



The President's Council on Science & Technology (PCAST)

Improving Groundwater Security
in the United States

Members of the Groundwater Working Group

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PCAST Recognizes

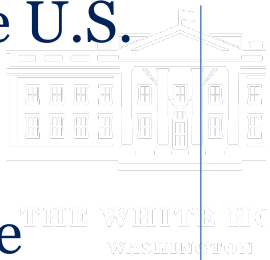


- Federal government has limited authority to regulate groundwater
- States have primary responsibility for creating and enforcing their own laws, policy, and regulations
- Groundwater system is heterogeneous across the Nation – in terms of geology, climate, economics, culture, politics
- Decentralized system allows states to address specific challenges and opportunities within their jurisdiction



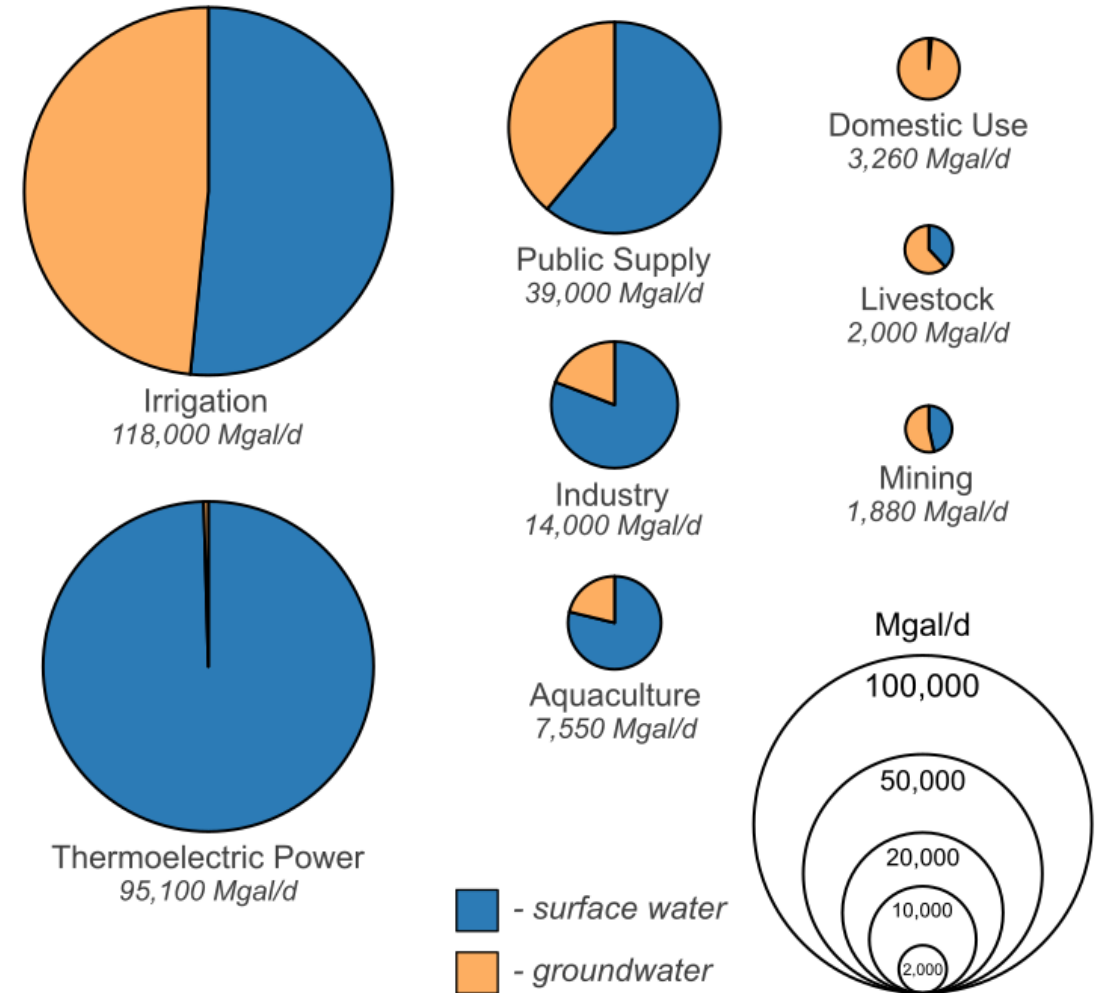
Groundwater

- Supplies drinking water for half the U.S. population
- Irrigation - 70% of groundwater use
- Groundwater from the West is embedded in agricultural products transported to the rest of the U.S. and in agricultural commodities exported globally.



Groundwater security and sustainability is critical for food security, health, and economy

Freshwater Withdrawals in the United States, 2015



<https://www.usgs.gov/media/images/source-and-use-freshwater-us-2015>



Consultations with Federal and State Agencies, Professional Associations, Academia, and Other Subject Matter Experts

April 2024: Blog to solicit public input

July 2024: Workshop in Tempe, AZ: 200+ participants (in-person, remote)



- State and local efforts are limited by available funds
- Limited accessibility to groundwater models and predictions
- Lack of standardization data protocols and metrics hampers sharing data and best practices
- There is a shortage of skilled workforce in groundwater science, management, and stakeholder engagement



This Report: Improving Groundwater Security in the U.S.



Focus on the Science and Technology aspects

- How can the Federal Government help state and local water managers?
- What research is needed now to safeguard water security and sustainability in the future?
- What are potential incentives the Federal Government can provide to promote sustainable quantity, quality and efficiency



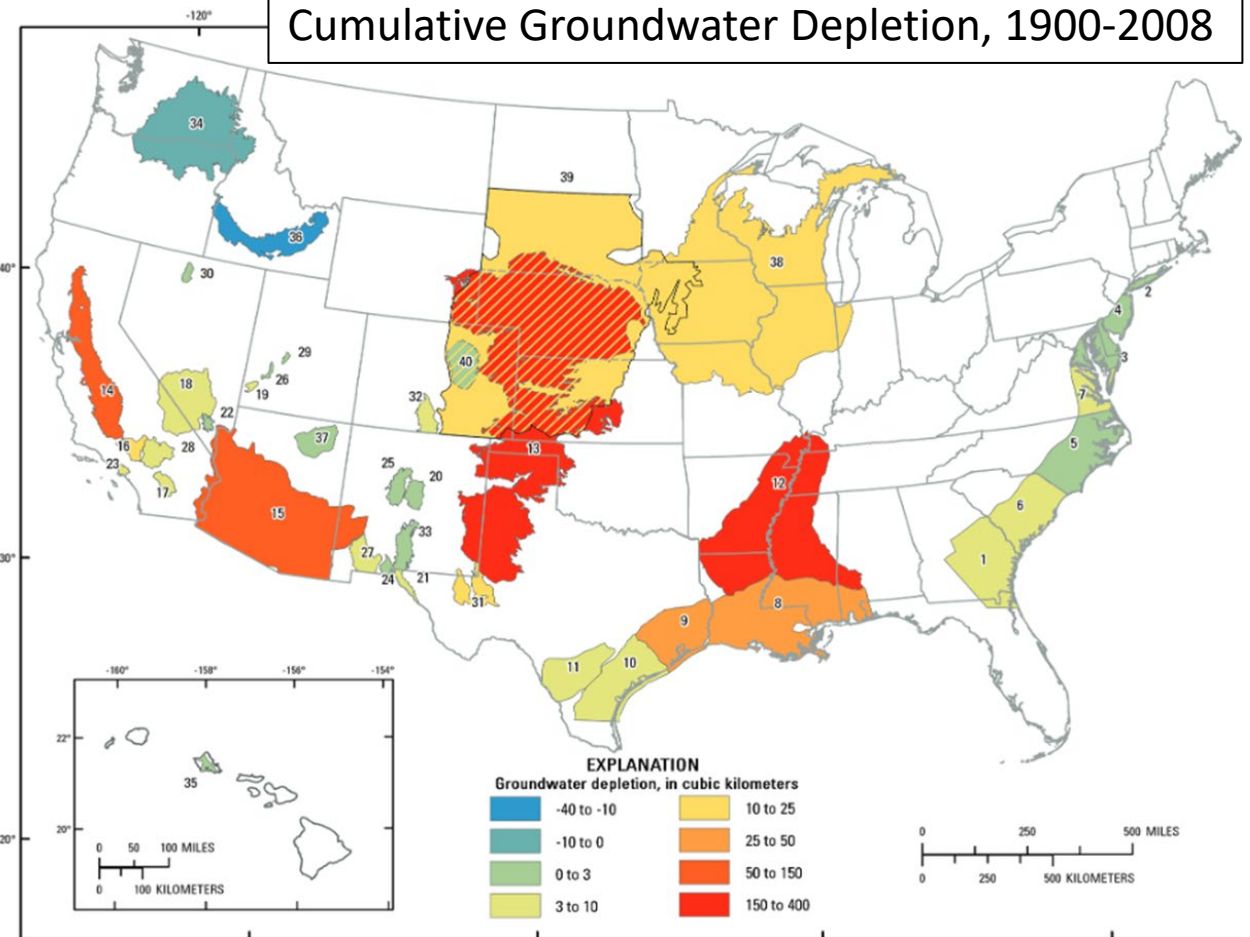
Decline in Groundwater Quantity and Quality is an Urgent Problem

Withdrawal > Recharge

- Much of groundwater is fossil water, >100,000 years old, cannot be replenished naturally, via precipitation and snowmelt, in centuries and millennia
- Changing climate and precipitation patterns exacerbate natural recharge constraints
- Increasing demand will further deplete groundwater storage and degrade water quality



THAT W



<https://www.usgs.gov/special-topics/water-scienceschool/science/groundwater-decline-and-depletion> (From Konikow, L.F., 2013, Groundwater depletion in the United States (1900–2008): U.S. Geological Survey Scientific Investigations Report 2013–5079, 63 p., <http://pubs.usgs.gov/sir/2013/5079>.)



Recommendation 1

Accelerate the development of a comprehensive repository for data and toolkits for groundwater storage, withdrawal, and recharge at spatial and temporal scales useful for water managers and users.

The U.S. needs the coordination and collaboration among all Federal and state agencies to facilitate comprehensive and reliable information on groundwater quantity and quality.

PCAST recommends that an **Interagency Group on Groundwater Security and Sustainability** be established to guide coordinate, coordinate and provide oversight of the data, software, and toolkits needed to do water accounting and prediction by local management, and to mitigate risk of water depletion.



1.1 Enhance the collection and synthesis of measurements on groundwater inventory and quality across the Nation.

PCAST recommends that the Interagency Group on Groundwater Security and Sustainability designate USGS as the lead agency to host all federal and non-federal data on groundwater inventory and use, to ensure common protocols and standards for groundwater monitoring and accounting, and to provide actionable information to facilitate planning and decision making.

1.2 Develop tools to enhance the Nation's capacity to manage groundwater sustainably, to support water management planning decisions, and to mitigate risk of groundwater depletion.

PCAST recommends that the Interagency Group on Groundwater Security and Sustainability establish a national framework to coordinate hydrologic modeling with consistent approaches to incorporate surface water and groundwater.



Recommendation 2

Establish a research program to advance technologies and strategies for safeguarding the future of groundwater supply and quality.

THE WHITE HOUSE
WASHINGTON

2.1 Develop a research program for comprehensive analysis of the chemical composition of groundwater

PCAST recommends a coordinated measurement program that deploys state-of-the-art techniques for molecular-level identification of hundreds of thousands of chemicals in water. The program should be built on the programs at EPA, DOE, USGS, and USDA that analyze the chemical composition of water, and should be partnered with NSF, academia, and the private sector.



2.2 Establish a national research program to advance technologies for groundwater monitoring, recharge, conservation, and reuse, as well as new water sources to reduce pressure on groundwater resources in different groundwater basins or aquifers.

PCAST recommends that the Interagency Group on Groundwater Security and Sustainability convene a national initiative on Managed Aquifer Recharge (MAR), to share knowledge about design and implementation of existing MAR projects across the Nation, to understand the barriers to implementation, and to share lessons learned. In addition, PCAST recommends enhancing research into new cost-effective ways to deliver water to replenish aquifers. These include technologies and strategies for MAR, long-distance pipeline transport of water, desalination, among things.

2.3 Support research that emphasize sustainable use of groundwater to enhance food security and biodiversity.

PCAST recommends that USDA Agricultural Research Service (ARS) and Economic Research Service (ERS) co-sponsor research programs that would provide the scientific underpinning for farm operators to adapt their operations to maintain sustainable use of groundwater.



Recommendation 3

Establish a federal incentive program and a network of groundwater engagement hubs, including Tribal Nations Groundwater Engagement Hubs, to support and assist in planning sustainable groundwater use.

Each hub in the network should be tailored to the local conditions and needs, and establish easily accessible platforms for local communities to understand their available groundwater resources. They should also provide access to the latest research into groundwater recycling, recharge, and reuse, as well as data to support informed decision-making on development, agriculture, and business expansion. The hubs in the network should share tools and strategies and lessons learned.



Recommendation 4

Create a competitive grants program to incentivize the planning, sustainable management, and restoration of aquifers, along with the surface waters critical to their recharge and cleanliness.

The program should be a component of the Administration's America the Beautiful Initiative and be coordinated by the Interagency Group on Groundwater Security and Sustainability. It should be jointly funded by the agencies that currently host incentives for groundwater management. The funding should be primarily in the form of federal incentives for the non-federal entities who have the authority to manage an integrated groundwater and surface water system. The grants program would coordinate and amplify now separate federal efforts to improve the lives of people who depend on these water systems, and in so doing create state and local political momentum to continue sustainable management.



Recommendation 5

Incorporate the valuation of groundwater resources into natural capital accounting and ensure these estimates are integrated into all federal cost-benefit analyses and planning.



PCAST fully endorses OSTP's development of methods to account for the value of natural capital and to use these valuations when making decisions across the federal government.



Recommendation 6

Launch a comprehensive campaign to recruit, develop, and retain a skilled workforce in groundwater science, management, and stakeholder engagement.



PCAST recommends that all federal agencies with responsibilities for and activities in groundwater should invigorate campaigns to recruit, develop, and retain workforce in groundwater science and management and stakeholder engagement. Partnerships with academic institutions, industry experts, and professional organizations can help create a pipeline of well-trained professionals equipped to address current and future challenges.



Improving Groundwater Security in the United States



Recommendations aim to help State and local groundwater managers and users.

Only through a comprehensive and scientifically – grounded, and informed approach can we secure groundwater for future generations and maintain the health and prosperity of our nation and its citizens.





whitehouse.gov/PCAST