WESTERN STATES WATER COUNCIL

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PCAST Groundwater Working Group
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Subject: State Groundwater Management and Protection

Dear PCAST Groundwater Working Group Co-Leads and Members:

The Western States Water Council (WSWC) is a bi-partisan government entity created by Western Governors in 1965, representing eighteen States. Our members are appointed by and serve at the pleasure of their respective Governors, advising them on water policy issues. Our mission is to ensure that the West has an adequate, secure, and sustainable supply of water of suitable quality to meet its diverse economic and environmental needs now and in the future. Two of our WSWC position statements related to groundwater are summarized below.[1]

Water in the West is an increasingly scarce and precious resource. Groundwater is a critically important resource that is vital to the economy and environment of the arid West. Western States recognize the importance and role of comprehensive groundwater planning in overall water management. The conditions affecting groundwater supplies, demands, and quality vary considerably across our individual member States, and we anticipate that their comments will reflect these variations. States are in the best position to protect groundwater quality and quantity. Western States understand and have demonstrated effective and comprehensive groundwater management policies, programs, and projects. They have shown the ability and authority to protect, allocate, and administer groundwater resources through state laws and regulations tailored to their individual circumstances. Working cooperatively with their federal partners, States have also shown that they have the ability and authority to address federal needs regarding groundwater within existing legal frameworks, including but not limited to, memoranda of understanding, water rights compacts, stipulations, and other methods.

States have exclusive authority over the allocation and administration of rights to the use of the groundwater located within their borders and are primarily responsible for allocating, protecting, managing and otherwise controlling the resource. Federal agencies should work cooperatively with appropriate state agencies and officials to address federal needs involving groundwater through state laws and authorities. The WSWC opposes any and all efforts that would establish a federal ownership interest in groundwater not otherwise recognized or allowed under state law, or diminish the primary and exclusive authority of States over groundwater. Wisely, the United States' Congress and court system have long upheld States' exclusive authority over the allocation and administration of rights to the use of

[1] See https://westernstateswater.org/wp-content/uploads/2023/09/506_Groundwater-Quality-Resolution.pdf and https://westernstateswater.org/wp-content/uploads/2024/03/515-State-Primacy-over-Groundwater-14March2024.pdf

water within their borders.[2] Federal administrative actions have also followed a longstanding policy of deferring to the States to develop and implement groundwater management and protection programs. Any Administration effort to exert control over groundwater or otherwise infringe upon States' authority over groundwater are contrary to existing federal law and threaten effective groundwater management and protection.

Efforts to safeguard water security should be conducted with careful adherence to the principles of cooperative federalism and deference to States' respective laws, policies, and programs. No future administrative initiatives should attempt to usurp States' rights and prerogatives related to the management and protection of groundwater resources. Any federal groundwater strategies must recognize and respect States' primacy, reflect a true state-federal partnership, and provide adequate funding consistent with current federal statutory authorities and regulatory mandates.

Attached are responses to the specific working group questions, which are intended to serve as illustrations from a western regional perspective rather than exhaustive lists. On behalf of the WSWC, we look forward to further conversations with PCAST related to this effort.

Sincerely,

Tony Willardson
Executive Director

[2] See, e.g., the Mining Acts of 1866 and 1870, the Desert Land Act of 1877, § 8 of the Reclamation Act of 1902, § 10 of the Federal Water Power Act of 1920, § 1 of the Flood Control Act of 1944, § 301(a) of the Water Supply Act of 1958, § 101(b) and (g) of the Clean Water Act of 1972, *Oregon Power Co. v. Beaver Portland Cement Co.*, 295 U.S. 142 (1935), *County of Maui v. Hawaii Wildlife Fund*, 140 S. Ct. 1462, 1471-72 (2020).

Groundwater Working Group Questions

1. How can we enhance the timely collection of data on groundwater inventory, use, recharge, and flow across the United States to gain a whole-of-country picture of the nation's groundwater resources?

WSWC principles declare, "All levels of government must prioritize the collection, analysis and open sharing of reliable data regarding water availability, quality, and usage given its importance to research for sound science and data driven decision making." Federal agencies should work cooperatively with appropriate state agencies and officials to address both federal and state data needs involving groundwater, and to disseminate data as appropriate in a findable, accessible, interoperable, and reusable way.

All Western States administer rights to the use of groundwater and have various sources of data related to water use. The WSWC's Water Data Exchange (WaDE) program has provided access to data and metadata for some 3 million western state water rights, including ownership, point of diversion and place of use, surface or groundwater sources, and allowed diversions measured by flow or volume. This water rights data is available via a user-friendly dashboard referred to as our Western States Water Data Access and Analysis Tool (WestDAAT). The WSWC is also working with the U.S. Bureau of Reclamation to incorporate water rights and open evapotranspiration (OpenET) data as a measure of consumptive use, including groundwater use. Similar support for state efforts is likely to be the most effective and efficient means of securing more comprehensive and timely data on groundwater.

Further, States require drilling logs for water wells that can provide data on water levels and changes over time. States also operate monitoring wells with data available in varying formats on both water quantity and quality. Some States require flow meters on groundwater wells and periodic reporting of use. Others use indirect measurements, such as monitoring power used for pumping groundwater. Remote sensing to measure evapotranspiration and consumptive use by agriculture and other outdoor uses continues to expand using both aerial surveys and satellite imagery.

The WSWC strongly supports existing federal programs critical to addressing groundwater challenges, such as the National Aeronautics and Space Administration's (NASA) and U.S. Geological Survey (USGS) land imaging programs. Past and present Landsat satellites (Landsat 7,8 & 9), and the Landsat Next mission, provide thermal infrared imagery that many Western States are using to measure and monitor water use, including groundwater use, to administer water rights, and to inform water resources planning and management. The NASA-ISRO SAR (INSAR) Mission enables Synthetic Aperture Radar Interferometry (InSAR) using radar satellites to observe and monitor the ground surface and map topography and detect surface changes. InSAR, can be used to measure land subsidence due to groundwater extraction. Light Detection and Ranging (LiDAR) is another useful tool for precision topographic measurements.

Based on NASA's capabilities, Open Evapotranspiration (OpenET) uses best available science to provide easily accessible satellite-based evapotranspiration (ET) data for improved water management across the western United States. Using the Data Explorer or Application Programing Interface (API), users can

access OpenET data at the field scale for millions of individual fields or at the original quarter-acre resolution of the satellite data.

The USGS Water Resources Mission area covers important programs related to groundwater data. USGS works in collaboration with federal, state and local data providers as partners to monitor groundwater levels using the framework of the National Groundwater Monitoring Network (NGWMN). USGS also provides federal support for a Climate Response Network (CRN) with continuous, real-time instrumentation designed to provide data on long-term groundwater levels. These data are vital to water-availability studies and assessments which seek to evaluate the balance between supply and demand and the relative influence of individual components in affecting that balance and achieving water security.

The SECURE Water Act (42 U.S.C. §10368) authorized a program that supports activities related to data collection and methods research and development at the State level. The USGS Water-Use Data and Research program (WUDR) provides financial assistance through cooperative agreements with water resource agencies in States to improve the availability, quality, compatibility, and delivery of water-use data that is collected or estimated by States, including groundwater use data. USGS support for state water data gathering plans and implementation is limited. Some States have taken full advantage of WUDR funding and exhausted available funding, while others have not, often due to the prohibitive administrative burden. Further support for States' efforts is needed.

The Bureau of Reclamation plays a significant role in certain western states with respect to developing, funding, and delivering water to local recharge or water banking initiatives. It is essential that the Bureau coordinate with and consult state agencies when conducting these activities to ensure state groundwater management strategies and water rights considerations are incorporated.

2. How can we effectively model and predict changes in the inventory, recharge, and flow of groundwater in the context of the overall water cycle and provide that information to stakeholders and decision-makers?

Effectively modeling changes in groundwater availability requires enhanced data collection, inventorying, and monitoring best accomplished through state-federal partnerships and collaborative data management. Funding for water modeling, water budgeting and water data sharing will allow state and local management agencies to make informed, timely, coordinated decisions within their respective legal frameworks.

While the WSWC is primarily a policy advisory body, our member states have spent several decades collecting information about and developing expertise to better manage their respective and sometimes overlapping aquifers. For example, in 1980, Arizona passed a Groundwater Code that established Active Management Areas (AMAs) to address the effects of large-scale groundwater withdrawals on groundwater resources. Additionally, all water wells in Arizona must be registered with the Arizona Department of Water Resources (ADWR). California's Department of Water Resources (DWR) has used groundwater models for at least 40 years to simulate interactions of river basins, groundwater basis, and water projects in the Central Valley. The California DWR provides extensive technical support for local agencies on groundwater modeling, including serving modeling code,[3] has invested in a massive statewide mapping and analysis program to characterize areas suitable for recharge,[4] and has pioneered a

[3] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/FAQ-and-Fact-Sheets/SGMA-Data-Tools-and-Reports-Fact-Sheet_2023.pdf
[4] https://data.cnra.ca.gov/dataset/aem

FloodMAR program.[5] Idaho has been a leader in the modeling of groundwater use and changes in groundwater levels and the impact of both surface and groundwater availability in the Snake Plain Aquifer. Kansas has developed several groundwater flow models for various basins. Nebraska has developed a number of models simulating the interaction between surface and groundwaters. Oregon has developed groundwater flow models in four basins and uses them to evaluate options for groundwater management. These models and their foundational studies were conducted in collaboration with the U.S. Geological Survey with support from its Cooperative Matching Funds (CMF) program. The CMF program supports such applied, collaborative science across the country, and limited availability of these funds constrains the nation's capacity for data-informed resource management. Expanding CMF funding for the USGS Water Availability and Use Science Program (WAUSP) budget area will directly and efficiently provide additional capacity to effectively model and predict changes in groundwater quantity and ensure that information is both peer-reviewed and readily available to stakeholders and decision-makers through USGS publications and data products. Texas has developed groundwater availability models (GAMs) that include comprehensive information on each aquifer: such as recharge; geology and how that conveys into the framework of the model; related rivers, lakes, and springs; water levels; aquifer properties; and pumping. Each model is calibrated to ensure that the models can reasonably reproduce past water levels and groundwater flows.

3. How can we efficiently scale groundwater recharge while mitigating risks? How can we ensure clean and safe groundwater, especially for the communities that are affected most by groundwater contamination and depletion?

Many Western States have decades of experience with groundwater recharge programs and projects, particularly in the Southwest. In the 1990's, the WSWC worked with the U.S. Bureau of Reclamation to evaluate legal and institutional issues related to a number of groundwater recharge demonstration projects.[6] Some of the findings are summarized below.

Groundwater recharge projects are very site specific for hydrologic, geologic, economic, legal, and regulatory reasons. Projects are generally undertaken at a private or local government level to augment water supplies and ensure the reliability of existing water supplies. The highly variable and uncertain nature of natural precipitation and snowpack runoff in the West is often both a reason for and an obstacle to successful recharge projects. Not all aquifers are suitable candidates for groundwater recharge. Project sponsors must take into consideration the porosity or fractured nature of the underlying sediments or bedrock; the timing of the intended storage and recovery and whether the water will stay in the desired location or migrate; and the chemistry of the recharge water, the receiving water, and the surrounding aquifer geology. Project costs for upfront capital financing have generally been recovered through general tax revenues or water and sewer user fees. Unit costs of water are sensitive to such factors as project scale and production levels, and municipal projects have historically had a higher probability of success given the economies of scale and higher water values. In the West, water rights are similar to property rights, and state water laws regarding beneficial use and the administration and allocation of water can impose some constraints on the intended benefits of groundwater recharge projects. Local planning and zoning requirements can substantially increase the costs of municipal recharge projects. State and federal laws protecting the quality of existing groundwater resources, particularly where those resources are used for drinking water, can also constrain groundwater recharge projects. Federal environmental oversight and regulatory requirements under the Clean Water Act, Endangered Species,

[5] See https://floodmar.org/ and https://water.ca.gov/programs/all-programs/flood-mar
[6] See Ground Water Recharge Projects in the Western United States: Economic Efficiency, Financial Feasibility, and Legal/Institutional Issues (Part I) (1990) and (Part II) (1998)

Act, National Environmental Policy Act, and Safe Drinking Water Act can substantially increase the cost of federally-supported projects, to the point of making them cost-prohibitive and outweighing the federal cost-share.

Successful agricultural recharge projects have used existing infrastructure and low-cost water, and often help maintain rural lifestyles. Small impoundments can significantly increase recharge. However, discharges to groundwater through infiltration are not clearly regulated, and non-point source pollution controls can have a significant impact on such recharge projects. Banking water through recharge activities offers water managers greater flexibility in meeting peak demands and providing protection from drought. However, finding water available for recharge is a primary constraint. Additionally, during drought when many water users turn to groundwater as an alternative resource, recharge facilities may be idle or operate at a fraction of their capacity due to the lack of an available surface water supply. Reclaimed water may be used for groundwater recharge if the water quality and water chemistry is suitable, however, there is still a public aversion to commingling water supplies. Public education and participation may help minimize conflicts and opposition.

Where there is a clear public interest or benefit in a groundwater recharge project, state or federal involvement may be both appropriate and necessary, including reimbursable public financing, cost sharing, and technical assistance, including investigative research and baseline data collection to facilitate decisionmaking, and monitoring water quality and quantity. State and federal surface water projects may be used as a resource where appropriate to encourage and integrate recharge opportunities.

For federal financial assistance, project purposes that may justify federal cost sharing include flood control, environmental and fish and wildlife enhancement, endangered species recovery, federal reserved water rights uses, international treaty obligations, public health, and water quality improvements. In evaluating the benefit/cost ratio, social costs and benefits should be included, such as environmental values and instream water uses. The development of accepted standards of measurement for such costs and benefits would facilitate public and private decisionmaking.

Two primary state concerns associated with groundwater recharge are: (a) the potential degradation of ambient groundwater quality and adverse effects on the current, or future use of an aquifer; and (b) the technical challenge of quantifying water available for recovery given the hydrogeologic uncertainty surrounding some proposed projects. States have an interest in ensuring that their water quality standards protect the beneficial uses of groundwater and that water is put to allowable beneficial uses. States have also been grappling in recent decades with how their legal and institutional systems govern recharge and recovery activities, seeking a balance between protecting existing resources and facilitating future resources. Some of the legal and institutional questions that arise with recharge activities include: (i) is groundwater recharge recognized as a beneficial use of surface water; (ii) is the right to withdraw groundwater protected, and is adequate information available to define the recoverable amount; (iii) are third parties with groundwater and surface water rights adequately protected; (iv) are public interest values adequately protected; (v) should groundwater protection be based on ambient quality, which may preclude the recharge of potable surface water and other waters, or preclude present and future beneficial uses?

Future construction and operation of successful recharge projects in the West will depend in large part on the ability of different public and private entities to cooperate, find common or compatible purposes, and work out collaborative working arrangements.

4. How can we engage with communities to successfully ensure a sustainable supply of groundwater, including for agriculture, industry, energy, human consumption, and healthy ecosystems and biodiversity?

Different sectors that rely on groundwater are best engaged through existing state and federal programs. Fully funding federal/state groundwater-related conservation programs, including Farm Bill programs would be an important step. Public education and stakeholder participation in programs that explain project costs, benefits, and legal and environmental constraints should be encouraged.

5. What strategies and incentives can help limit groundwater over-use?

Every Western State has addressed the problem of groundwater depletion and many have tied water supply planning, including groundwater management, to land use planning. State groundwater management plans, policies and programs should be the base for evaluating and implementing any federal strategies and incentives. For example, Arizona's Groundwater Management Act established specific management goals and requirements to address groundwater overdraft including a demonstration of a 100-year assured water supply in AMAs and adequate water supply outside of AMAs. More recently, in 2014, the State of California enacted the Sustainable Groundwater Management Act (SGMA) to better manage groundwater supplies. It requires local agencies to adopt groundwater sustainability plans for high- and medium-priority groundwater basins, aiming to balance the amount of water pumped out of and put back into a basin's aquifers. Idaho curtailments of junior groundwater users under prior appropriation laws have led to various agreements to share in the water shortages during dry years. The Nebraska, New Mexico, Kansas, and Nevada legislatures have funded programs for the voluntary retirement of groundwater rights. Oregon is collaborating with the Farm Service Agency (USDA) to launch the Harney Valley Groundwater Conservation Reserve Enhancement Program (HVG CREP), a voluntary program aimed at reducing consumptive water use by incentivizing landowners to voluntarily cancel groundwater rights and establish new conservation crops in exchange for payments.