communities struggling to meet existing and future water supply needs and comply with present federal regulatory mandates; and

WHEREAS, over 90% of public water systems in the United States are small systems, serving 10,000 or fewer people; and

WHEREAS, these small systems face unique challenges, including financial constraints, aging infrastructure, technical operations and managerial administrative expertise, reduced or contaminated water supplies, and lack of access to alternative water supplies; and

WHEREAS, small system infrastructure consolidation poses significant challenges, particularly for geographically isolated communities; and

Commented [MB1]: Consolidation - sharing infrastructure (should we define this in the position?)

WHEREAS, regionalization of shareable technical and managerial resources across multiple small systems may present opportunities for small systems to make meaningful improvements; and

Commented [MB2]: Regionalization - sharing resources (should we define this in the position?)

WHEREAS, the Bureau of Reclamation's rural water program seeks to identify rural water needs and evaluate rural water supply projects and the demand for new projects; and

WHEREAS, in 2014, the Bureau of Reclamation working with other federal agencies and the Western States Water Council estimated the demand for potable water supply systems in rural areas of the 17 western States to be in the range of \$5 billion to \$9 billion for non-Indian projects and approximately \$1.5 billion for specific Indian water supply projects; and

WHEREAS, Reclamation also estimated that the cost to complete currently authorized projects that are under construction rose from \$2 billion originally authorized to \$2.4 billion in 2014, and

continues rising, and that given past levels of funding these priority projects will not likely be completed until well after 2065 at a cost of more than \$5.8 billion; and

WHEREAS, ~~recent investments by Congress have supported Reclamation's efforts to accelerate the completion of authorized rural water projects in Montana, New Mexico, North Dakota, and South Dakota; Reclamation has released a blueprint for spending \$1.66 billion annually through 2026 to implement the 2022 Bipartisan Infrastructure Law, including \$420 million for rural water projects to benefit tribal and non-tribal underserved communities by providing better access to potable water;¹ and~~

WHEREAS, there are several rural water projects that are under construction and two new rural water projects authorized in P.L. 116-260 (one for study only and one for construction) that may be eligible for funding; and

WHEREAS, Reclamation has in the past not requested funds for grants to undertake additional appraisal investigations or feasibility studies for new rural water projects, given the significant authorized backlog and lack of federal funding²; and

WHEREAS, there is an important role for the States in the conduct of appraisal investigations and feasibility studies, preparation of feasibility reports, and identifying other funding sources; and

WHEREAS, with respect to funding sources, more money is needed to address rural water needs and we continue to strongly support the expenditure of Reclamation Fund revenues for their intended purposes, including rural water projects, as authorized by the Congress; and

WHEREAS, USDA's Rural Development is a leader in helping rural communities with populations of 10,000 or less, including native Alaskan villages, tribal lands and colonias; and

WHEREAS, Rural Development's Water & Environmental Programs (WEP) invest billions to help rural communities improve quality of life and increase economic opportunities through technical assistance and financing to develop safe drinking water, wastewater and sanitary waste disposal systems; and

WHEREAS, WEP provides water and waste disposal grants, loans, loan guarantees, predevelopment planning grants, revolving loan funds, technical assistance and training grants, emergency community water assistance grants, and a circuit rider program, as well as individual water and wastewater grants and household water well system grants; and

WHEREAS, existing federal and state rural water and wastewater programs must be coordinated to facilitate the most efficient and effective solution to meeting the water needs of non-federal project sponsors; and

WHEREAS, upgrading and replacing inadequate rural water systems may require finding new water supplies, which will entail acquiring necessary state water rights; and

WHEREAS, continuing compliance with state water laws and interstate compacts is vital; and

¹ ~~Bureau of Reclamation Implementation of the Bipartisan Infrastructure Law (usbr.gov);~~

² <https://www.usbr.gov/ruralwater/docs/Rural-Water-Assessment-Report.pdf>; pp. 6-7, 11.

WHEREAS, opportunities exist to leverage non-federal funding through federal loan guarantees and other financial instruments to ensure that water districts can access private sources of financing; and

WHEREAS, water districts and individual water users depend on federal and non-federal infrastructure for their livelihood and the risk of default is minimal.

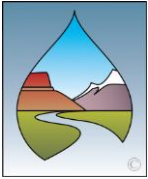
NOW THEREFORE BE IT RESOLVED that the Western States Water Council supports federal and state legislative and administrative actions to authorize and implement rural water supply projects and programs that enhance water supplies and promote economic development, through streamlined permitting processes and appropriate financing instruments, while appropriately protecting environmental resources and taxpayers.

BE IT FURTHER RESOLVED that the Western States Water Council supports the appropriation of sufficient funds to undertake additional appraisal investigations or feasibility studies for new rural water projects.

~~**BE IT FURTHER RESOLVED** that the Western States Water Council also supports the development and implementation of appropriate and informed soil, water and watershed conservation programs at all levels to minimize demands placed on our natural resources and ecosystems.~~

BE IT FURTHER RESOLVED that rural water project development should recognize and ensure consistency with state water law and regulatory authority.

Revised and Readopted
(see also Position No. 478, 4/06/22; 432, 3/22/2019;
Position No. 390, 3/22/16; and Position No. 350, 4/5/2013)



**POSITION STATEMENT
of the
WESTERN STATES WATER COUNCIL
in support of
RENEWABLE HYDROPOWER DEVELOPMENT
~~Arlington, Virginia~~Lincoln, Nebraska
~~April 6, 2022~~April 25, 2025**

WHEREAS, the Western States Water Council (WSWC) is a government entity representing eighteen states, with members appointed by their respective governors; and

WHEREAS, the WSWC's 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; and

WHEREAS, the water and hydropower resources of the West have been developed through partnerships between energy and water users, and continue to be inextricably connected; and

WHEREAS, clean, efficient, inexpensive hydropower is a vital part of the energy resources needed to meet our present and future energy demands; and

WHEREAS, hydropower is ~~the primary~~an important source of renewable electricity in the United States, representing about ~~48%~~27% of total renewable electricity generation, with approximately ~~103.44~~ gigawatts (GW) of capacity and nearly 5.7% of total electricity generation¹; and

WHEREAS, the potential exists for further public and private development of this valuable resource, including upgrading existing generators, developing small hydro and the power potential from low-head hydro on existing man-made conduits and canals, development of tidal energy power systems, as well as hydroelectric pumped storage projects; and

WHEREAS, other than those projects requiring review by the Federal Energy Regulatory Commission (FERC), such development can often be undertaken with little impact on the environmental and important ecological resources, requiring minimal further environmental review; and

WHEREAS, permitting requirements may be appropriately minimized and streamlined so as to promote reasonable development while avoiding unnecessary costs; and

WHEREAS, the future development of potential hydropower resources should be appropriately undertaken in compliance with substantive and procedural state water law and interstate compacts, and consistent with the States' authority under Clean Water Act Section 401; and

WHEREAS, the rights and preference privileges of existing water and power users should be respected; and

WHEREAS, federal legislation has from time to time been introduced to further authorize and promote the wise and sustainable development of our renewable hydropower resources, also creating jobs, providing economic relief to power users, and reducing carbon emissions; and

Commented [MB1]: Note from Lauren re: pumped hydropower systems and FERC review - not minimal environmental review

¹ <https://www.energy.gov/sites/prod/files/2016/10/f33/Hydropower-Vision-Chapter-2-10212016.pdf>; p. 3, 76.

WHEREAS, hydropower is a prominent component of electricity generation in a number of western states, and important part of state renewable portfolio standards; and

WHEREAS, the potential exists to increase hydropower production by as much as 189 GW²-by rehabilitating, expanding and upgrading existing facilities, powering non-powered dams, installing hydropower at existing conduits and canals, development of tidal energy power systems, as well as developing new project sites.³

NOW THEREFORE BE IT RESOLVED that the Western States Water Council supports federal legislative and administrative actions to authorize and implement reasonable hydropower projects and programs that enhance our electric generation capacity and promote economic development, through efficient permitting processes, while appropriately protecting environmental resources and respecting States' 401 certification authority under the Clean Water Act and States' authority over water allocation within their borders.

BE IT FURTHER RESOLVED that the Western States Water Council also supports the development and implementation of appropriate energy and water conservation programs at all levels to minimize demands placed on our natural resources and ecosystems.

BE IT FURTHER RESOLVED that past, present and future hydropower development and operational changes should recognize and ensure consistency with state law and regulatory authority and delegated authority under federal law.

Revised and Readopted
(see former Positions No. 479, 4/06/22; 433, 3/22/2019,
No. 391, 3/22/2016 and No. 351, 4/5/2013)

Commented [MB2]: ExComm question about whether this paragraph belongs in this position, while also acknowledging that the water-energy nexus is important and not always well understood.

Commented [MB3R2]: Nexus and Conservation language from Position #512:

Whereas: ...energy resource development and related water requirements can be significant on state, local and westwide scales

Now therefore be it resolved that western water and energy planners, policymakers, managers and regulators should consider the following... (3) promoting integrated water and energy conservation and use efficiency... (9) taking advantage of synergies and economies of scale related to integrating water and energy conservation, development and protection programs and projects

² Ibid, pg. 95.

³ Ibid, pg. 95.

Tab I – National Drought Mitigation Center



The **National Drought Mitigation Center's**

mission is to reduce the effects of drought on people, the environment and the economy by researching the science of drought

monitoring and the

practice of drought planning. We collaborate with and learn from decision-makers at all levels –



individual ranchers, communities, regions, watersheds, tribes, states, countries – across the US and around the world. We organize and present workshops, write shops and other capacity-building activities, in close cooperation with local partners.

We are a team of experts whose goal is to mitigate drought and its effects worldwide. Individually, we are climatologists, remote sensing and information technology scientists, sociologists, community and regional planners and developers, geographers, analysts, and communicators. We look forward to matching our expertise with your needs.

The National Drought Mitigation Center (NDMC) is a major contributor to the U.S. Drought Monitor.

U.S. Drought Monitor - Who draws the map?

The U.S. Drought Monitor has been a team effort since its inception in 1999, produced jointly by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the National Oceanic and Atmospheric Administration and the U.S. Department of Agriculture. Meteorologists and climatologists from the NDMC, NOAA and USDA take turns as the lead author of the map, usually two weeks a time. The author's job is to do something that a computer can't. When the data is pointing in different directions, they make sense out of it.

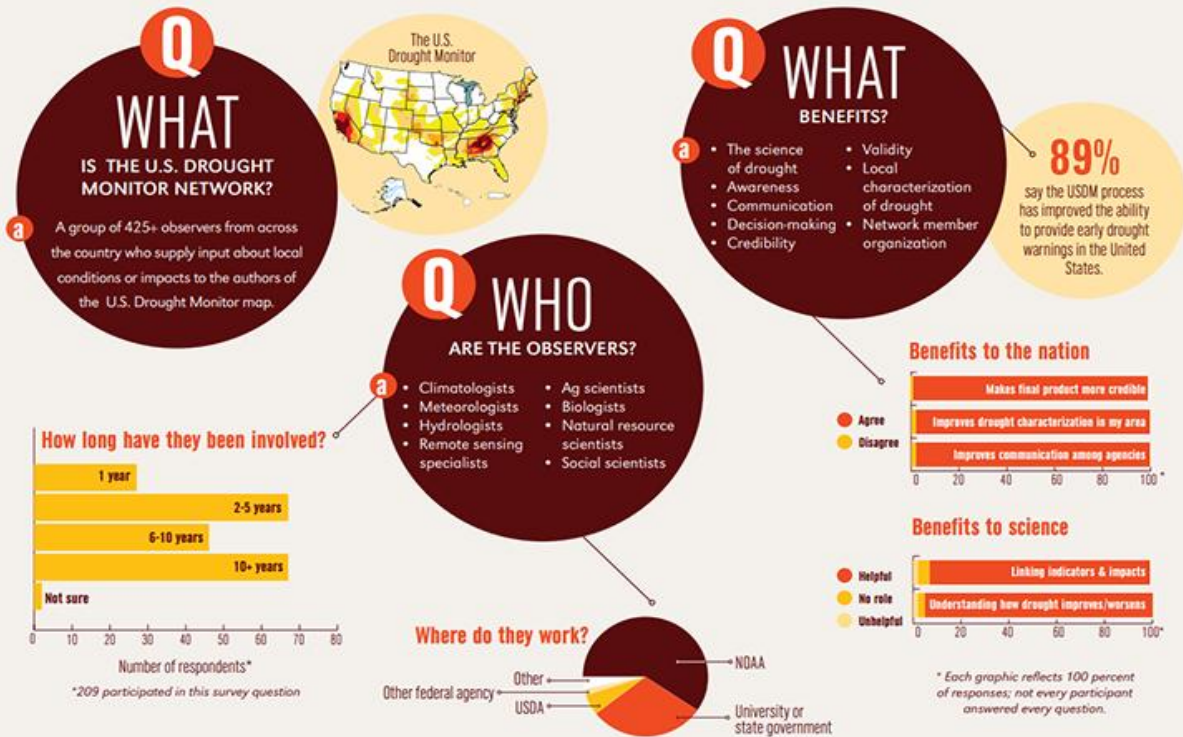
THE U.S. DROUGHT MONITOR NETWORK

IMPROVING DROUGHT EARLY WARNING

Based on a survey of the network by the National Drought Mitigation Center, with funding by the National Integrated Drought Information System.



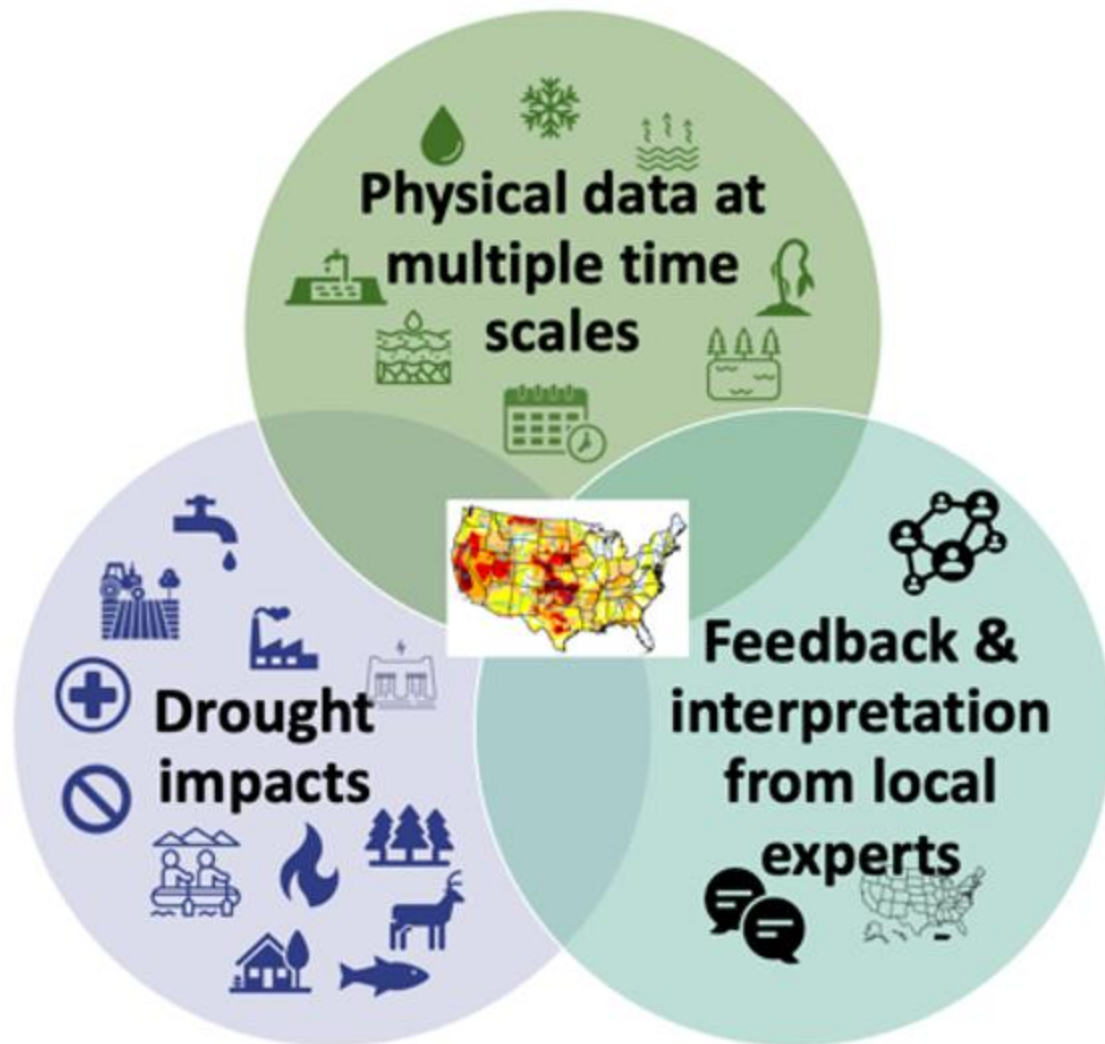
NATIONAL DROUGHT
MITIGATION CENTER
UNIVERSITY OF KANSAS



How do we know when we're in a drought?

When you think about drought, you probably think about water—or the lack of it. Precipitation plays a major role in the creation of the Drought Monitor, but the map's authors consider many data sources. Some of the numeric inputs include precipitation, streamflow, reservoir levels, temperature and evaporative demand, soil moisture and vegetation health. No single piece of evidence tells the full story, and neither do strictly physical indicators. That's why the USDM isn't a statistical model; it's a blend of these physical indicators with drought impacts, field observations and local insight from a network of more than 450 experts. Using many different types of data and reconciling them with expert interpretation is what makes the USDM unique. We call it a convergence of evidence approach.

Learn more about the USDM process at the [Drought Classification](#) page.



The
USDM uses a convergence of evidence approach, bringing together physical climate, weather and hydrological data with records of drought impacts, on-the-ground observations and local expert feedback.

How fast does the map change?

Recognizing emerging drought, or determining when a drought is over, entails understanding what's normal for a given location and season and observing both short- and long-term weather patterns. If an area has been in drought for a while, it usually takes more than one or two rains to end it. Intense heat can also make things dry out quickly, but, as an established practice, the map doesn't show drought intensification by more than one category per week (though, in the event of a major storm, it can improve more quickly).

Hear about the Drought Monitor directly from a USDM author on USDA Radio

- Developing the U.S. Drought Monitor (August 2022)
- Public Input in Drought Monitoring Reporting (September 2022)
- Drought Monitor Role in Some USDA Disaster Programs (September 2022)

Does the USDM look back or forward in time?

5 Facts about the United States Drought Monitor (USDM)

The U.S. Drought Monitor (USDM) is a map that comes out every Thursday, showing where drought is and how bad it is. It is a joint product of the National Drought Mitigation Center at the University of Nebraska-Lincoln, the National Oceanic and Atmospheric Administration, and the U.S. Department of Agriculture. Find the USDM maps, data and more at droughtmonitor.unl.edu.

Fact #1 - The USDM is made with more than precipitation data.

When you think about drought, you probably think about water, or the lack of it. Precipitation plays a major role in the creation of the drought monitor, but the map's author considers numerous indicators, including drought impacts and local insight from over 450 expert observers around the country. Authors use several dozen indicators to assess drought, including precipitation, streamflow, reservoir levels, temperature and evaporative demand, soil moisture and vegetation health. Because the drought monitor depicts both short and long-term drought conditions, the authors must look at data for multiple timeframes. The final map produced each week represents a summary of the story being told by all the pieces of data. To help tell that story, authors don't just look at data - they converse over the course of the map-making week with experts located across the country and draw information about drought impacts from media reports and private citizens.

Fact #2 - A real person, using real data, makes the USDM.

Each week's map analyzes new data for the weekly update. The map authors are climatologists or meteorologists from the National Drought Mitigation Center at the University of Nebraska-Lincoln (the academic partner and web host of the USDM), the National Oceanic and Atmospheric Administration, and the U.S. Department of Agriculture (USDA). The author's job is to do something that a computer can't. When the data is pointing in different directions, they make sense out of it.

Fact #3 - The USDM is a current snapshot, not a forecast.

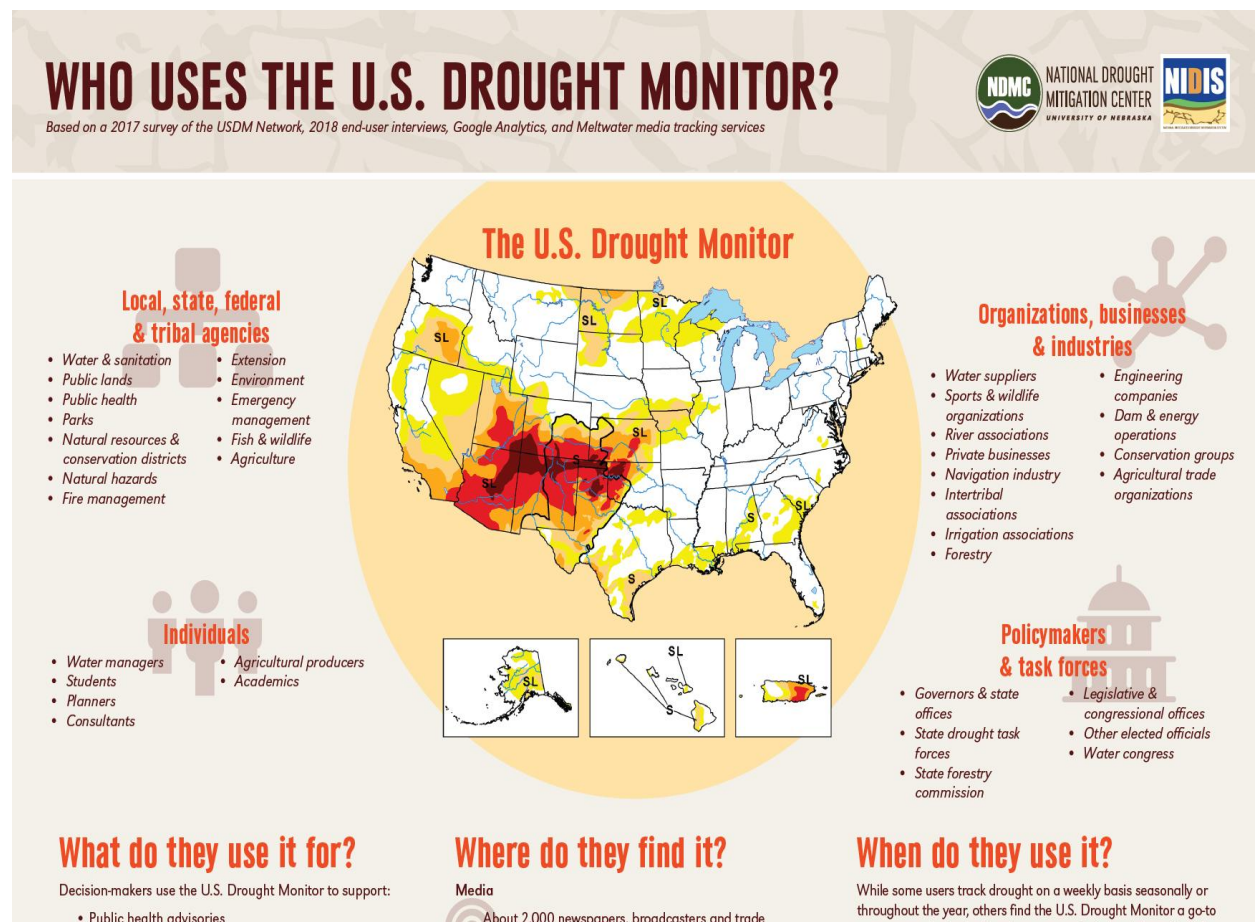
The USDM is a "snapshot" of current drought conditions. Each map is an update of the one before. The map comes out on Thursday, and shows what happened up through Tuesday morning. Precipitation that falls on Wednesday won't change the next day's map, but it might change the next week's map. This gives the author at least two days to look at all the data and make a final map.

NDMC
NATIONAL DROUGHT MITIGATION CENTER
UNIVERSITY OF NEBRASKA

droughtmonitor.unl.edu

Unlike most of the weather maps people regularly see, the U.S. Drought Monitor is not a forecast; it looks back in time, providing a “snapshot” of very recent conditions. The map comes out on Thursdays, using data through the previous Tuesday morning and building upon the previous week’s map. That gives authors about two working days to review the latest data. It also means that any precipitation that falls on Wednesday will not be incorporated until the following week.

Who uses it, and what do they do with it?



The USDA uses the Drought Monitor to trigger disaster declarations and eligibility for low-interest loans. The Farm Service Agency uses it to help determine eligibility for their Livestock Forage Disaster Program, and the Internal Revenue Service uses it for tax deferral on forced livestock sales due to drought. State, local, tribal and basin-level decision makers use it to trigger drought responses or declare drought emergencies, ideally along with other local indicators of drought. Though these various entities use the USDM, it does not in itself trigger any political actions.

How does drought affect the country?

Drought is a normal part of the climate. It tends to be a slow-moving hazard, which can cause people to underestimate the damage it can do, but losses from drought may be as substantial as those from hurricanes, tornadoes and other disasters. Drought causes losses to agriculture; affects domestic water supply, energy production, public health and wildlife; and contributes to wildfire, to name a few of its effects. However, it is important to note that large urban water systems generally have diverse water supplies and can keep water flowing in both dry and wet periods.

Learn more about the impacts of drought with the [**Drought Impacts Toolkit**](#). You can also see how drought affects different industries and states with the [**State Impacts tool**](#).

How can I get involved?

What to contribute your observations to the USDM process? Here are some ways.

1. **Talk to your state climatologist** — Find the current list at the American Association of State Climatologists website at [**www.stateclimate.org**](http://www.stateclimate.org).
2. **Submit CMOR reports** — Use the [**Condition Monitoring Observer Report system**](#) to provide information about how drought is affecting your area. Your report will appear immediately on an interactive map. Reports won't directly change an area's classification on the USDM, but your observation will help Drought Monitor authors and others interpret complex data and identify areas that may need more attention.
3. **Become a CoCoRaHS observer** – Submit drought reports along with daily precipitation observations. Learn more at [**www.cocorahs.org**](http://www.cocorahs.org).
4. **Email** — Emails sent to [**droughtmonitor@unl.edu**](mailto:droughtmonitor@unl.edu) inform the USDM authors.

National Drought Summary for April 8, 2025

Summary

This U.S. Drought Monitor (USDM) week saw widespread improvement in drought-related conditions across areas of the South, Southeast, and Midwest, where a series of strong storms delivered heavy rainfall, damaging winds, and severe flooding. The multi-day storm event saturated soils leading to inundation of rivers, and severe flooding in low-lying areas from Arkansas to Ohio. Storm totals from the multi-day event ranged from 4 to 18+ inches, with the highest accumulations observed across central Arkansas, southeastern Missouri, and western portions of both Tennessee and Kentucky. In addition to heavy rainfall, the storm system sparked dozens of tornadoes as well as strong gusty winds in other areas, causing widespread power outages. Elsewhere, improving conditions over the past 30 to 60 days, led to reduction in areas of drought in the Northeast, from New York to Maine, as well as in areas further south including New Jersey and Virginia. In the Midwest, this week's rainfall event pushed rainfall totals well above normal levels for the past 30-day period, leading to improvements across the Midwest in Missouri, Illinois, Indiana, and Michigan. In the Upper Midwest and portions of the Plains, drought-related conditions improved on the map across areas of Minnesota, Wisconsin, and South Dakota, where precipitation has been above normal for the past 30-90-day period and soil moisture monitoring products are showing normal to above-normal levels. In the West, above-normal springtime temperatures are causing a rapid melting of high-elevation snowpacks across the entire region. Looking at the current snowpack conditions out West, deep seasonal snowpack deficits remain across the ranges of southwestern Colorado, New Mexico, northern Arizona, and southwestern Utah. Elsewhere in the region, areas of the Great Basin and Intermountain West saw improvements on the map including parts of northeastern Nevada, Wyoming, and northwestern Colorado. In terms of reservoir storage in the West, California's reservoirs continue to be at or above historical averages for the date (April 8), with the state's two largest reservoirs, Lake Shasta and Lake Oroville, at 116% and 120% of average, respectively. In the Southwest, the U.S. Bureau of Reclamation is reporting (April 6) Lake Powell at 33% full, Lake Mead at 34% full, and the total Colorado system at 41% full (compared to 42% full at the same time last year).

South

On this week's map, widespread improvements were made in response to very heavy rainfall accumulations observed across parts of the region, with the highest

totals (ranging from 5 to 15+ inches) observed in northeastern Texas, eastern Oklahoma, Arkansas, western Tennessee, and southern Mississippi. The multi-day storm event led to catastrophic flooding in parts of the region as well as tornadic activity, widespread power outages, and loss of life. However, the deluge of rains also led to significant improvements in drought-related conditions, with multiple category improvements made on the map. For the week, average temperatures were above normal in eastern areas, with anomalies ranging from 3 to 12 degrees F. Conversely, the western extent of the region, including much of Texas, Oklahoma, and Arkansas, experienced temperatures ranging from 3 to 12 degrees F below normal. Looking at Texas reservoir conditions, statewide reservoirs are reported to be 75.7% full, with many reservoirs in the eastern part of the state in good condition (over 90% full), while numerous reservoirs in the western portion of the state continue to experience below-normal levels, according to Water Data for Texas (April 9). In terms of streamflow activity (April 9), the U.S. Geological Survey is reporting well above normals streamflows (>90th percentile) across northeastern Texas, southeastern Oklahoma, Arkansas, Mississippi, and western Tennessee, while areas of central and southern Texas are experiencing below normal levels (1st to 24th percentile range).

Midwest

Widespread improvements were made across the region in response to this week's severe storm event that delivered very heavy rainfall accumulations and severe flooding to parts of the region including Missouri, Kentucky, Illinois, Indiana, Michigan, and Ohio. The multi-day storm caused widespread power outages, catastrophic flooding, damaging winds, and tornadic outbreaks. Precipitation totals for the storms ranged from 2 to 18+ inches, with the highest totals logged in western Kentucky. The rainfall improved conditions on the map in Missouri, Illinois, Indiana, Ohio, and southern Michigan. Elsewhere in the region, above-normal precipitation during the past 30-90 days, led to reductions in areas of drought in Minnesota, Wisconsin, and northern Michigan. For the week, average temperatures were below normal across most of the region, with anomalies ranging from 2 to 8 degrees F above normal.

High Plains

On this week's map, improvements were made in the region, namely in northern Kansas, northern Nebraska, and South Dakota, where shorter-term precipitation (past 30-60 days) is normal to above normal. Additionally, these areas were showing improvements in other drought indicators including soil moisture,

streamflow activity, and satellite-based vegetation health. In western North Dakota, areas of Extreme (D3), Severe (D2), and Moderate (D1) drought expanded on the map in response to a combination of factors, including numerous recent impact reports from the agricultural sector, below-normal precipitation (past 30 days), and low streamflow and soil moisture levels. For the week, generally dry conditions prevailed across western portions of the region, while eastern portions received modest accumulations of <1.5 inches (liquid). In terms of temperatures, below-normal average temperatures (ranging from 2 to 10+ degrees F) were logged across the entire region.

West

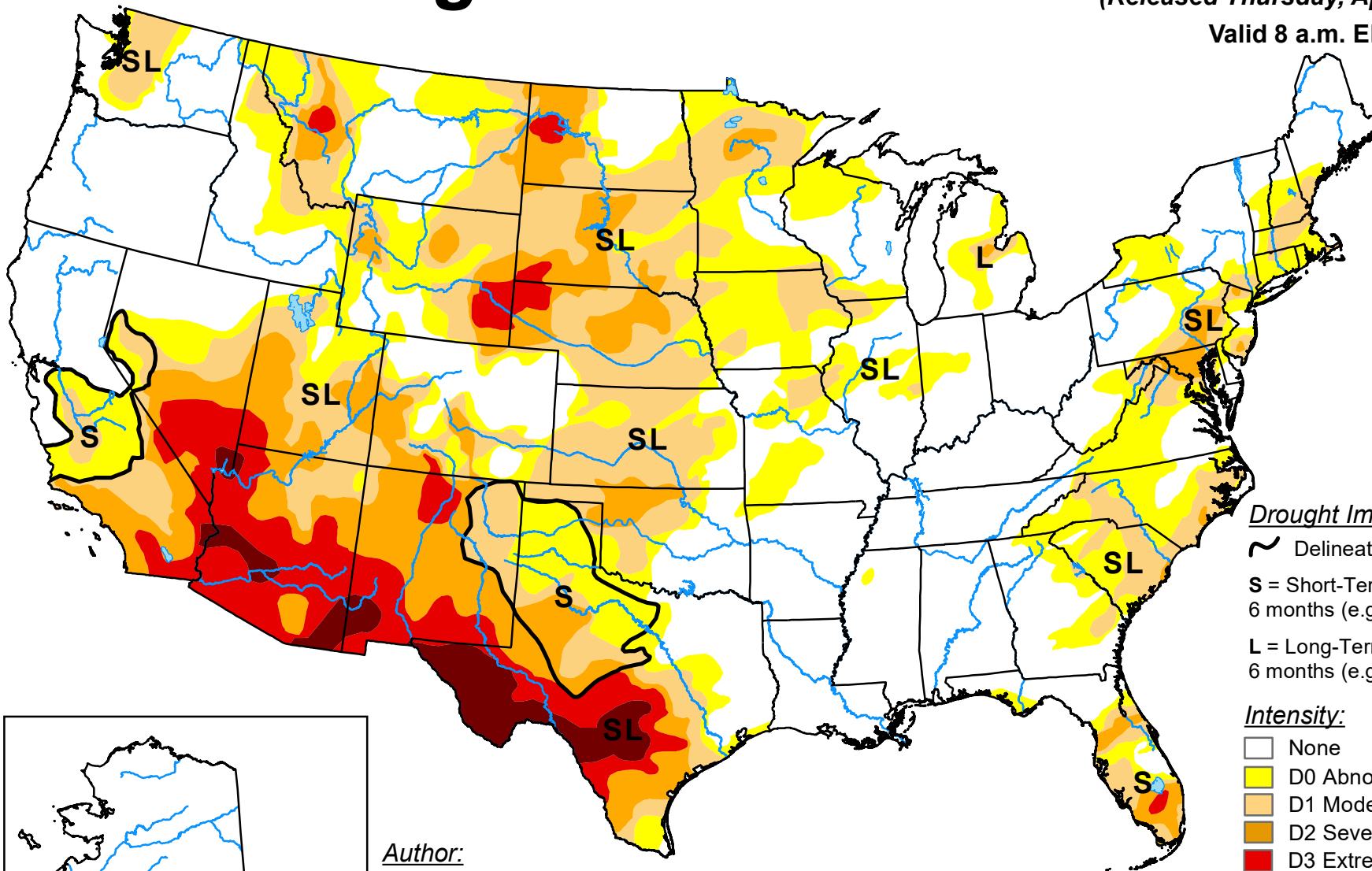
Out West, generally dry conditions prevailed over much of the region, including areas of California, the Great Basin, the Intermountain West, and the Desert Southwest (southern Arizona and southwestern New Mexico). However, some mountain locations in the Pacific Northwest and the Rocky Mountains received light-to-moderate precipitation accumulations. On the map, areas of Extreme (D3) drought were introduced in southeastern Arizona, where precipitation deficits existed at both short- and longer-term time scales. Similarly, ongoing below-normal snowpack conditions (snow water equivalent at NRCS SNOTEL stations ranging from 6 to 55% of median) in the Nacimiento, San Juan, and Sangre de Cristo ranges of New Mexico, led to the introduction of areas of Extreme (D3) drought. Elsewhere, some improvements were made on the map in drought-affected areas of northeastern Nevada, northeastern Utah, northwestern Colorado, and Wyoming. Looking at the regional snowpack, the NRCS SNOTEL network is reporting (April 8) the following region-level (2-digit HUC) SWE levels: Pacific Northwest 102%, Missouri 97%, Upper Colorado 89%, Great Basin 104%, Lower Colorado 69%, and Rio Grande 46%.

U.S. Drought Monitor

April 15, 2025

(Released Thursday, Apr. 17, 2025)

Valid 8 a.m. EDT



Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

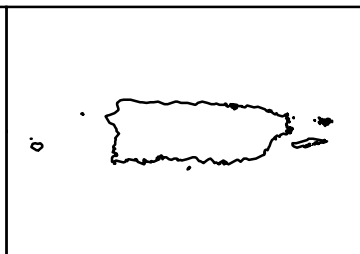
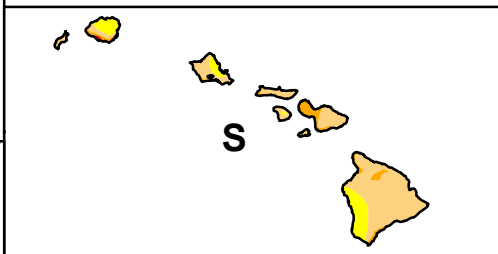
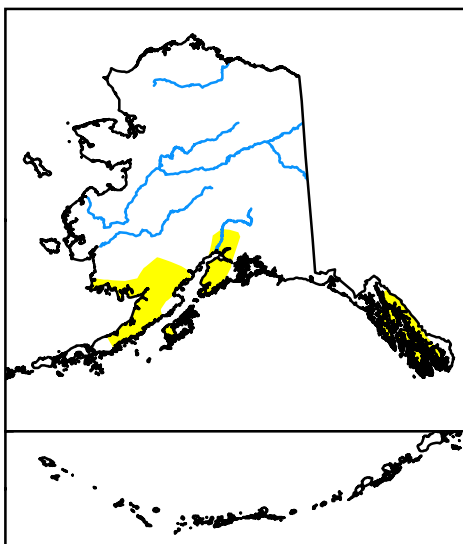
Author:

Curtis Riganti
National Drought Mitigation Center

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>



droughtmonitor.unl.edu



Tab J – Workforce Development

WSWC Water Agencies' Staff Hiring and Retention Concerns
Summary of Zoom Call
October 22, 2021

Participants

Alaska:

Henry Brooks, Natural Resources Manager, Alaska Department of Natural Resources

Idaho:

Jerry Rigby, Attorney, Rigby, Andrus & Rigby Law, PLLC

Mandy Davis, Legal Secretary, Rigby, Andrus & Rigby Law, PLLC

Mary Anne Nelson, Water Quality Division Administrator, Idaho Department of Environmental Quality

Kansas:

Connie Owen, Director, Kansas Water Office

Earl Lewis, Chief Engineer, Division of Water Resources, Kansas Department of Agriculture

Matt Unruh, Assistant Director, Kansas Water Office

Nebraska:

Jesse Bradley, Deputy Director, Nebraska Department of Natural Resources

Oklahoma:

Sara Gibson, General Counsel, Oklahoma Water Resources Board

South Dakota:

Jeanne Goodman, Director, Division of Environmental Services, South Dakota Department of Agriculture and Natural Resources

Nakaila Steen, Natural Resources Engineer, South Dakota Department of Agriculture and Natural Resources

Texas:

Kathy Alexander, Technical Specialist, Water Availability Division, Texas Commission on Environmental Quality

Kim Nygren, Deputy Director, Water Availability Division, Texas Commission on Environmental Quality

Utah:

Norm Johnson, Natural Resources Division Director, Utah Attorney General's Office

Washington:

Mary Verner, Water Resources Program Manager, Washington Department of Ecology

Wyoming:

Jeff Cowley, Administrator, Interstate Streams, Wyoming State Engineer's Office

Survey

Prior to the call, Council staff sent out a brief survey to pinpoint areas of greatest concern.

What concerns prompted your interest in participating in this Zoom call? (check all that apply)

- 1. Improving state budgets (articulating needs to executive/legislative branch, setting adequate fees, etc.)*
- 2. Finding ways to do more with less (lean six sigma, training, technology)*
- 3. Managing an effective remote workforce (tools away from the office, broadband access, collaborative meetings/projects, quality work)*
- 4. Finding qualified employees for a non-competitive government benefits package (salary, retirement, job training)*
- 5. Concerns over employee engagement/work satisfaction (flexibility in timing/location, rigid statutory requirements, lack of adequate tools for the job, ripple effects of high turnover--e.g., doing the work of more than one position, few opportunities for career advancement/pay increases)*
- 6. Concerns over the hiring process (HR knowledge of needs, effective applications, recruitment reaching the target audience, diversity/inclusion)*
- 7. Pandemic/Millennial/GenZ concerns (specific to current circumstances, younger generation mindset, how to adapt to a slow-moving bureaucracy)*

Four respondents highlighted different areas of concern, but items 1, 2, 4, 5, and 7 received the most responses overall.

Motivations to remain in government employment

Tony Willardson facilitated a roundtable discussion first noting what factors led to the call and second asking what prompted participants' long-term retention in their government positions working on water resource issues. Their responses are summarized below.

- ❖ The agency's work or mission matters
 - Belief in the mission, despite the many challenges and obstacles (e.g., resources needed to accomplish the mission effectively)
 - Opportunity to impact change on a broader scale (across the whole state, interstate, state-tribe, state-federal, across multiple agencies/sectors/issues) than in private practice, seeing the bigger picture
 - Opportunity to work with the people, with tribes, with water users large and small ("crucial for the state to be there as a partner with others")
 - Ability to develop water policy pieces in a way that isn't possible from outside the agency
 - Interesting, meaningful, complex issues to tackle – some that span an entire career or require wearing multiple hats ("moving battleships, big issues that need to change trajectory with the times") ("technology, policy, legal aspects, bringing people together") ("that blend and mix, hydrogeologist, assistant director, working through the policy, sitting down with lawyers, still looking at groundwater models, connecting with counterparts across the West")

- Building on a long history with water resource issues, opportunity to make a difference in the next stage as we work toward a better future
- Personal passion for the importance of water resource policies or management, natural resources, enjoyment of the outdoors, and environmental protection issues
- Seeing the results and impact of your work over time
- ❖ Benefits
 - Family-friendly, home every night, encouraged to use leave, find a work-life balance
 - Stability (usually, although that can be affected by legislative/executive cutbacks and economic downturns)
 - Avoiding the billable hours or inconsistent/project-specific work of private practice, private sector
 - Flexibility to contract with the state, to make more time for family
 - Consistent work – there is always more that needs to be done
- ❖ Great supervisors, mentors, colleagues make a difference, pleasant work environment matters
- ❖ Opportunities for career growth, advancement
 - Many participants started from entry level positions directly out of college, and several started as interns or in temporary positions, and many have stayed for multiple decades
 - Willingness to do the sometimes hard, tedious, mind-numbing work at entry level positions was recognized and rewarded (“work your way up with a little gumption and drive”) (“if you’re willing to come in and work and learn things you can have a lot of opportunities”) (“making sure the people who are working hard can accomplish their work and be recognized”)

Staffing Challenges in State Water Agencies

- ❖ Water agencies need technical expertise to function—engineers, hydrologists, computer modelers, lawyers
 - Difficult to attract and retain qualified people over time
 - Water resource work can be highly specialized, requiring training beyond general advanced education
 - Narrow niche, very few people work in this sector
 - Understanding the complex and nuanced world of water
 - Difficulty finding lawyers who even know what the APA is
 - Confusion about navigability and riparian issues
 - Many applicants are vastly underqualified for the posted position
 - Sometimes only a handful of people even apply for posted positions—and none of them are qualified
 - Some field locations for entry level positions can be extremely remote, making it difficult to attract those just out of school who don’t want to go to the middle of nowhere to work
 - Looking at not requiring technical positions to take on supervisor responsibilities to advance – great tech experience but not great supervisors

- End up reaching out to expensive consultants to do the necessary work, but they don't have the benefits of institutional knowledge
- ❖ We cannot offer the salaries that the private sector does
 - Offer what we can in terms of flexibility and rewards
 - Try to keep salaries within 15-20% of the private sector, plus state benefits, usually enough to keep the jobs appealing
 - Entry-level salaries are okay, but by years 3-7 we start to fall behind on pay scales
 - Some states review the job market on a periodic basis, but it's difficult to match the job market (other states are not permitted to review the job market for comparison of professional level positions)
 - Legislatures do not understand why anyone should make more than \$50,000 a year; political tirades against excessive state salaries
 - Moving from "classified" to "unclassified" positions to offer more flexibility in pay, but there has to be money available to meet the higher end of that flexibility
 - Getting rid of merit class, looking at performance pay
- ❖ State water agency jobs become a "training ground" for federal, private, other state agencies
 - Poaching each other's staff, constant shuffling between agencies
 - Limited opportunities to advance: with 100 or fewer people in the agency, career progression can be difficult unless you want to stick around 20+ years
 - Difficult to keep staff through the "middle period" (5-7 years?)
 - Also presents opportunities, crossover training, multiple agencies (state and federal) collectively benefit

Potential Solutions/Opportunities

- ❖ Cross-posting jobs between states
- ❖ Developing connections with colleges and universities that have natural resources programs, developing a network with the academic institutions, expanding job postings beyond local schools (blast email, other ways to post jobs to make them more accessible)
- ❖ Talent pipeline, tapping into the upcoming generation willing to do the work and offering insights as they continue their educational path, let them know what opportunities, internships, career paths are available
 - Letting college kids know there is an industry in need of employees; the number of people interested in water is generally a pretty small group
 - Generalized natural resources training barely touches on water, water taking a back seat to oil and gas or general environmental issues
 - Water Leaders Academy (in Nebraska, young high performing employees take a field trip each month to a different part of the state, agency folks talk to them about policy matters, Q&A)
 - Virtual gatherings, presentations, conversations, Q&A – our members can be on those calls, or volunteer colleagues
 - A typical day in the life of a state hydrologist, a hot topic of particular interest, etc.

- ❖ Retention of existing employees, sitting down with them to let them know they are appreciated, continuing to offer challenges, keeping things fresh and meaningful. It's better to keep qualified people than to have to start from scratch and train again.
- ❖ Training program for existing younger employees interested in becoming future supervisors, developing a pool of qualified supervisors with experience
- ❖ Pooling resources across agencies or across states
 - Remote areas that multiple agencies need to visit, combining tasks to collect data
 - Circuit Rider programs
- ❖ Having a federal liaison spend time in the office several days a month (e.g., Corps, water operations, information exchange, appreciation of state responsibilities and perspectives)

Other comments

- ❖ HR can be great to work with, but they are only as good as the criteria and information they are given to do the applicant screening – also have to provide information about whether there can be training and mentoring, and not just the requirement of more academic degrees.
- ❖ Running into concerns with transition planning as the more experienced staff reach retirement age, loss of institutional knowledge, filling vacancies, training new generation
- ❖ In addition to general turnover, pandemic-related turnover has also been high
- ❖ Long-term plans for desperately-needed scientific studies and data collection for more informed decisionmaking
- ❖ Identifying the critical functions of the office, reimagining workflows, rewarding employees, outsourcing, automating
- ❖ Importance of educating judges—so many of them are unfamiliar with the complex nuances of water, and states end up having to change legislation due to court decisions

WSWC Water Agencies' Staff Hiring and Retention Concerns
Summary of Zoom Call
January 24, 2022

Participants

Jennifer Verleger (ND)
Micheline Fairbank (NV)
Eric Gronlund
Jeanne Goodman
Jeff Cowley (WY)
John Paczkowski
Kathy Alexander (TX)
Nakaila Steen (SD)
Sara Gibson (OK)
Sue Lowry (ICWP)
Tony Willardson (WSWC)
Michelle Bushman (WSWC)

Summary of Call

Survey of States

- We talked about preparing a brief survey of our states (approximately ten questions) to identify the most significant challenges to attracting and retaining qualified and knowledgeable state water agency employees
- Compile a list of job posting resources currently used in each state.
- Some states have done the work to compare agency salaries with neighboring states and would be willing to share that information. The National Compensation Association of State Governments may be another useful salary data resource.
- We would prepare a white paper from the responses and other non-survey information collected for other sources, describing those challenges (including salary comparisons) and how states are trying to adapt or being left behind, and how that is impacting the quality and quantity of work the agencies are tasked to do.

Opportunities

- Tony talked with Jennifer Gimbal and Scott Verhines (New Mexico Water Resource Research Institute) about their perspective from the education side. They discussed the potential of a Future Water Leaders curriculum, with virtual online classes that would help educate folks about the complexities of water management, and also move them toward careers in water resource management.
- The WestFAST webinar series has provided opportunities for the federal agencies to learn from each other. Potential for something similar to present what state water agencies are working on, giving younger employees and students opportunities to learn and receive training.
- Seasonal workers and interns seem to want to return once they've had that experience (although some agencies are finding it difficult to attract even seasonal college level students.)
- Collaboration with other water resources folks—e.g., Universities Council on Water Resources (UCOWR), Institute of Water Resources, others?
- WSWC serving as a speaker's bureau, to coordinate with members to provide speakers in different universities across the West?

Posting Jobs

- Are there resources with narrower access to the target audience, a one-stop shop for finding universities that have water resources programs or other places to post jobs that will reach the people most interested and qualified?

- Limited budgets for posting jobs on multiple sites (indeed.com, others?)
- State Bar website for attorneys?
- governmentjobs.com charges fees based on the number of FTEs. Subscribing as a Department has put one state agency in the category of 500-999 employees, and about six of their divisions are sharing that subscription for \$2,831 per year.
- WSWC Job Board for providing information across states? Doable, but has the drawback of limited awareness of our website outside of our members.
- Potential for seeking an arrangement with state colleges to post state jobs?
- Local job fairs
- Working with sister agencies to meet mutual hiring needs

Ongoing Challenges

- Retirements are looming and no training is available for replacements.
- Siloed institutional knowledge, e.g., no one is being trained to become the next state engineer, and no one else understands how to manage water under the compacts and decrees.
- Multiple internal meetings and time spent brainstorming ideas about how to get candidates and where to advertise.
- For some, getting entry level positions filled isn't difficult, but finding anyone with experience ready to meet the job requirements seems almost impossible right now. The few applicants that respond don't have even the basic skills necessary, and state agencies generally can't compete with private practice salaries. Even with broad job postings with a jump in salary and a wide range of experience, some agencies are struggling to receive a respectable number of applicants to choose from. It seems to be getting worse.
- Private practice salaries are also drawing away existing employees, and despite increased revenues, state agencies are still dealing with flat budgets.

Retention Incentives/Bonuses

- Sign-on bonus for engineers, or extra time for internal candidates to get their P.E., salary bump once they've passed the P.E.
- After 15 years there is some extra pay on the work anniversary—but this doesn't seem to help with retention.
- Agencies with the potential to offer bonuses don't seem to see the long-term benefits; after a round of bonuses that make the news (with negative public perceptions of how taxpayer dollars are used and political ramifications) the program seems to disappear for a while.
- Longevity pay prior to the Great Recession, but many of those benefits were stripped in 2012 and further budget cuts have continued to whittle away at those types of incentives.
- One state noted that job classification standards prevent step increases in salary.
- Another state noted that they eliminated the classified merit system and instituted a pay-for-performance system, which is great in theory, except they haven't funded the program.
- One incentive is being able to retire comfortably, even if long-term state employees will never be wealthy.
- One state did a study on pensions and found that younger people don't like the defined contribution programs.
- One state's HR decided that so many salaries were behind, they made an across-the-board adjustment.
- It can be challenging to compare compensation packages and demonstrate the value of the non-salary benefits (health care, pension) compared to the private sector

Water Agencies' Staff Hiring and Retention Concerns

WSWC Staff Initial Ideas

Survey Questions/Internal comments

- How do you currently post jobs? On what platform(s) and for how long?
- What are the current demographics of your workforce? Estimate percentage close to retirement in ~5 years.
- What is the average retention time of entry-level jobs? Once people stay for five years, do they usually stay with the agency for their career?
- Does your agency recruit new staff at multiple levels (entry-level, mid-career, leadership, late-career)?
- What types of jobs do you offer? Permanent/full-time, permanent/temporary, internships, contract based.
- Promotions- what percentage of promotions are within the agency? Do the candidates meet the qualifications for that promotion? If the educational experience was substituted for years on the job, would that help with internal promotions?
 - Do state agency job title/level requirement qualifications need to change to better support internal promotions?
- Do you find it is harder to recruit people in rural offices? Why or why not?
 - Have you/would you consider combining rural offices and having more travel expenses? Why or why not?
- What is your most significant limitation in hiring people?
 - Examples: Experience, low level of applicant responses- specific job training that is not available prior to the job?
- What skills would you request if you had to develop a short training program for entry-level employees? What skills or tools do you need to fulfill current and future roles?
 - Examples: Water rights, modeling, GIS/ remote sensing, policy development, compliance, geology, hydrology, water quality etc.....
- Would it be beneficial if WSWC had a job board for listings of water resource jobs within our member states and circulated that list to colleges and universities? Could your state provide quarterly updates of current hiring needs for compilation?
- Does your state provide career service protections for staff? What is the history of COLAs for your agency/state? How do pay and benefits package compare to federal/local agencies in your geography?
- How many jobs or what percentage of your agency have positions that cannot be filled due to funding limitations or hiring freezes?
- What if any communication do you have with the legislative/ appropriations budget offices to support additional funding and resources for your agency?
 - In what ways was it successful?
 - What did not work about your attempts to communicate your agency's needs to the people making decisions?

- Do all of your offices have quarterly or annual meetings to check in and ensure operations are carried out in the same manner?
 - Do you discuss the strengths and weaknesses of each office and how to improve specific challenges for that region?

Development of a future leader's water curriculum:

- Start attracting candidates early – undergraduate programs to educate and encourage people to study water resources.
- A 6-month course would allow candidates to develop skills and enter into the federal and state workforce. Each state would develop a short course on water resource challenges and current regulations. After graduating, a networking event will be held for candidates to interview with states of their choice. Possible educational topics include-
 - Why water matters
 - What are surface and groundwater resources
 - Stakeholders engagement
 - Understanding the water needs of different entities
 - Water right short course/ prior appropriation system
 - Regulations
 - Permitting
 - Water resource management
 - Challenges and complexities of managing water resources for the future
 - Tools and resources for data analysis, observation, and database management
- The program would require scholarships or funding for people that enroll. However, the benefit would be a direct pipeline to agencies once they graduate.
- Consider a program similar to the University of Utah's O'Hara fellowship program in which the final year tuition is paid (or a stipend) and fellows are guaranteed employment in a state agency for 2 years. This could be a multi-university and multi-state effort.
- Make the program a certificate program- people like having certifications/training certificates- not sure why it matters so much
- Evaluate program structures across western water agencies - identify opportunities for growth paths that include technical/management roles. Traditional models of promotions only for those that take on supervisory duties leaves too many people without growth opportunities.
- Proposed training schedule:
 - One week of intensive in-person training at the beginning of the cohort
 - Help facilitate communication and a good working relationship throughout the year
 - Additionally, a weeklong intensive at the end with in-person training where they discuss their experiences and what they learned.
 - What does a future water lead look like
 - Weekly zoom/ virtual training xxx hours per week with an instructor.

- Create assignments- similar to questions or tasks of entry-level responsibilities. Help apply the information learned via trainings.

Critical Needs:

- Develop new language in job posting to outline benefits and mission of working at state water agencies
 - Stress benefits package over salary range and educational benefits of working with state agencies
 - Communicate that water resource agencies do important work, but immediate results are not seen. Part of this job is long-term planning and future resource development and conservation
 - Change academic qualifications
 - The younger generation wants to do more than compliance work on a daily basis. I think retention would increase if employees could switch up the tasks and responsibilities and be able to experience other types of work within the agency.
 - A well-rounded person is useful when understanding the complexity of water resources and water right challenges.
 - It was the challenge I had when hiring people for entry-level compliance jobs, employees left after 2 years.
- Contact Josh water jobs- see if he can put together a section on western water- some already under North America Header. Most of the postings are currently international.
 - Look for other similar water resource job boards
- Talk to universities about having undergraduate degrees that focus in the freshwater sector
- Figure out how to keep the younger generation from job-hopping every 2 years-- somehow, we are trained to think that job diversity is better than having expertise in a particular field/ area of interest

Tab K – NWCC Snow Survey & Water Supply Forecasting Program



National Water and Climate Center

The **National Water and Climate Center (NWCC)**, located in Portland, Oregon, supports the **Snow Survey and Water Supply Forecasting Program** and Soil Climate Analysis Network (SCAN) Program. As part of the USDA's Natural Resources Conservation Service, the NWCC is responsible for producing and disseminating accurate and reliable water supply forecasts and other climatic data to its wide variety of users.

Most of the western United States has a dry climate, where agriculture depends on irrigation. The water supply for irrigation largely comes from rivers and creeks, whose streamflow originates from the springtime melting of winter snow.

A **water supply forecast** is a prediction of streamflow volume that will flow past a point on a stream during a specified season, typically in the spring and summer. The Natural Resources Conservation Service (NRCS) issues water supply forecasts for hundreds of points in the western United States near the first of the month between January and June each year and at other times as requested.

The basis of water supply forecasting lies in the fact that most of the streamflow in western North America originates as winter snow. This snowpack serves as a natural reservoir, storing water during the winter and releasing it during the spring and summer snowmelt season. The delay between when the snow accumulates and when it melts is what makes it possible for hydrologists to use measurements of winter snowpack to make predictions of spring and summer streamflow.

In some areas, however, snowmelt is not as dominant, and therefore forecasting is more difficult. For example, on the west side of the Cascade Mountains, the east slope of the Rocky Mountains, and in parts of the Southwest, winter, spring, and/or summer rainfall can

supply a significant amount of the streamflow volume. Because the source of this runoff occurs in the future at the time forecasts are issued, and it cannot easily be predicted, forecast uncertainty is higher in these areas than in dominantly snowmelt basins.

Water supply forecasts can vary in accuracy depending on the strength of the snowmelt component. Nevertheless, useful predictions can be made in most areas of the West.

The NRCS uses statistical models to produce water supply forecasts. These are equations that express a fitted mathematical relationship (usually linear) between several predictor variables and the target seasonal streamflow volume. Predictor variables are primarily snow water equivalent at selected measurement sites but can also include precipitation, antecedent streamflow, and a few other miscellaneous quantities.

NRCS hydrologists manage a comprehensive network of manually-measured snow courses and automated **Snow Telemetry (SNOTEL) monitoring** sites throughout the West, manage the data collection process, and estimate the runoff that will occur when it melts. All the data collected at the National Water and Climate Center are quality-controlled and placed in a comprehensive database known as the Water and Climate Information System (WCIS). In addition to the data collected through the automated SNOTEL and manual snow data collection processes, the NWCC also incorporates precipitation, streamflow, and reservoir data from the U.S. Army Corps of Engineers (USACE), the U.S. Bureau of Reclamation (BOR), the Applied Climate Information System (ACIS), the U.S. Geological Survey (USGS), various water districts and other entities into the Water and Climate Information System database.

In 1991, the National Water and Climate Center instituted a pilot **Soil Climate Analysis Network (SCAN) project**. SCAN stations monitor and report soil moisture, soil temperature, and other climate data at over 200 sites across the U.S. More recently, the Tribal Soil Climate Analysis Network (Tribal SCAN) was developed to serve Tribal lands throughout the U.S. SCAN and TSCAN data are also incorporated into the Water and Climate Information System.

In addition to supporting the SSWSF Program and SCAN Pilot Programs, the NWCC is responsible for ensuring the data in the Water and Climate Information System database is continuously available to users. An extensive internet delivery system provides data in raw format as well as processed into reports, maps, graphs, charts, and other tools.

The NWCC also conducts the annual, west-wide Snow Survey Training School, an intense week of training in data collection, safety, and outdoor survival.

[Snow Survey and Water Supply Forecasting Program | Natural Resources Conservation Service](#)

Tab L – OpenET

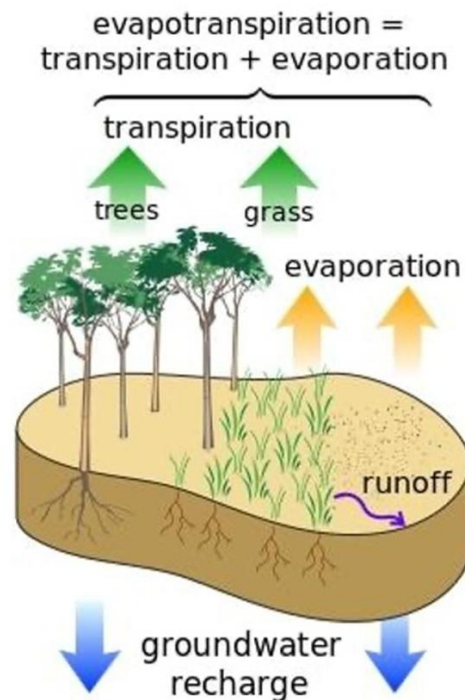
OpenET: Balancing Water Supply and Demand in the West

Milan Loiacono, Science Communication Specialist

OCT 14, 2024

What is Evapotranspiration?

Evapotranspiration is the combined process of evaporation and transpiration, both of which transfer water from the land surface to the atmosphere as water vapor. Evaporation transforms water from the surface of the ground or bodies of water into water vapor, while transpiration is water vapor that is evaporated from plant tissues and escapes through the stomata, the tiny pores in plant leaves and stems. It is a process that is happening all around us almost all the time, but because water vapor is invisible to the human eye, it is very hard to measure on the ground.



A conceptual diagram of near-surface hydrology.

M. W. Toews

To understand the effect evapotranspiration has on a local water cycle, picture a large decorative fountain. Typically, these fountains recycle the same water over and over. As a fountain runs, water is pumped out of the fountain heads, falls back into the fountain's basin, and then flows back through the pipe system before starting the process all over again. We can think of the water remaining within this fountain's local water system as *non-consumptive* water use. Some water, however, will be lost from the fountain's local water system by evaporating from the pool's surface or mist from the fountain's spray.

Imagine the fountain also has lily pads growing in its basin. The lily pads will use the fountain's water to survive and grow, losing some of that water to transpiration. The total water lost is evapotranspiration, and is considered *consumptive* water use, because it cannot be reused by the fountain. Tracking evapotranspiration can tell you how much water is removed or "depleted" from a local water system, and how much water needs to be added back in to support plant growth and maintain a healthy balance between water supply and water use. If too much water leaves the fountain, it will stop running. If too much water is added, it will overflow.

These concepts can be applied more broadly to the hydrologic cycle as a whole, and evapotranspiration data can play an important part in designing and implementing sustainable water management practices to combat larger issues like drought, as well as both short and long-term reductions in water availability. Historically, ET data have been obtained from ground-based instruments and methods, such as weighing lysimeters, which weigh soil and plants to track the water volume lost by evaporation or transpiration. Another common method is called eddy covariance, which calculates the amount of water vapor transported away from the land surface by wind eddies as they move across the land surface. But both are expensive and difficult to install and maintain, and measurements are only representative of a small portion of an individual agricultural field. It is cost prohibitive to collect these measurements over larger areas.

What makes OpenET different?

The OpenET team saw the important niche left open by traditional evapotranspiration measurement methods and filled it. They built upon decades of research funded by NASA, USDA and USGS and developed a new platform that can take easily accessible and already available data from satellite programs, like Landsat, and combine it with weather data to calculate the ET for every quarter acre of land. Satellites can record information like the Earth's surface temperature and how much of the incoming light from the sun is being reflected

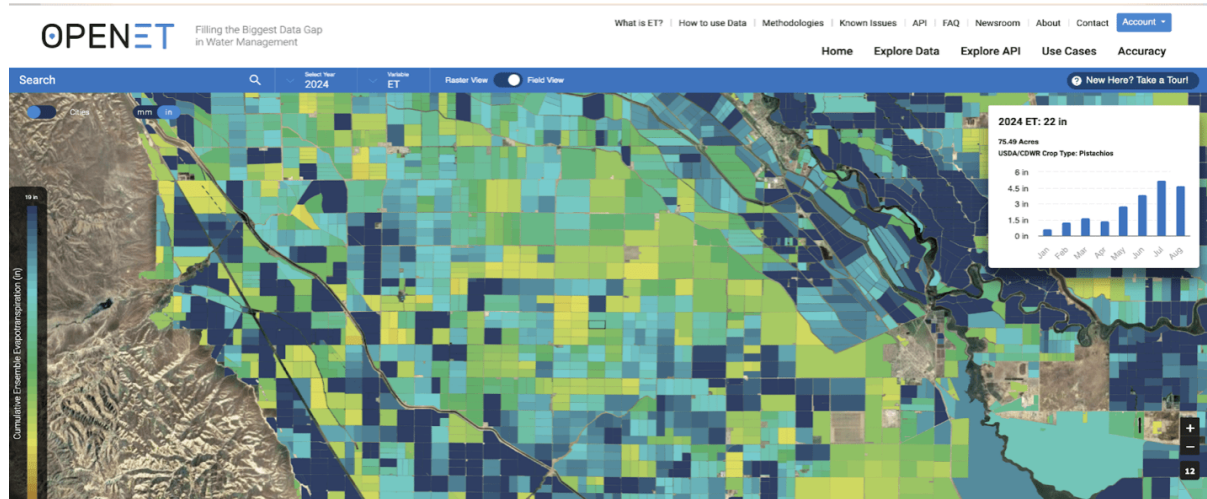
back out to space. OpenET is able to use physically-based mathematical models to combine the satellite and weather data and output accurate data on evapotranspiration rates and volumes.

This information is then made easily accessible through OpenET's Data Explorer, a free web-based tool that allows anyone with an internet connection to access the data OpenET provides. Users begin by selecting an area of interest from a map of the western United States that provides data at the satellite resolution of a quarter-acre, and also broken down into known areas of interest and individual agricultural fields, each color coded with a heat map of evapotranspiration. Cooler colors indicate higher rates of evapotranspiration while warmer colors indicate lower rates. Users can zoom into specific areas on the map, and with just a click, a chart pops up showing the evapotranspiration trends for a given area, for the current year and the past five years.

The chart can show monthly ET trends, useful for understanding seasonal fluctuations, and also cumulative trends, useful for understanding year-to-year changes in evapotranspiration. "The OpenET team took a user-driven design approach from the beginning, and each element of the Data Explorer and the open data services is there because a water manager or farmer asked for it," Melton explained. As we played around with the map, it became apparent how much work was put into developing this project. Scientists needed to improve models and assess the accuracy of data, programmers had to develop the user interface and data services, designers needed to make the interface intuitive enough to be impactful, agriculture and environmental groups needed to help validate the model's accuracy, and users of all types needed to provide requirements and then test the product to make sure their needs were actually met.

The OpenET consortium includes NASA, USGS, USDA Agricultural Research Service (ARS), Environmental Defense Fund (EDF), Google Earth Engine, California State University Monterey Bay (CSUMB), Desert Research Institute (DRI), Habitat Seven, Chapman University, Cornell University, University of Nebraska-Lincoln and close to a dozen other universities and experts across the U.S. NASA Ames Research Center and CSUMB have played key roles in the scientific and technical leadership of the effort from the outset, working closely with DRI, EDF and the recently formed non-profit OpenET, Inc. In addition, over 100 partners from the water management, agriculture and conservation community provided user requirements and assisted with the design and testing of the OpenET platform and tools.

“OpenET would not be possible without the contributions of each one of those partners,” Melton said. “Both on the implementation side and those who are translating the data from OpenET into solutions to long standing challenges.”



Map of farmlands showing ET data for 2024. The cooler colors represent higher levels of evapotranspiration (ET), while warmer colors indicate areas with less ET.

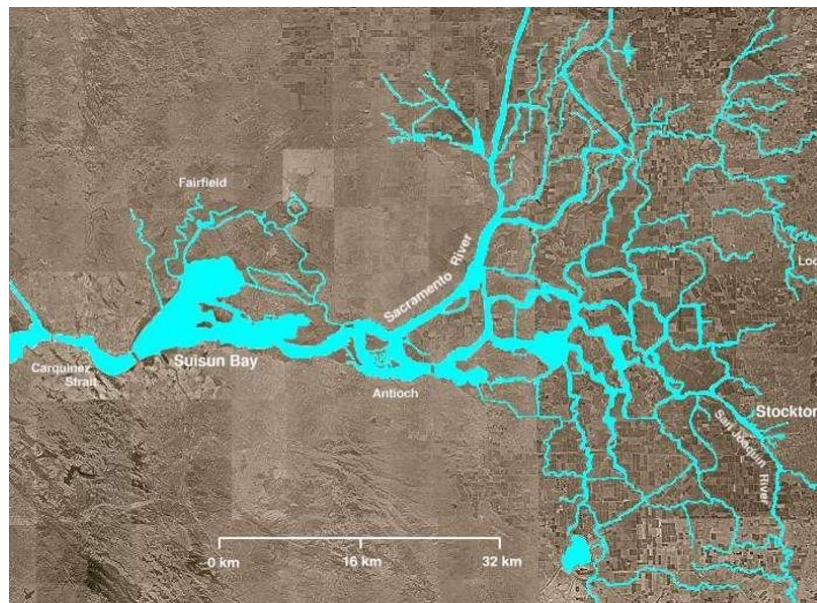
Models like those built into OpenET can be extremely useful tools for understanding patterns in ET and water use, but are only helpful if their accuracy is known. The OpenET science team recently completed the largest accuracy assessment to date for field-scale satellite-based ET data, comparing the satellite data to ground-based measurements at more than 150 sites across the U.S. Led by John Volk of the Desert Research Institute, the study was published in *Nature Water* earlier this year. A key finding was that across all sites, an ensemble value computed from six different ET models performed the best overall, leveraging the strengths of each individual satellite-driven model.

However, the study also found that some models performed best for particular crop types or regions, which is important information for water managers and farmers who need the most accurate data possible. Publishing the results as an open access study with all data and analysis made publicly available was also important to build trust in the data. While the study highlighted some limitations of the models and priorities for future research, the rigorous and reproducible accuracy assessment helps to build user confidence that they can use the data, while being aware of the expected accuracy for different applications of the data.

Bridging the Gap Between Farmers and Resource Managers

OpenET has already contributed to one significant win for farmers that affects how water use will be monitored and reported in the Sacramento-San Joaquin Delta.

This inland river delta covers 750,000 acres and is an important water resource in California, but one where accelerated demand combined with habitat loss and water quality issues has led to major concerns. In the Delta, large portions of the agricultural land are below sea level. Levees protect the fields and contain the river channels that supply water for irrigation. In 2023, the state began requiring farmers to maintain a water meter or measuring device on each diversion, where water is diverted from a river for irrigation. However, this measurement proved challenging and costly as there are thousands of diversions in the Delta, and the measuring equipment was inaccurate and difficult to maintain in this environment. In addition, water users also had to pay for meters at the locations where water that drained from the fields was pumped back over the levees and into the river channels.



The Sacramento-San Joaquin River Delta is a major water resource in California.

Matthew Trump

“Mostly, what the state was interested in was the consumptive use: how much (water) was actually removed from the supply in that region,” Melton said. “So, it’s the perfect place for using OpenET because evapotranspiration really is the majority of the consumptive use in the Delta, if not all of it.”

After the launch of OpenET, farmers in the Delta worked with the Delta Watermaster, the California State Water Resources Control Board, the OpenET team and the Delta Measurement Consortium to develop an alternative compliance plan that used OpenET data to help streamline the water use required reporting for this complex region. Once the alternative compliance plan was approved, Forrest Melton and Will Carrara of NASA worked with the state Water Resources Control Board, the Delta Watermaster and water management agencies, and Jordan Harding of HabitatSeven to implement this solution. The [Delta Alternative Compliance Plan](#), also known as the Delta ACP, allows farmers to use OpenET data to estimate their water usage; enabling farmers to complete their use reports in a matter of minutes.

“It’s the first time that satellite-based evapotranspiration data has been automatically integrated with a state-managed water reporting system,” Melton said.

Last year, more than 70% of farmers in the Bay-Delta region chose to use OpenET and to report their water use through the Delta ACP website, and they expect this percentage to continue to increase over time.

“The best part is that it is saving farmers hundreds of hours on preparing and submitting reports, avoiding millions of dollars in costs for farmers to deploy and maintain meters, and giving the state consistent and reproducible data on water use that has been reviewed and approved by the water user,” Melton said.

According to Delta Watermaster, Jay Ziegler, this approach has a clear benefit in the unique water flow setting of the Delta. “In reality, OpenET – and the use of publicly accessible data measuring ET is the only way to really discern consumptive use of water in the Delta on a reliable basis,” Ziegler said. “Candidly, we don’t really have a viable “plan B” in the absence of applying Open ET for water use reporting.”

“In reality, OpenET – and the use of publicly accessible data measuring ET is the only way to really discern consumptive use of water in the Delta on a reliable basis.”



JAY ZIEGLER

Sacramento-San Joaquin Delta Watermaster

Water Beyond Borders

“Water doesn’t see borders. It doesn’t follow our rules. Deforestation in one place can affect people thousands of kilometers away.”



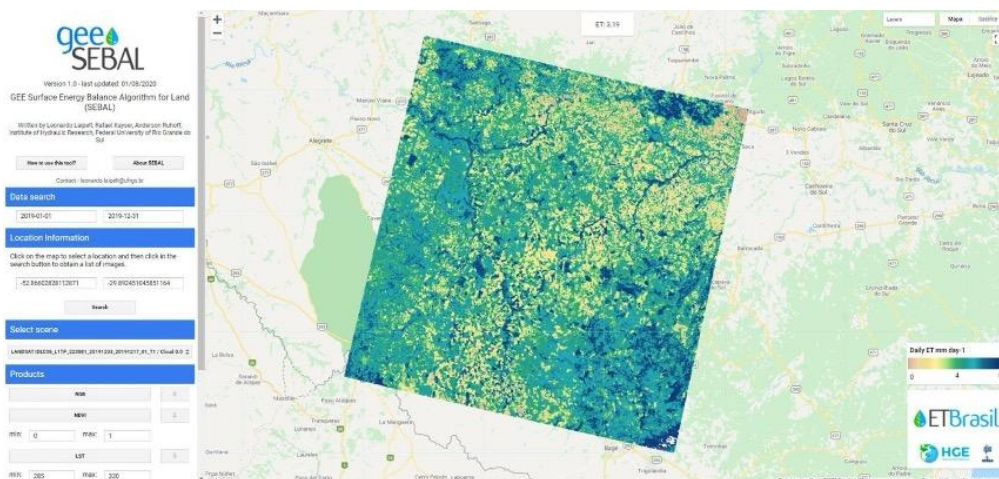
ANDERSON RUHOFF

Professor of Hydrology and Remote Sensing, Federal University of Rio Grande do Sul, Brazil

Studying evapotranspiration can reveal the impacts of deforestation with even more clarity. And importantly, it’s also public information. “So not only the farmers and water managers but every citizen can check how much water is being used in their area, especially during drought. It’s democratic information in that way,” Ruhoff said. “I think it’s important to have this information openly available and to try and reach as many people as possible.”

Melton feels there’s the potential to expand the project, if more people like Ruhoff are there to lead the way.

“There’s huge potential, but there do need to be stakeholders that come to the table and say that this is something that they’re interested in,” Melton said. “Water is so important and at times so contentious that it’s really important the data is seen as trusted. When there is a local leader, that substantially increases the likelihood that it will be trusted, and most importantly, used to bring people together to develop solutions.”



The geeSEBAL application that Anderson Ruhoff’s team developed, which now informs the OpenET platform.
Science Direct/Anderson Ruhoff

Even when you live in a water-scarce region like California it's easy to take water for granted. What platforms like OpenET can do for us, however, is make water, even in its most diffuse form, more visible to everyone.

Written by Jane Berg and Rachel Sender, co-published with the Bay Area Environmental Research Institute

To learn more about OpenET, visit [**https://etdata.org/**](https://etdata.org/)

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Tab M – WaDE/WestDAAT/WestCAT Update

Western States Water Council

Water Data Exchange (WaDE) Program Update

Ryan James, WaDE Data Analyst / Hydroinformatics Specialist

Tony Willardson, Executive Director

The Water Data Exchange (WaDE) Program is committed to assisting the Western States Water Council (WSWC) member states in publicly sharing water rights, allocation, supply, and use data through a streamlined and standardized service that enables regional analyses to inform water resources planning and policies¹. Since 2011, the WSWC has nurtured the WaDE Program development with financial support from federal agencies and philanthropic organizations. The WaDE Program's overarching goal is to provide a standardized water data-sharing platform for state and other public agencies that makes data findable, accessible, interoperable, and reusable (FAIR).

This report provides a brief update of the WaDE Program's status from October 2024 through March 2025 in the following areas: (1) WaDE data technical activities; (2) WaDE/WestDAAT Improvements; (3) WestDAAT user traffic update; (4) Western Water Data Hub; (5) Western States Water Conservation Application Tool (WestCAT); and (6) Key outreach and coordination activities.

Of note, WaDE is currently funded by three grants to assist in modernizing western water data and infrastructure as an Internet of Water Coalition hub. The funds come from: (1) a Broken Hill Proprietary (BHP) Foundation grant through Duke University; (2) a subcontract with the Center for Geospatial Solutions at the Lincoln Institute of Land Policy funded by the Bureau of Reclamation; and (3) a Bureau of Reclamation Applied Science WaterSmart grant and financial assistance agreement.

A description of the WaDE infrastructure is in Appendix A.

1. WaDE Data Technical Activities

Current Water Data Sharing

The WaDE Program's database offers data access originating from 229 unique datasets across the Western 18 states for the following three categories of western water data in a consistent format and terminology where one State may have multiple datasets: (1) water rights data; (2) water supply data,

¹ WaDE: <https://westernstateswater.org/wade>

which includes (a) site-specific historical reservoir and streamgage data, (b) data on groundwater pumping, and (c) available aggregated water supply estimates at a watershed scale; and lastly (3) water use data, including (a) historical site-specific withdrawals related to water rights, (b) site-specific state public-supply water use, and (c) aggregated withdrawal, demand, delivered water, and consumptive use at a watershed scale; and (4) administrative and regulatory overlays data (Table 1). Currently, only water rights data are accessible through WestDAAT, but with the imminent completion of WestDAAT 2.0 the other data sets will be accessible.

Table 1: Summary of WaDE-supported datasets that are shared through the APIs and WestDAAT

#	Data Type	Data and key metadata	# States Sharing	# Datasets Shared	WaDE Database / API	WestDAAT
1	Water Rights	Owner, priority date, point of diversion, place of use, purpose of use, permitted flow or volume, and water source name and type.	18	43	Yes	Yes
2	Water Supply	Site-specific historical reservoir and streamgages or groundwater pumping	12	46	Yes	No
		Aggregated water supply, such as runoff in streams, reservoirs, or groundwater	2	4	Yes	No
3	Water Use	Site-specific historical withdrawals related to water rights	4	5	Yes	No
		Site-specific state public-supply water use	5	34	Yes	No
		Aggregate withdrawal, demand, delivered water, consumptive use	9	68	Yes	No
4	Overlay	Administrative & Regulatory Overlays	17	29	Yes	No

2. WaDE/WestDAAT Improvements

WestDAAT 2.0 will include additional WaDE recorded data not already being shown (Figure 1). This includes: (1) visualizing how administrative and regulatory overlay information relates to water rights; and (2) querying historical water supply/water use data available in the WaDE database. In addition, WaDE API service's capabilities are being redeveloped to follow the Open Geospatial Consortium (OGC) Standards.

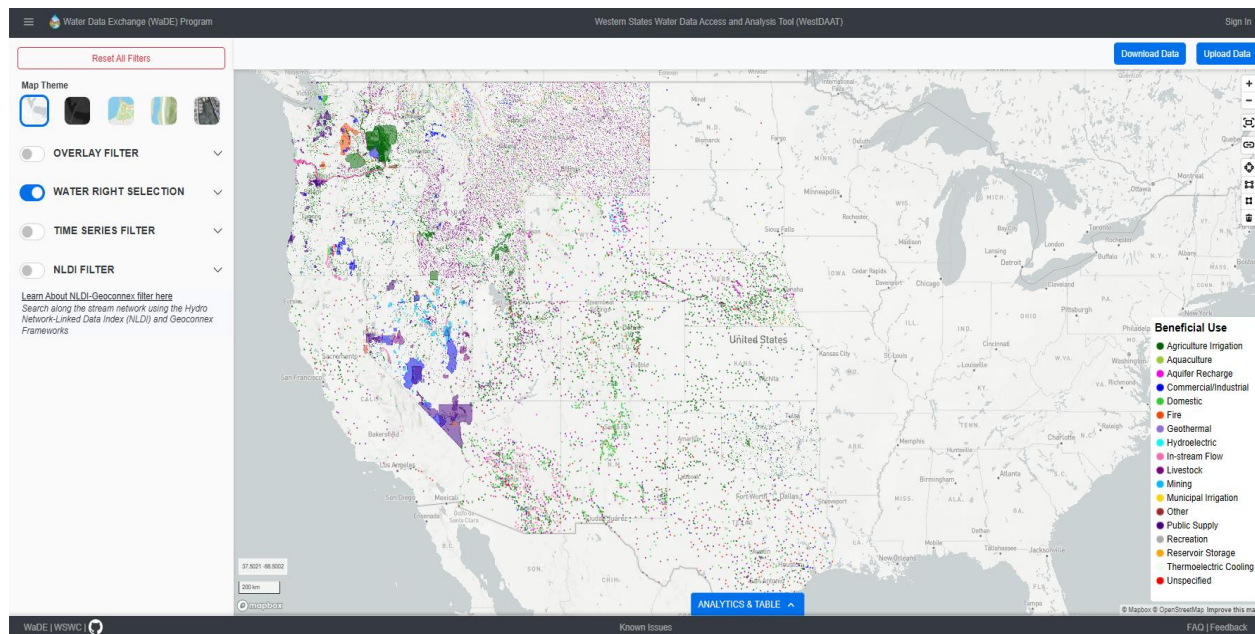


Figure 1: Screenshot of the new WestDAAT Layout

The following is a break down of the new features being included...

- New Data Type Administrative and Regulatory Overlays: WestDAAT 2.0 will be capable of displaying geospatial overlays paired with water right site information. The two types of overlays envisioned are administrative (boundaries of districts or offices with authority over water) and regulatory (geographic areas that may or may not follow basin or aquifer boundaries where specific rules or requirements apply to water use). Each overlay has a geospatial boundary, name, type of overlay, the water source type it applies to, an oversight agency, and a hyperlink that points to online documentation provided by the oversight agency.

In the WaDE database, each overlay is mapped to water rights. Thus, administrative and regulatory overlays are geospatial metadata related to water rights that provide context to surface and groundwater water rights and water use across the West. Each overlay has a landing page with its metadata and a hyperlink to the oversight agency. Users of this overlay information will be able to answer questions like the following: (1) What are the administrative or regulatory agencies or districts with authority over groundwater or surface water across the West? (2) What local or regional regulations exist in an area of interest? and (3) What water rights or water uses could be impacted by an administrative or regulatory decision?

- New Data Type Time Series Data: WestDAAT 2.0 will also be capable of showing state-based historical time series records on water supply and use, alongside the existing water right site information (and listed geospatial overlay data mentioned above). Such water supply records include site-specific historical reservoir releases, streamgage flow, and groundwater level or pumping measurements. Water use records include site-specific historical withdrawals related to an existing water right, and public-supply use related to geospatial areas. Existing site landing pages of WestDAAT will be updated to include both the site and time series information. Users of this data will be able to more easily answer questions like the following: (1) Where are related points of diversion/return flow and their actual volume or flow rate in a hydrologic system? (2) What is the annual time series for a given set of sites with known beneficial use categories, water source types, and/or methodologies? and (3) What responses may be appropriate given real-time changes to reservoir levels, streamgage measurements, or longer-term changes such as groundwater levels.
- New Water Right Filter Options: WestDAAT's ability to filter and query for water right data has been expanded to include the following new data filters. A description of each filter type is described as follows: (1) Allocation Type: description of the type of water right (e.g., Underground Water Claim, Federal Reserved Water Right, etc); (2) Legal Status: the state-recognized legal status of the water right (e.g., proven, approved, perfected, adjudicated, etc.); 3) Site Type: the high-level description of the site type recognized by the data provider (e.g., well, spring, reservoir, river, ditch, etc.).
- New Site Selection Drawing Tools: New drawing tools for both water right and time series sites have been included. New tools include expanding upon the existing draw tools to include a draw circle polygon, draw square polygon, and a new custom input file select from the user. Accepted file types include shape files (shp) and geojson.
- New Water Right Analytic Visuals: Existing analytic visuals for water rights have been expanded. New visual includes the option to use a bar chart, and the ability to group results by the following: beneficial use (existing), water source type, owner type, allocation type, legal status type, site type.
- New WaDE API Data Delivery: WaDE is expanding upon its existing APIs data retrieval service to better follow the data retrieval guidelines set down by the Open Geospatial Consortium (OGC)² for retrieving and finding geospatial data. Specifically, WaDE will be using the OGC Features³ standard which is a modern, web-friendly standard developed for accessing and interacting with geospatial feature data over the web. It enables users to query, retrieve, and filter collections of geographic features (such as rivers, parcels, or monitoring stations) while using familiar web technologies (e.g., RESTful URLs) and industry standard data formats (.e.g, shp, GeoJSON). One of OGC's strengths is its

² OGC: <https://ogcapi.ogc.org/>

³ OGC API Features: <https://ogcapi.ogc.org/features/overview.html>

modular, interoperable design, allowing for lightweight, flexible data access across different systems and devices without requiring specialized GIS software.

3. WestDAAT User Traffic Update

WestDAAT uses Google Analytics to anonymously measure users' interest in WestDAAT over time. Since the soft release in September 2022, WestDAAT has had 5,311 visitors from the United States, 210 international visitors (Figure 2).

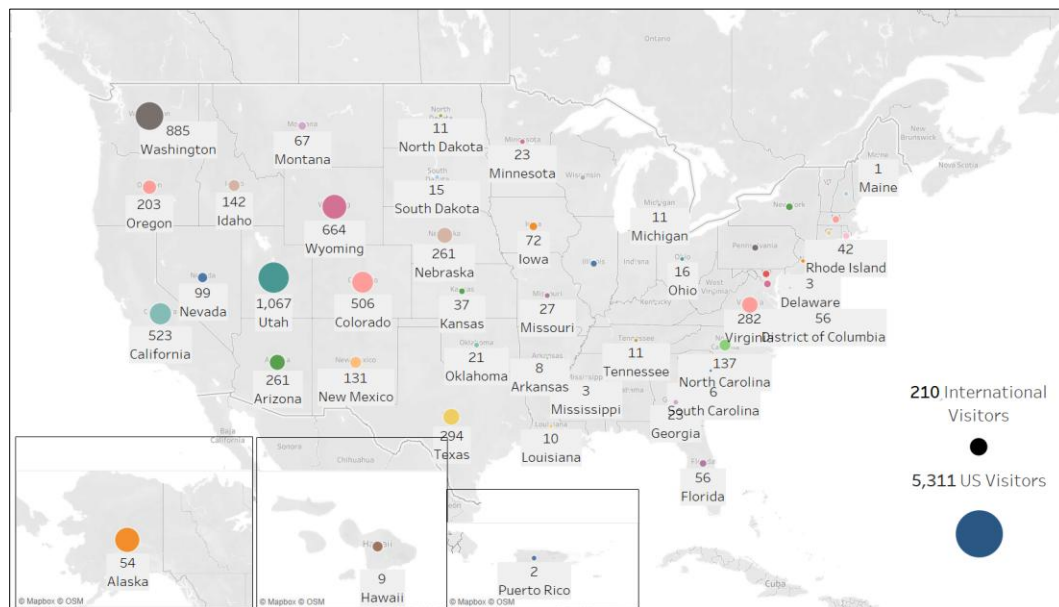


Figure 2: Geographic distribution of WestDAAT active visitors across the US from September 1, 2022, through April 15, 2025.

Since its public release in April 25, 2023, WestDAAT has had an average of roughly 48 active users per week (Figure 3).

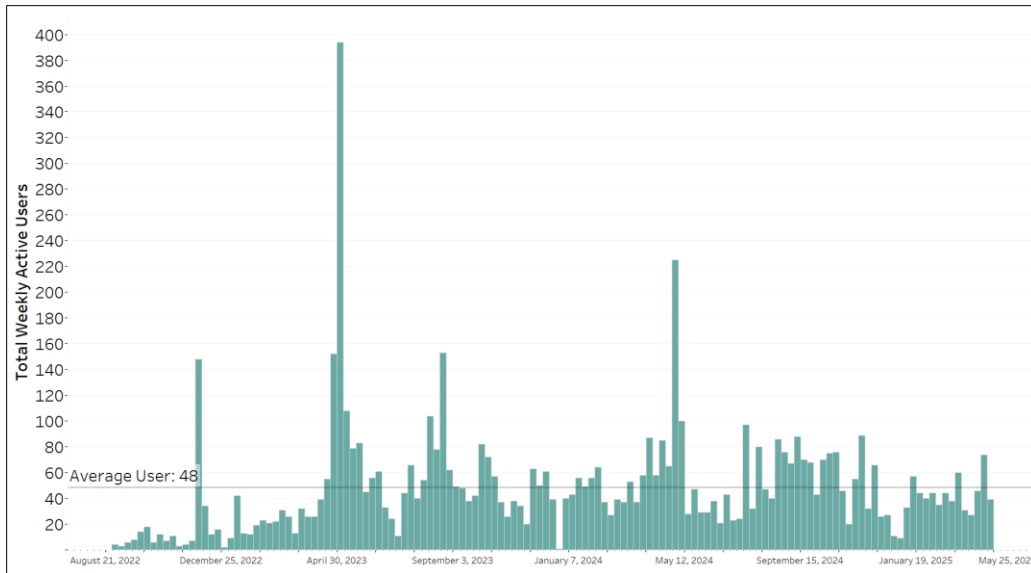


Figure 3: Distribution of WestDAAT active weekly visitors from September 1, 2022, through April 15, 2025. The spikes in visitor activity are related to key engagement events. The last six months show 48 visitors per week.

Figure 3 shows a pie chart and table of the current count and distribution of 82 registered WestDAAT user accounts by user type. Registration is required to access WaDE’s raw data, as compared to casual visitors. Roughly 75% of existing users are consulting firms and private entities, non-profit organizations and university researchers. The other nearly 25% are state and federal agencies.

- State agency users: City of Phoenix in Arizona, California State Water Resources Control Board, New Mexico Office of the State Engineer, Texas Water Development Board, and State of Utah.
- Federal agency users: U.S. Department of Agriculture, and Department of the Interior’s Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, Fish and Wildlife Service, National Park Service, and U.S. Geological Survey, as well as Los Alamos National Lab.
- University users: in the West include Arizona State, Boise State, California (Berkley & Davis), CalTech, Nebraska-Lincoln, Northern Arizona, Texas A&M, Utah State, Washington State, Cornell, Duke, North Carolina-Chapel Hill, Penn State, Southern Illinois, Virginia Tech, and Yale.
- Non-profit uses: American Rivers, the Freshwater Trust, Lincoln Institute of Land Policy, the Nature Conservancy, and Vibrant Planet (a public benefit corporation).

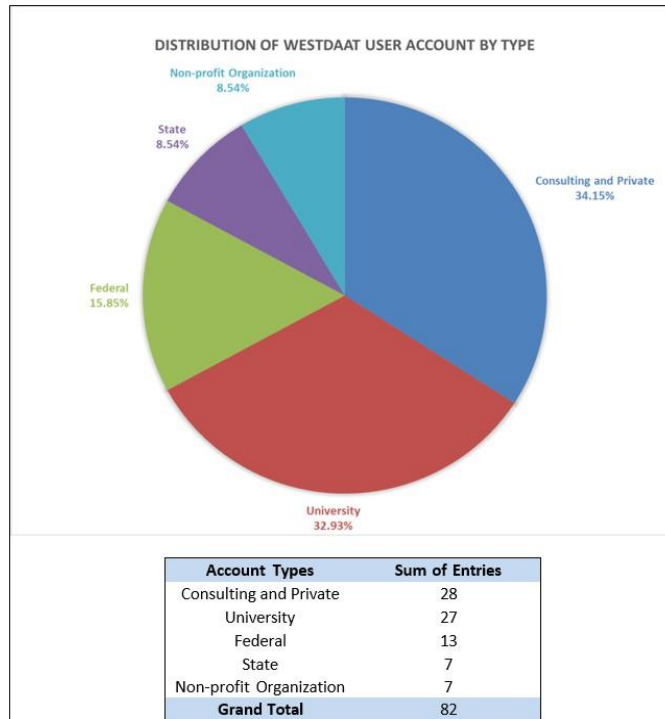


Figure 4: Registered WestDAAT User Distribution by Type

4. Interoperable Western Water Data Hub

In October 2023, WSWC entered into a two-year agreement with the Center for Geospatial Solutions at the Lincoln Institute (Lincoln-CGS) to develop an Interoperable Western Water Data Hub (Hub) for the Bureau of Reclamation (Reclamation). The project will streamline access to diverse water data sources to support Reclamation’s mission to manage, develop, and protect water and related resources in an environmentally and economically sound manner (Figure 5).

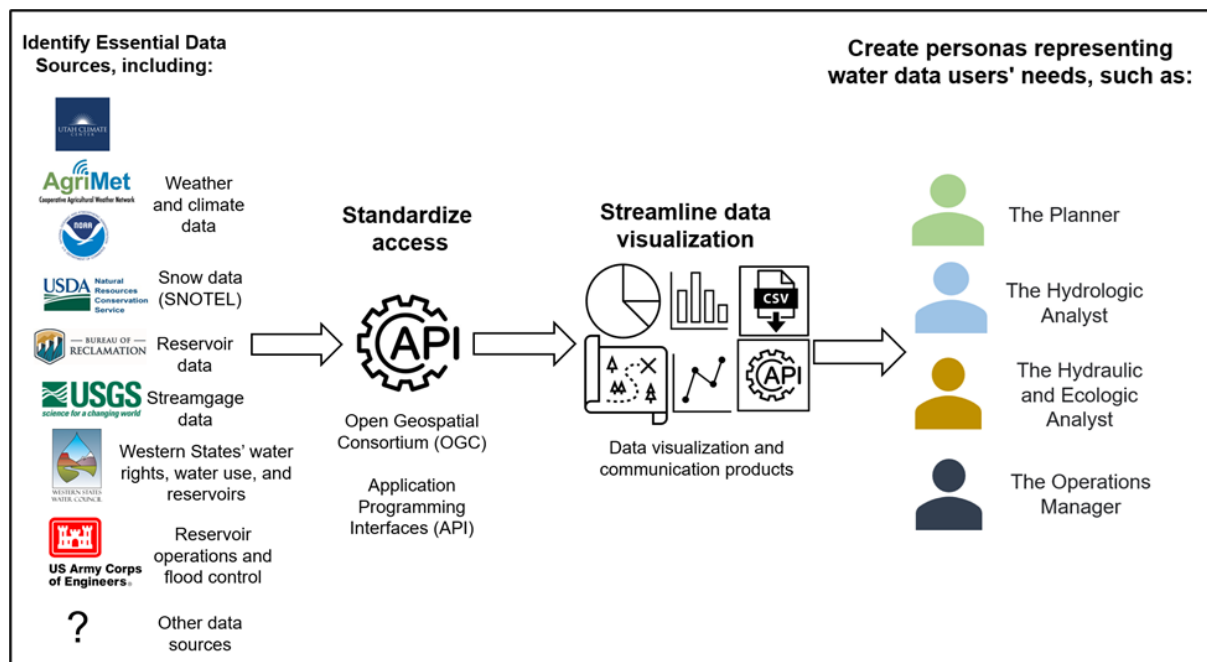


Figure 5: The Hub will streamline data access and visualizations across disparate data sources based on the needs of different user groups at Reclamation.

The Lincoln-CGS and WaDE team (the Hub team) will take advantage of a mixture of open-source and proprietary technologies to develop a modernized data infrastructure for sharing the identified datasets along with data visualization and communication products to address questions of importance to Reclamation.

Recent updates made by the Hub team include the following: Tasks (2) Milestone 2 is near completion. The improvements to WaDE/WestDAAT include an update to the WaDE API Data Delivery service, specifically the standards set out by the OGC. This improvement will make it easier for the Hub to ingest WaDE-related data.

5. Western States Water Conservation Application Tool

In October 2023, WSWC submitted a grant application to the WaterSmart Applied Science Grants program at the Bureau of Reclamation to develop a new Westwide Western Water Conservation Application Tool (WestCAT) to streamline implementation of voluntary, compensated, in-state, and temporary water conservation measures. A financial assistance agreement was signed in September 2024 (Figure 6). Conservation measures might include full-season fallowing, alternative irrigation

strategies, and crop switching. WestCAT will integrate two foundational data sets for water conservation: WestDAAT water rights data and evapotranspiration (ET) data as a proxy for consumptive use estimates relying on OpenET.

Our IT contractor (Don't Panic Labs) has been able to accelerate development, in coordination with the WaDE team, and a working demo (in a staging environment) is to be released sometime in April 2024.

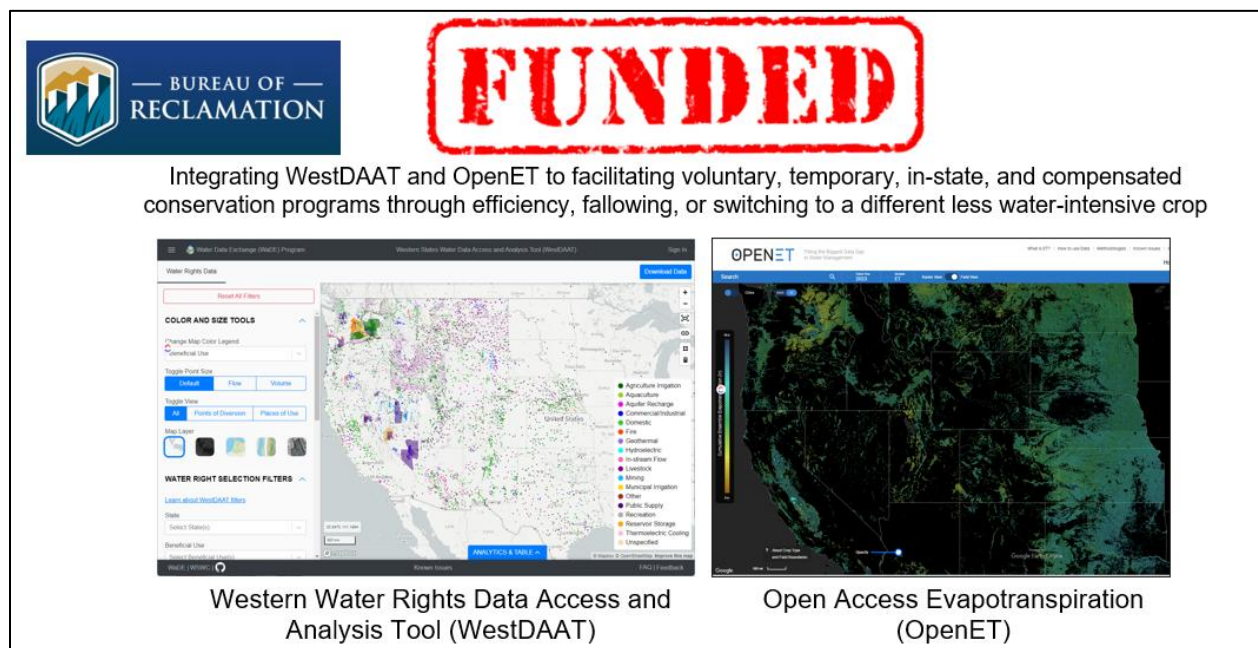


Figure 6: WestCAT mockup

6. Key Outreach and Coordination Activities

The WaDE team scheduled three separate demonstrations to showcase the developments for WestDAAT 2.0 (one demo on March 27th and two demos on April 1st). Demonstrations included a brief presentation on new features, a live demo, followed by an open discussion where attendees had access to WestDAAT 2.0 in a staging environment. Attendees were asked to provide feedback on useability, neatness, and suggestions on improvements to better visualize and access the data.

Attendance includes the following...

- Kevin Petrone - Alaska DNR / Alaska Hydrologic Survey
- James Dieckhoff - Arizona Department of Water Resources

- Jennifer Stricklin - CA Dept. of Water Resources
- Megan Kramer - Colorado Water Conservation Board
- Danielle Favreau – Idaho Department of Water Resources
- Andrew Padilla - Lincoln-CGS
- Colton Loftus - Lincoln-CGS
- Faith Sternlieb - Lincoln-CGS
- Gino Mbaigoto - Lincoln-CGS
- Ryan Kelly - Nebraska DNR
- Chase Martin - New Mexico Bureau of Geology and Mineral Resources
- Rachel Hobbs - New Mexico Bureau of Geology and Mineral Resources
- Jessica Correll - Oklahoma Water Resources Board
- Sara Larsen - OpenET Chief Executive Officer
- Jordan Beamer - Oregon Water Resources Department
- Taylor Christian - Texas Water Development Board
- Craig Miller – Utah Division of Water Resources
- Danyal Aziz - Utah Division of Water Resources
- Adel Abdallah - Utah Division of Water Rights
- Anna Doyle - Utah Division of Water Rights

Appendix A: WaDE Infrastructure

The WaDE 2.0 Data System is a centralized cloud-based system where the WaDE team maps and imports Western States' water data into a SQL Server Database hosted in Microsoft Azure web services. The WaDE database is based on a standardized and scalable data dictionary for water rights, water supply, and water use data in the Western U.S. The WaDE data dictionary has the following seven fundamental metadata elements.

- Water right metadata - priority date, owner name, and permitted diversions by flow or volume
- Sites are the spatial location of a point of diversion or place of use associated with water data
- Variables reported or measured – water source, water use, beneficial use, and units
- Water source types - generally surface or groundwater
- Beneficial use includes agricultural, municipal, industrial, etc.
- Methods used to estimate or model the data value
- Organizations or data providers

WestDAAT, as a front-end user-friendly tool, is deployed as part of the WaDE system in three independent environments, which also include the Microsoft SQL Server database, APIs, and the web-browser-based front-end dashboard (i.e., WestDAAT). These separate environments allow the WaDE team to test any changes or data updates before going into the final product. First, the Quality Assurance (QA) or development environment is used to test how the system performs following new design changes using a sample of data. Second, the User Acceptance Testing (UAT) or staging environment is used to test the quality of data and user experience. Finally, the third or Production environment is the live service that is available to users (Figure A1).

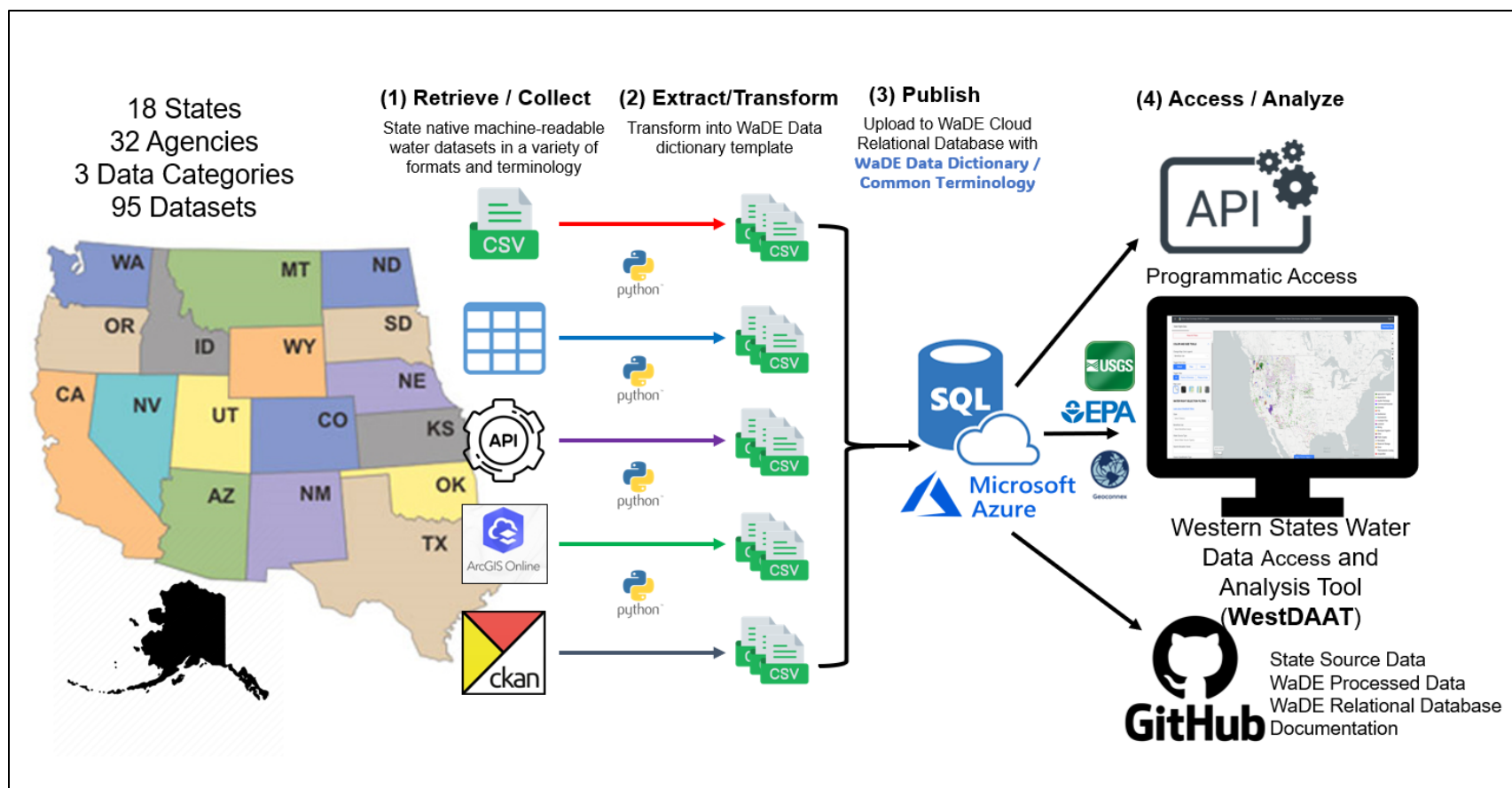


Figure A1: WaDE 2.0 architecture to streamline access to western states water rights, water use, and water supply data as FAIR through a streamlined and standardized service.

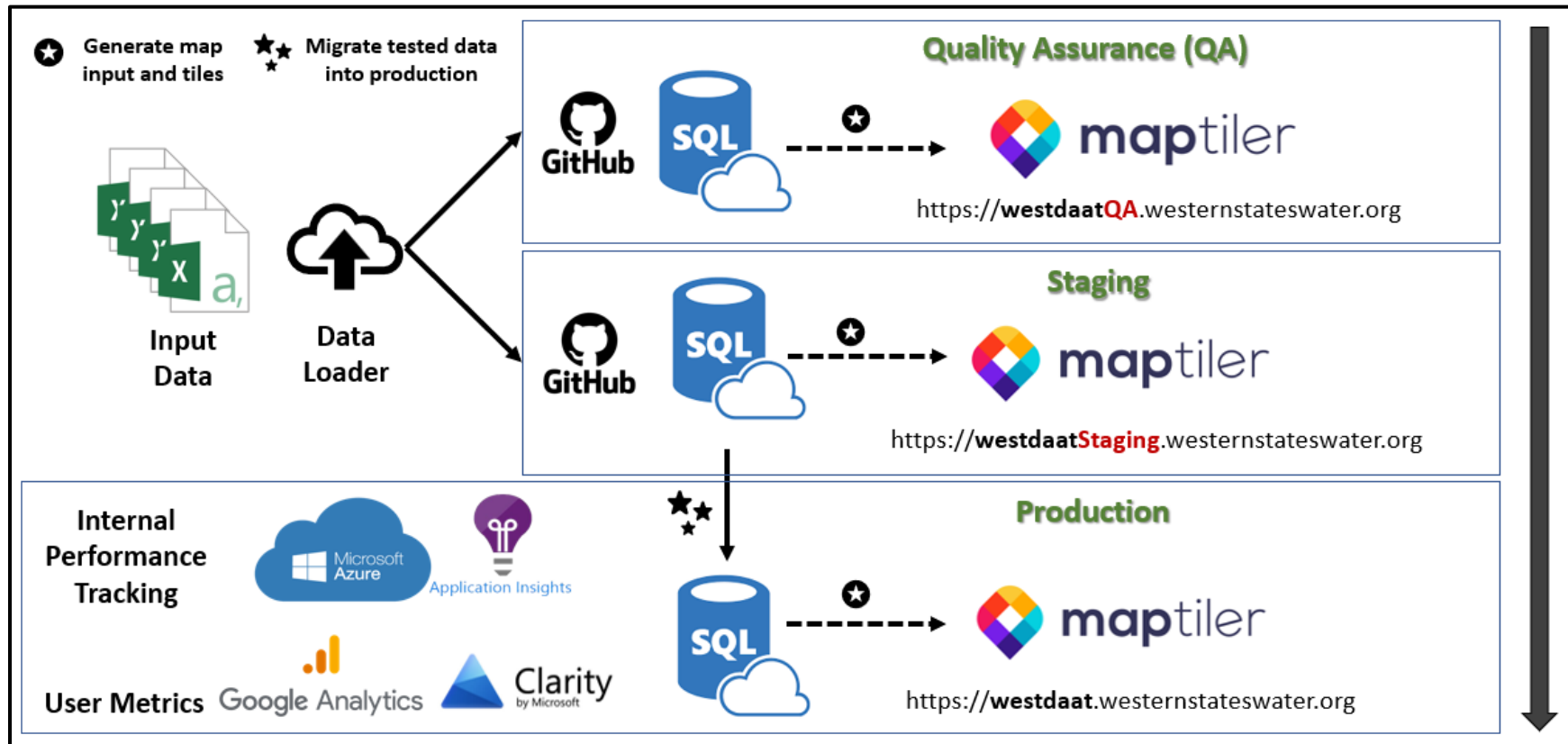


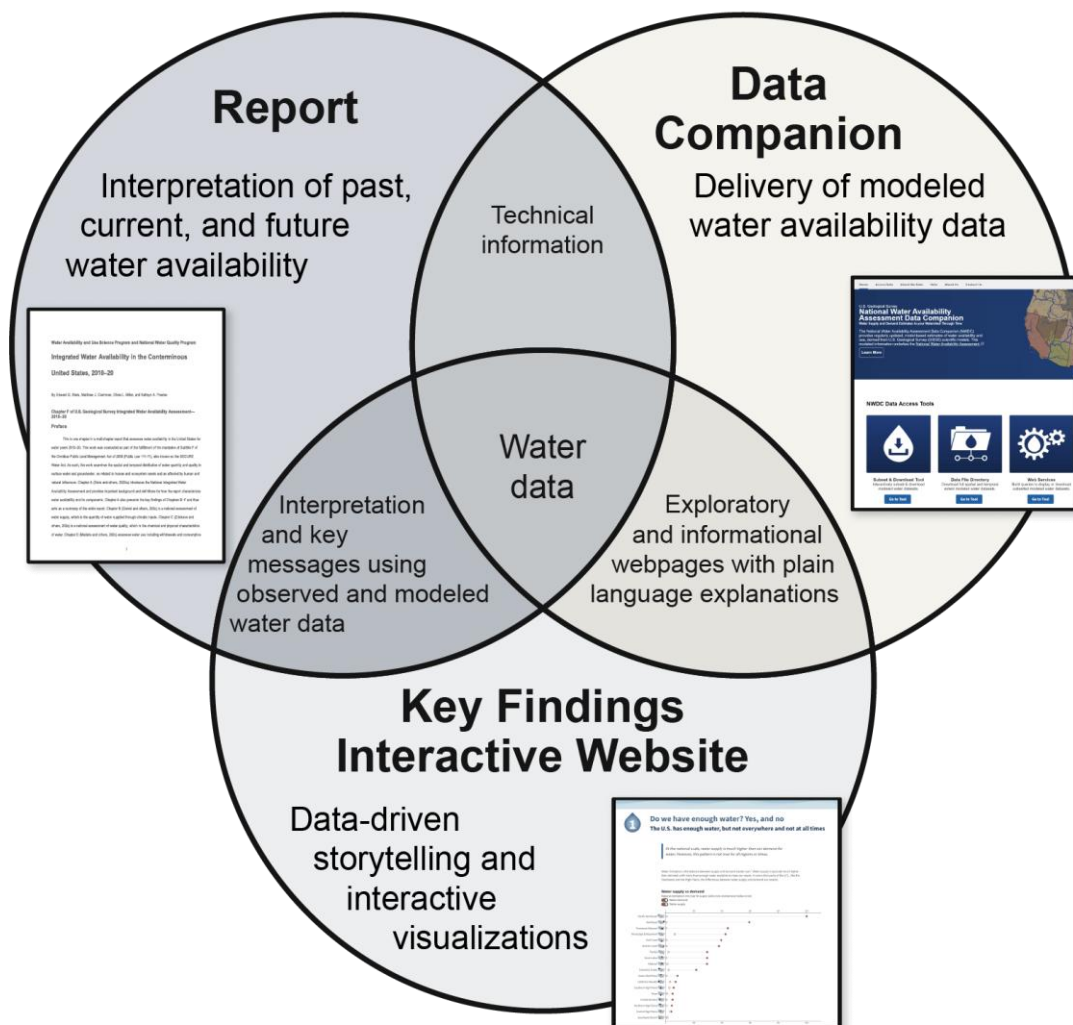
Figure A2: State-of-the-art scalable WaDE Data System based on the best IT practices deployed in three environments: Quality Assurance; Staging; and Production with open-source code tracked in GitHub at <https://github.com/WSWCWaterDataExchange>

Tab N – USGS Water Use Availability

USGS Water Availability Report and Data Companion Tool

The U.S. Geological Survey released a new Water Availability Assessment (2010-20) in January 2025, along with a suite of new associated products. The [National Water Availability Assessment](#) now consists of two primary products—the Report and the Data Companion—as well as a supplemental key findings interactive website. **The National Water Availability Assessment Report** is an interpretive document that provides a comprehensive, scientific summary of water quantity, quality, and use in the United States. The Report can be accessed at <https://water.usgs.gov/nwaa-data/about-report>.

National Water Availability Assessment



The **National Water Availability Assessment Data Companion (NWDC)** can be accessed at <https://water.usgs.gov/nwaa-data/>. It provides regularly updated, model based estimates of supply versus demand over time and space, as well as estimates of the individual components of supply and demand. Here you can also download and subset modeled datasets and access the NWDC API.

NWDC Data Access Tools



Subset & Download Tool

Interactively subset & download modeled water datasets.

[Go to Tool](#)



Data File Directory

Download full spatial and temporal extent modeled water datasets.

[Go to Tool](#)



Web Services

Build queries to display or download subsetted modeled water datasets.

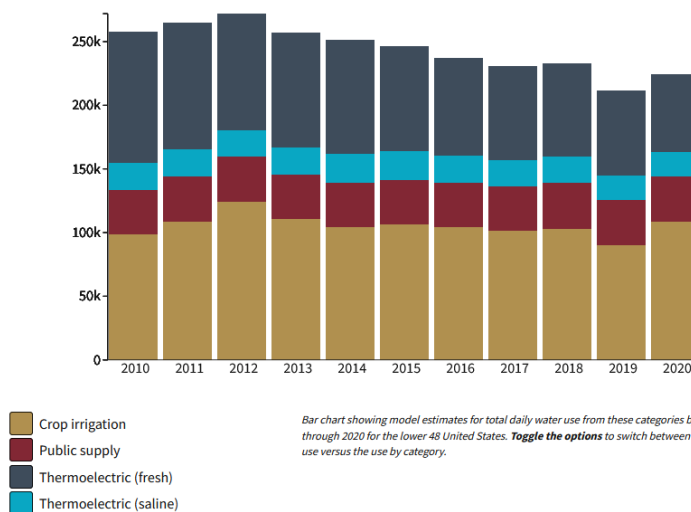
[Go to Tool](#)

The supplemental **Key Findings Interactive Website** provides data-driven storytelling and data visualizations (example below) that explore some of the key findings of the Assessment. It can be accessed at <https://water.usgs.gov/vizlab/water-availability>

Average daily water use from 2010 to 2020

Millions of gallons used per day by use type

Total use ☒ Use by category



Bar chart showing model estimates for total daily water use from these categories by year from 2010 through 2020 for the lower 48 United States. **Toggle the options** to switch between viewing the total use versus the use by category.

Other categories of water use such as mining, aquaculture, livestock, and domestic and industrial (from non-public supply sources), that together account for 10% of water use in the country, can also be locally or regionally important.

Tab H – Draft FY25-26 Committee WorkPlan
Water Resources / Executive / Water
Quality / Legal

WATER RESOURCES COMMITTEE
WORK PLAN
July 1, 2024 to June 30, 2025

1. WATER AVAILABILITY & USE - WATER DATA EXCHANGE (WaDE)

Background/Work-to-date: The Council continues to work with member states and federal agencies through the Western States Federal Agency Support Team (WestFAST) to build a robust and performant architecture for accessing and sharing water data – Phase 2. WaDE 2.0 is a cloud-based schema centered around supporting use cases for data queries to support decision making within and across state boundaries. Along with the development of the WaDE 2.0 system, WSWC have been working on connecting publicly available water rights and water use datasets as published by our member state agencies into the WaDE SQL database. WSWC is working towards a user-friendly portal to access, filter, and analyze water rights and water use data.

With WSWC assistance, Member States are developing WaDE-compliant data services that will feed directly into the new WaDE platform. Some eastern states have expressed interest in deploying to the WaDE platform also, with a proto-type completed for New Jersey. WSWC will work with ICWP and through the USGS Water Use Data and Research (WUDR) program to engage states and other entities that wish to serve data in the WaDE platform.

WaDE is collaborating with and seeking to help integrate other national efforts, including the Water Availability and Use Program (WAUSP), which is led by the U.S. Geological Survey (USGS), as well as federal and non-federal open water data initiatives. WaDE supports these efforts by laying the groundwork for exchanging the core state data. The WSWC serves as a foundational hub for the Internet of Water, and promotes related FAIR data standards (Findable, Accessible, Interoperable and Reproducible). Greater interoperability and consistent data standards to facilitate decisionmaking are goals of the program.

The WSWC co-hosted a Water Information Management System (WIMS) workshop with NASA's Western Water Applications Office (WWAO) in 2018 and in September 2019 cohosted a WIMS workshop with USGS. Other events were planned, before meeting and travel restrictions were imposed due to the Covid-19 pandemic. In August 2023, the WSWC hosted a National Water Use Data Workshop in Salt Lake City, Utah.

On April 25, 2023, the WSWC publicly released its Western States Water Data Access and Analysis Tool (WestDAAT) with data for over 1.7 million water rights, including where available, in a machine-readable format, ownership, point of diversion, place of use, purpose of use, and priority date. For the first time, such information was presented in a user-friendly format across state lines. Work continues to add data to the tool, including state time series data related to state streamgages, wells and reservoirs. A significant amount of outreach with various state and federal agencies, and public and private stakeholders was involved in the development and production phases of WestDAAT's release. Such outreach continues.

2023-2024: WSWC is working to support specific use cases of the data, including a streamlined, spatially and temporally consistent water budget implementation for selected states. WSWC will

also continue assisting participating member states to refine their data, find optimal ways to publish those data that are compatible with WaDE.

The Council will also continue working with member states, USGS, NASA and various federal agencies to gather and disseminate water resources data using WaDE and other resources. The Council continues to discuss with USGS ways of facilitating funding to states for water data through the WUDR program.

The Committee, through the Water Information and Data Subcommittee (WIDS) and various other work groups, will continue to gather information on state water availability and use data and summarize existing state capabilities. Work to help states develop, disseminate, visualize and review data on water availability will continue. The WSWC is seeking resources to maintain current efforts. A number of philanthropic foundations have provided support, as has the U.S. Bureau of Reclamation through its WaterSMART program

The WSWC working with an IT contractor has also completed scoping the effort and resources needed to incorporate OpenET (evapotranspiration data) into WestDAAT in order to tie measurable consumptive use with water rights and field boundaries. Such capabilities would help facilitate efforts to conserve water for various private and public purposes. The WSWC is working with the Upper Colorado River Commission and other interests to help expedite and simplify initiatives such as the UCRC's System Conservation Pilot Program.

Subcommittee: Sam Hermitte (TX), Lisa Williams, Natalie Mast (AZ), Mat Weaver, Linda Davis (ID), Ken Stahr (OR), Julie Cunningham, Kent Wilkins (OK), Gary Darling (CA), Todd Adams, Candice Hasenyager (UT), Lane Letourneau, Ginger Pugh (KS), Nancy Barber (USGS), Allison Danner (USBOR), Dwane Young (USEPA), Forrest Melton (NASA)

Timeframe: Ongoing

2. WESTERN WATER OBSERVING SYSTEMS

Background/Work-to-date: The Council has a long history of working to support federal programs to maintain and improve the observation, measurement, monitoring and management of western water resources and related data, including related Interior, NASA, NOAA and USDA programs (see Positions #473 Sept. 2021; #487 Oct. 2022; and #500 May 2023). Such programs include but are not limited to USGS cooperative streamgaging and groundwater monitoring, NRCS snow survey and water supply forecasting, NASA/USGS Landsat, and EPA water quality monitoring. These data are important for a number of applications. Some examples include, but are certainly not limited to: (a) state and regional water planning and water rights administration; (b) local watershed and urban planning and development; (c) analyzing water balances and water budgets; (c) siting of electric power generation and other energy production facilities; and (d) enabling a better understanding of the links between energy, water quantity, and water quality.

2024-2025: The WSWC will communicate the critical need for federal water data related programs and will revise and renew its message to better bring attention to water data needs and develop strategies to meet those needs. Consistent reliable future funding will be one major focus.

There are a number of items under this functional area. Part of this effort will be to highlight critical measuring and monitoring “tools” for any water management “toolbox,” and communicating their value for enhancing our ability to wisely manage water resources. This includes working with Congress on authorizations and appropriations, as well as with the Administration on budget requests and program implementation.

Subcommittee:

Timeframe: Ongoing

3. SUB-SEASONAL to SEASONAL PRECIPITATION FORECASTING

Work to date: The Western States Water Council (WSWC) and California Department of Water Resources (CDWR) have entered into a number of agreements to assist with efforts to improve sub-seasonal to seasonal (S2S) forecasting skill (2 weeks to one year). Several workshops were held in between 2015 and 2019. The Council prepared a report on these meetings and an outreach publication with recommendations to NOAA on improvements regarding sub-seasonal to seasonal precipitation forecasting. Additional workshops in 2020 were precluded by the pandemic.

In 2020, NOAA released a report to Congress on efforts to improve S2S forecasting, as required by the Weather Research Act of 2017. The report recommendations included developing four pilot projects. In 2022, the WSWC worked with its members and congressional staff to encourage support for appropriations to initiate work on a western pilot project.

2024-2025: Additional S2S workshops have and will be held, and the Council will otherwise work to support federal efforts to improve our predictive capabilities and skill. The Council will support efforts to acquire sufficient federal appropriations for appropriate programs. The WSWC will also work to promote federal funding to implement the 2017 Act, and the recommended S2S pilot projects in the West. (Position #491, May 2023)

Subcommittee:

Timeframe:

4. RESEARCH to OPERATIONS (R2O)/TECHNOLOGY TRANSFER

Background: Too often promising water resources related discoveries and scientific advances fail to lead to widespread improvements, for a variety of reasons, some technical, but often institutional, financial, economic or political. Research to Operations (R2O) and technology transfer success requires advance planning and effective partnerships that are often lacking. Academic and government research agencies may focus on important basic research, but even applied research organizations are generally not designed and staffed to bridge the so-called “valley of death” between researchers and those entities and individuals that can successfully envision and leverage resources to add value to that research through management, policy and operational changes.

Work to date: In August 2019, in cooperation with NASA’s Western Water Applications Office (WWAO), the Council sponsored a workshop intended to identify and begin to address the challenges inherent in effectively moving research advances towards improvements in water resources management and project operations. The workshop brought together partners from federal and state agencies that have experience with technology transfer, or that have programs that could be adopters of new technology and remotely sensed information products. Next steps were outlined in the workshop summary report.

A second planned WSWC/NASA workshop was postponed due to the pandemic. Future workshops would build upon the insights identified and connections established to: (1) strengthen agency partnerships and continue building an inter-agency community to facilitate R2O in water resource management; (2) develop WSWC’s WestFAST network to help transition new technologies and information products for water resources management to operational federal programs, including, but not limited to, remote sensing-based measurement technologies and sub-seasonal to seasonal (S2S) weather forecasting; and (3) develop a strategy for raising awareness and support within state and federal government agencies for R2O.

2024-2025: The Committee will consider holding another workshop to identify best practices to transfer applied research to operational programs working with western federal, state, and local water agencies and tribes.

5. DROUGHT, NIDIS and EXTREME WEATHER EVENTS

Work to Date: Drought is a recurring natural phenomenon, the effects of which can be minimized through appropriate planning and preparedness activities. The Council has expressed its support for federal applied research and hydroclimate data collection programs to assist water agencies at all levels of government in adapting to weather extremes and climate variability and change (Positions #500 May 2023 and #473 September 2021). The Council also supports development of an improved western observing system for extreme precipitation events and research to better understand hydroclimate processes (Position #483 Aug. 2022). The Council’s Executive Director serves as Co-Chair of the National Integrated Drought Information System (NIDIS) Executive Council with NOAA and USDA.

2024-2025: The Committee will continue working to improve preparedness and response to drought, floods and other extreme events in cooperation with member states, the WGA and WestFAST. The Council will also continue to support and advise WGA and NOAA with respect to NIDIS, and other weather/climate monitoring and adaptation efforts (including RISAs work). The Council will work to evaluate proposed climate, drought and weather legislation and drought related authorities and programs of federal agencies, and support appropriate authorizing legislation and appropriations.

Subcommittee:

Time Frame: Ongoing

6. GROUNDWATER RECHARGE PROJECT PROGRAMS & POLICIES

Work to Date: The Council has in the past addressed groundwater management programs and policies, including recharge and aquifer storage and recovery projects. The Council prepared a number of reports covering financial feasibility, legal and institutional issues, and water reuse for recharge (1990-2012). Much of the work is now dated, and many changes have taken place.

2024-2025: Working with the Legal Committee and the Council, the Committee will update past reports on state groundwater management programs and especially efforts to promote conjunctive use of surface and groundwater resources through artificial aquifer storage and recovery projects. This may include the use or reuse of waters of impaired quality.

Subcommittee:

Timeframe:

7. WESTERN WATER INFRASTRUCTURE PROJECTS AND PROGRAM FUNDING

Work to date: Many western states face overwhelming infrastructure financing needs, as well as declining budgets for ongoing services. The Council's origins are associated with challenges to augment and better manage the West's water supply, which continues to be a priority. The Council has in the past prepared reports on state water resources programs and project cost sharing and financing and analyzed state water use fees. The Council has also convened symposia and workshops and summarized the proceedings. Further, the Council has compiled summaries of western state infrastructure financing authorities, funding sources, policies and programs. Further, the Council has supported expenditures from the Reclamation Fund for authorized project purposes, including specifically authorized rural water supply projects and authorized projects as part of negotiated Indian water rights settlements.

2024-2025: The Council will continue to call on the Congress to ensure that revenues raised from the development of western resources, specifically revenues accruing to the Reclamation Fund, are appropriated and expended as intended for the development and management of western water resources (consistent with Position #501, May 2023). The Council will otherwise support efforts to secure adequate federal funding to meet growing western water demands, and work to develop a strategy to communicate important infrastructure needs. The Council will promote development of public-private partnerships to support this effort. As conditions permit, the Council will sponsor a symposium on infrastructure needs, strategies, and federal and state programs, under the direction of the Executive Committee, with WestFAST's assistance and in cooperation with other non-federal and federal interests. Regulatory streamlining is also important for water resource projects. The Council will work with the Administration and Congress towards successful water project development. Finally, the Council will provide a summary of western state water financing authorities and programs, as time and resources permit.

Subcommittee:

Time Frame:

8. ENERGY & WATER RESOURCES – INTEGRATED MANAGEMENT

Work to date: The increase in demands for water to meet energy needs is raising interest in the interrelationship between water and power resources, including opportunities to better understand the energy-water nexus and maximize efficiencies. The Council has addressed various aspects of energy issues as they relate to water resources as part of its regular meetings, including the demand for water resources created by new energy development. Hydraulic fracturing has been an issue and long standing practice with which the states have considerable experience. The use of water produced by energy development has also been discussed. The Council has also urged the Administration and Congress to support Department of Energy hosted energy-water programs conducted at national laboratories (Position #485, Aug. 2022). The Council has in the past participated with the Western Electric Coordinating Council (WECC) and related State Provincial Steering Group and Environmental Data Work Group.

2024-2025: As resources permit, the Council will continue to compile existing information through WaDE addressing water availability and anticipated demands for energy resources development (and the implications for water use in the West). Further, the Council will consider and evaluate any federal legislation and other potential collaborative efforts in addressing energy and water needs, as well as related water quality concerns. The Council will evaluate as appropriate specific energy and water-related issues as they arise, such as hydraulic fracturing, hydropower licensing, pumped hydropower projects, Clean Water Act Section 401 certification, and other practices.

Subcommittee:

Timeframe: Ongoing

Tab XYZ – Sunsetting Positions for Summer
2025 Meetings (#482 - #485)



**RESOLUTION
of the
WESTERN STATES WATER COUNCIL
on the
PRESERVATION OF RADIO FREQUENCIES
NECESSARY FOR WEATHER FORECASTING AND
WATER MANAGEMENT**

**Polson, Montana
August 5, 2022**

WHEREAS, the Administration has launched a \$45 Billion “Internet for All” Initiative to Connect Everyone in America; and

WHEREAS, National Telecommunications and Information Administration (NTIA) sets policy regarding allocations and regulations governing the federal spectrum use, assigns frequencies, and participates in all aspects of the Federal government's communications related emergency readiness activities; and

WHEREAS, the Federal Communications Commission has been aggressively engaged in efforts to make as many frequencies of the radio spectrum as possible available for commercial broadband and wireless technologies, licensed and unlicensed; and

WHEREAS, legislation has been introduced that would require an estimation of the value of the electromagnetic spectrum assigned or otherwise allocated to federal entities, between 3 kHz and 95 GHz; and

WHEREAS, a proposed basis for estimation is “the value that the electromagnetic spectrum would have if the spectrum were reallocated for the use with the highest potential value of licensed or unlicensed commercial wireless services that do not have access to that spectrum as of the date of the estimate...while preserving the spectrum access necessary to satisfy mission requirements and operations of Federal entities;” and

WHEREAS, much of the nation’s data for emergency and administrative information on weather, river and streamflows, groundwater and forest fires are transmitted from remote platforms to satellites (GOES and POES) and then to “direct receive or downlink” stations on the 1675-1710 MHz range of the spectrum; and

WHEREAS, Earth-observation satellites use several radio frequency bands tied to the physical properties of the scientific measurements, including water vapor (23.8 GHz), rain and snow (36-37 GHz), atmospheric temperature (50.2 – 50.4 GHz), clouds and ice (86 – 92 GHz) and others; and

WHEREAS, sharing bandwidth, or noise from adjacent bands on the spectrum with inadequate controls, has the potential to interfere with the quality, accessibility, and utility of Earth-observation satellite data and data collected and transmitted from remote platforms on earth to satellites; and

WHEREAS, significant public and private funds have been invested to establish our satellite and ground networks, many of which would be costly to replace, and some of which are irreplaceable; and

WHEREAS, the serious, unintended consequences of data interference may include degradation in short-term weather forecasts; loss of data for streamgaging and water monitoring networks; ability of state and federal agencies to prepare for and respond to floods, fires, and extreme weather events; the ability of western states to administer and manage their scarce water resources and water quality programs; and risks of loss to human life, health, welfare, property, and environmental and natural resources.

NOW, THEREFORE, BE IT RESOLVED that the Western States Water Council supports efforts to preserve frequencies needed for weather forecasting, streamgaging, and related water and emergency management information needs.

BE IT FURTHER RESOLVED that the Council supports interagency coordination between the NTIA, FCC, NOAA, USGS and other state and federal agencies, to quantify and analyze the effects of commercial broadband use on satellite observation data and transmissions.

BE IT FURTHER RESOLVED that the Council supports a meaningful evaluation of the existing government and potential alternative uses of the electromagnetic spectrum without discounting the costs of natural disasters and degradations in data needed for water management decisions, and with input from the States as appropriate.



**POSITION STATEMENT
of the
WESTERN STATES WATER COUNCIL
in support of
STRENGTHENING THE RESILIENCY OF OUR NATION
TO THE IMPACTS OF EXTREME WEATHER EVENTS**

**Polson, Montana
August 5, 2022**

WHEREAS, the West and the Nation continue to suffer the effects of increasingly extreme weather events, including tornadoes, hurricanes, extreme precipitation, flooding and drought, resulting in the loss of life and economic, social, and environmental damages; and

WHEREAS, Western States have recently experienced extreme seasonal and year-to-year weather volatility that has brought record or near-record events with floods, followed by drought and wildfires, as well as devastating tornadoes, all threatening public safety and property, and often taxing the capacity of our aging water infrastructure; and

WHEREAS, widespread flooding along many western rivers and streams, including the Clark Fork, Flathead, James, Tanana, Yellowstone, and others, have demonstrated the continuing need for more flood control capacity and early warning systems, with timely and accurate forecasts; and

WHEREAS, there is a need for developing new monitoring technologies such as remote sensing that provide more timely data availability and better spatial coverage for assessing flooding and drought impacts; and

WHEREAS, prolonged drought increasingly afflicts the West and the Nation, and affects the performance of interstate compacts and international treaties; and

WHEREAS, extreme prolonged drought has led to the cooperative development and implementation of the Drought Contingency Plans (DCPs) by the Seven Colorado River Basin States, the United States and Mexico and calls by the Department of the Interior for further reductions in water use; and

WHEREAS, flood control, drainage and other water resource issues also involve relations with Canada, including negotiations over renewing the Columbia River Treaty; and

WHEREAS, present water resources planning and sound decision-making depends on our ability to understand, monitor, predict, and adapt to droughts, floods, extreme storms, and other weather events; and

WHEREAS, in the West, sound decisionmaking demands accurate and timely data on precipitation, temperature, soil moisture, snow depth, snow water content, streamflow, and similar information; and

WHEREAS, investments in observations, research, forecasting, and monitoring the development of extreme weather events provide an opportunity to significantly improve real-time water rights administration, planning and project design, and operations to maximize storage, avoid or minimize the loss of life and property, as well as mitigate economic and environmental damages; and

WHEREAS, the Weather Research and Forecasting Innovation Act of 2017 was reauthorized in 2019, together with the National Integrated Drought Information System Act, and both are soon due for reauthorization; and

WHEREAS, the Council continues to support NOAA's National Integrated Drought Information System, implementation of the Weather Research Act, and emergency drought response authorities for the Bureau of Reclamation and other federal agencies; and

WHEREAS, a National Academy of Sciences' report suggests a pathway and 10-year research agenda for advancing our capabilities with a vision of a decade from now using subseasonal to seasonal (S2S) forecasts as widely as we now use 5-10 day weather forecasts; and

WHEREAS, the Council has urged NOAA to implement the western pilot project for improving S2S precipitation forecasting contained in its 2020 report to Congress pursuant to the Weather Research Act; and

WHEREAS, NOAA has allocated minimal resources for improving the skill of S2S forecasts (forecasts extending from 3 weeks to 2 years); and

WHEREAS, western states' precipitation originates as storms moving over the Pacific Ocean and Gulf of Mexico, and the absence of key ocean observations constrains the ability to improve the skill of precipitation forecasting at near-term weather and S2S timescales; and

WHEREAS, advances in weather forecasting and research, such as that of NOAA's Hydrometeorological Testbed program on West Coast atmospheric rivers, demonstrate the potential for improving extreme event forecasting at the operational time scale; and

WHEREAS, the Council has supported development of an improved observing system for western extreme precipitation events, to aid in monitoring, prediction, and climate trend analysis associated with extreme storms; and

WHEREAS, there is a need for maintaining and improving existing monitoring networks that help provide early warning as well as tracking impacts of extreme events; and

WHEREAS, there is a need for improving precipitation forecasting at all time scales to support implementation of Forecast-Informed Reservoir Operations (FIRO); and

WHEREAS, there is a continuing need for greater collaboration between and among federal agencies, state agencies, local governments, non-governmental organizations and public/private organizations and businesses.

NOW THEREFORE BE IT RESOLVED, that the Western States Water Council supports as a high priority appropriate federal appropriations and actions to plan, prepare for and avoid, minimize or mitigate the impacts of extreme weather events, including implementing the S2S forecasting pilot project recommended in NOAA's report to Congress and implementing NOAA's proposed Precipitation Prediction Grand Challenge.

BE IT FURTHER RESOLVED that the Western States Water Council also supports legislation advancing the goals of: (1) minimizing the loss of life and property and economic, environmental and social cost from extreme weather events; (2) improving collaboration and coordination among agencies and organizations at all levels; (3) increasing consultation with state, local and tribal governments; (4) maintaining and enhancing data gathering and monitoring, as well as communication capabilities, identifying and addressing gaps and overlap; (5) identifying and addressing federal agency responsibilities, as well as regulatory and other preparedness and response barriers, (6) recognizing and addressing regional differences; and (7) advancing research within the physical sciences, and dynamical and statistical modeling to improve our S2S forecasting capabilities.

BE IT FURTHER RESOLVED that the Western States Water Council pledges to work with the Administration and the Congress to appropriately address current and future needs to improve S2S forecasting and extreme events response and resiliency.



**RESOLUTION
of the
WESTERN STATES WATER COUNCIL
regarding
HYDRAULIC FRACTURING**

**Polson, Montana
August 5, 2022**

WHEREAS, hydraulic fracturing is a process that injects sand, water, and other fluids, including various chemical compounds, underground to aid in the extraction of oil and natural gas; and

WHEREAS, hydraulic fracturing has been used for over 60 years in oil and gas production, with over one million wells having been fractured in the United States alone; and

WHEREAS, states have primary and exclusive authority over the allocation and administration of rights to the use of water used in hydraulic fracturing operations; and

WHEREAS, states have decades of experience, knowledge, and information regulating hydraulic fracturing and other oil and gas activities, and making decisions regarding the protection of their water resources; and

WHEREAS, states are best positioned to regulate hydraulic fracturing because of their understanding of regional and local conditions and their ability to tailor regulations to fit the needs of the local environment.

NOW, THEREFORE, BE IT RESOLVED, that federal efforts involving hydraulic fracturing, including efforts to study potential adverse impacts on water quantity and quality, should leverage state knowledge, experience, policies, and regulations.

BE IT FURTHER RESOLVED, that federal efforts to study the potential impacts of hydraulic fracturing on water resources should be based upon sound science and driven by states' research and policy priorities.

BE IT FURTHER RESOLVED, that the Western States Water Council opposes any and all efforts that would diminish the primary and exclusive authority of states over the allocation of water resources used in hydraulic fracturing.



**RESOLUTION
of the
WESTERN STATES WATER COUNCIL
urging the
ADMINISTRATION AND CONGRESS
TO SUPPORT WATER RESEARCH AND DEVELOPMENT PROGRAMS
at the
DEPARTMENT OF ENERGY NATIONAL LABORATORIES**

**Polson, Montana
August 5, 2022**

WHEREAS, the Western States Water Council (the Council) has long recognized that water and energy resources are interdependent – using one requires the other – and this presents a particular challenge in the West, where energy demand continues to rise while water supplies are increasingly stressed; and

WHEREAS, integrating, protecting, and wisely managing our national water and energy resources for the benefit of our present and future generations, is increasingly important; and

WHEREAS, one purpose of the Council is to accomplish effective cooperation among western states (and our federal partners) in the conservation, development and management of water resources; and

WHEREAS, a second purpose of the Council is to maintain vital state prerogatives, while identifying ways to accommodate legitimate federal interests; and

WHEREAS many watersheds are already fully-appropriated, and new stresses are emerging from climate, population growth, land use changes and water needs for energy development and production; and

WHEREAS, there is growing concern, particularly in the Arid West, over our ability to continue to supply water of adequate quality in quantities needed to sustain current and future uses, including energy, as well as agricultural, municipal and environmental uses; and

WHEREAS, the failure to provide for such needs would have significant regional and national consequences; and

WHEREAS, present water and energy resources planning and sound future decision-making depends on our ability to understand, monitor, anticipate and adapt to changing conditions; and

WHEREAS, electricity generation and other energy development is a significant driver of present and future water demands and the expertise and research of the national labs can supplement and enhance the ability of state, local and tribal water managers to understand and develop adaptation strategies; and

WHEREAS, water-related research at the Department of Energy's Office of Energy Efficiency and Renewable Energy, Office of and National Laboratories has included:

- exploring the energy-water nexus;
- highlighting energy-water-carbon nexus challenges and opportunities;
- developing unique multisector and multiscale model frameworks to address critical planning and operational decisions at the energy-water-land nexus;
- evaluating synergies between energy and water infrastructure to improve reliability and resiliency;
- understanding interactions among atmospheric particles, clouds, the land surface, and human activities;
- providing decision science, support and informatics for balancing water supply and demands;
- developing domestic water use projections;
- decreasing water and energy demands through efficient use;
- promoting sustainable groundwater management and storage opportunities while reducing cost and energy demands and insuring water quality;
- advancing next-generation hydropower and pumped storage systems;
- modernizing irrigation;
- increasing the safety, security, and sustainability of water infrastructure through the development of advanced technologies that create new water supplies;
- improving desalination membranes;
- managing water in a low-to-no snow future; and
- conducting research and development in hydrogen production, delivery, and storage for multiple end uses.

WHEREAS, such research should be guided by state needs as expressed in state water and energy planning documents and through state planning processes with a focus on water resource demands and water quality impacts; and

WHEREAS, in the West, States in compliance with State law have exclusive authority over the appropriation and adjudication of water rights for all uses, and the allocation of water for energy development, including the determination of whether or not there is any unappropriated water available for use.

NOW, THEREFORE, BE IT RESOLVED that the Western States Water Council urges the Administration and the Congress to recognize the value of Department of Energy hosted energy-water programs and research conducted at National Laboratories undertaken in collaboration with state water resources agencies, including but not limited to work at: the Idaho National Laboratory (INL); Lawrence Berkeley and Lawrence Livermore National Laboratories in California; Los Alamos and Sandia National Laboratories in New Mexico; the National Renewable Energy Laboratory (NREL) in Colorado; and Pacific Northwest National Laboratory (PNNL) in Washington, that collaboratively links federal energy research programs and water issues of concern to the western states.

BE IT FURTHER RESOLVED that the Western States Water Council urges the Administration and the Congress to encourage collaboration and cooperation between the National Laboratories and other federal agencies, including but not limited to the National Oceanic and Atmospheric Administration (NOAA), U.S. Bureau of Reclamation (USBR) and U.S. Geological Survey (USGS) to leverage federal expertise and resources (including supercomputing power; climate and precipitation site sensitivity analysis; systems analysis, integration, and security, etc.) in addressing the Nation's water-related challenges.

BE IT FURTHER RESOLVED that the Western States Water Council urges the Administration and the Congress to recognize the primary role of the States in allocating water for energy.